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## **A Road Map for Sustainable Municipal Solid Waste Management In Lagos: Using Scotland As A Case Study Of Best Practice**

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### **ABSTRACT**

This paper presents a road map for sustainable Municipal Solid Waste Management (MSWM) in Lagos, using Scotland as a case study of best practice. Lagos status as an industrial and commercial hub of the Nigerian economy, complemented by its rapid population growth and urbanisation, has complicated the problem of achieving sustainable solid waste management, thereby making it a subject of concern in the literature. Various authors have expressed issues with the types of municipal solid waste generated, waste treatments, and barriers to sustainable municipal solid waste management in Lagos. The existing collection service in Lagos has been rated inefficient despite the weekly average evacuation exercise, as waste accumulation exceeded the existing storage and collection facilities, resulting in an unclean environment and significant environmental degradation. This study provides a view of waste management practices in Lagos and the lessons Lagos can learn from Scotland in achieving sustainable municipal solid waste practice. A total of eight interviews were conducted with authorities and experts involved in municipal solid waste in both Lagos and Scotland to gather their experience and opinions in their respective regions and analyse them thematically. The findings from this research highlighted some initiatives directed towards promoting sustainable waste practices in both Lagos and Scotland. These empirical findings were used to propose a framework that could be used to achieve a circular economy in Lagos and identify areas for improvement in Scotland. This would promote the creation of more jobs and a subsequent reduction in carbon emissions and raw material importation in both regions. Future work should involve informing actors in interviews to get a broader view and increase the accuracy of the data collected on MSW practice in Lagos and provide analysis of strategies used and their impact to engage communities and promote behaviour change towards sustainable MSW management practice in Scotland.

**Keywords:** Municipal Solid Waste, Management Practice, Lagos, Scotland.

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## 1. BACKGROUND TO THE STUDY

Municipal Solid Waste (MSW) is defined as the waste that the local government collects, which includes home waste, non-hazardous solids from businesses, institutions, and industries, as well as non-pathogenic hospital waste (Ebikapade and Jim, 2016). Rao, Sultana, and Kota (2017) described MSW as waste that includes residential waste and non-hazardous solid waste from industrial, commercial, and institutional establishments (including hospitals), in addition to market yard waste and street sweepings.

According to Thakur et al. (2018), municipal solid waste management (MSWM) is generally acknowledged as a complicated environmental service that includes at least three stages: collection, transportation, and treatment and disposal. MSW can be regarded as both a nuisance and a resource depending on the management strategies used for collection, treatment, and final disposal (Rao, Sultana, and Kota, 2017). MSW has a high organic content (between 40 and 60 percent) thereby offering a good opportunity for energy recovery with the right technology and may also result in serious environmental damage if not properly processed (Varjani et al., 2022; Yang et al. 2021).

According to Tiseo (2022), extrapolating from current levels, MSW generation globally would reach 3.4 billion tonnes annually, a 50% increase by 2050. However, due to the inadequacy and constrained MSW management techniques, developing economies are anticipated to account for more than 50% of this growth (Dangi et al., 2017). The majority of the Global South treats their MSW using straightforward, practical, and labour-intensive methods like open burning, open dumping, and landfilling (Keng et al., 2020). However, this is different in the Global North, where MSW is considered a resource and treated sustainably using capital intensive treatment methods like Pyrolysis, Anaerobic Digestion, and material recovery facilities, among others (Kabir and Khan, 2020).

Considering this, MSW management stands as an obstacle to accomplishing the Sustainable Development Goals (SDGs), particularly SDGs 11 and 12 in the Global South, which deal with sustainable communities and consumption, respectively (Vassanadumrongdee and Kittipongvises, 2018). In moving the MSW practice forward and appreciating the value and potential that MSW offers to promote sustainable development in developing economies in the Global South, in this instance, Lagos could land from the Global North, in this instance Scotland.

### 1.1 Statement of Problem

Lagos, as one of the fastest growing megacities in the world, faces significant challenges in managing its MSW. The city's rapid expansion has also resulted in a simultaneous rise in the production of solid waste and a strain on the existing waste systems, thereby necessitating the urgent development of comprehensive and sustainable waste management solutions (Chidiebere, Abubakar, and Shabako, 2018). MSW is a current problem in Lagos since it affects issues like human health, pollution of the air, water, and land, among others, necessitating a study of the main issues preventing effective management and a practical solution (Abila and Kantola, 2020). There is an urgent need to address the MSW challenges in Lagos and align Lagos with other sustainable cities around the world by adapting best practices to its unique context.



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The proposed study is set in the sensitive context of Lagos' MSW crisis and Scotland's outstanding achievements in waste management. Scotland has emerged as a model for effective waste management techniques because of its forward-thinking attitude to environmental sustainability through waste reduction, recycling, resource recovery and incorporation of circular economy approach (Scottish Environmental Protection Agency, 2020). Lagos can use Scotland's experiences to inform its adaptation and customisation of techniques that fit its cultural, economic, and infrastructure circumstances.

### **1.2 Objective**

The main objective of this study is to develop a comprehensive roadmap for sustainable MSW management in Lagos, using Scotland as an example of best practice. This would serve as a guide for policymakers, regulators, and stakeholders in other Nigerian cities.

## **2. LITERATURE REVIEW**

### **2.1 Municipal Solid Waste Management Practice in Lagos**

According to Fajonyomi, Ajulor, and Ibikunle (2021), the massive emigration of rural residents to urban regions is what is responsible for the rise in environmental pollution and solid waste output in the megacity of Lagos. According to a survey (Chidiebere, Abubakar, and Shabako, 2018) evaluating the solid waste management strategies used in the thirteen local government areas of Lagos, Lagos State's rate of municipal solid waste generation outpaces both the number of recycling businesses and the current management strategies. Olukanni and Oresanya (2018) reported that Lagos generates about 12,000 metric tonnes of waste daily at a generation rate per capita of 0.72 kg per person per day.

However, extrapolating from existing data, more than 15,000 tonnes per day should be produced as of now. Akoni (2015) noted in the Vanguard Newspaper on August 15, 2015, that the high volume of waste generated in Lagos causes drainage systems to become clogged, flooding to occur, and poor air quality due to the bad habit of tossing waste from moving vehicles and still dumping waste in unapproved areas. According to Akoni, solid waste encircles several compounds, including highways, causing traffic jams and environmental degradation.

Aderemi and Falade (2012) reported that landfills, which are best categorised as open dumps situated for convenience and typically involve the pitching of waste in already existing pits, are the simplest and most used method of disposing of municipal solid waste in Lagos. A survey (Joseph et al., 2022) argue that 74% of people do not separate their waste, and the main waste materials are food waste, plastic bottles, and nylon. A survey (Olatubosun et al., 2023) on MSW management strategies reported that most respondents had no idea how waste generation contributed to the depletion of natural resources and believed that waste management was the sole responsibility of the government. A survey (Ayadi and Alo, 2020) concluded that Lagos State's waste management system is ineffective, inefficient, and unsustainable. They advise reorganising waste management organisations immediately to ensure their effectiveness and efficiency.

## 2.2 Overview of Waste Management in Scotland

Scotland aspired to achieve a circular economy and a zero-waste society, which means reducing population demand for primary resources and maximising resource reuse, recycling, and recovery rather than treating them as waste (Scottish Government, 2023). According to Lochhead (2010), Scotland has already achieved significant strides in the fight against MSW by reducing the quantity of waste dumped in landfills and significantly increasing recycling. The Scottish Government has actively aided local governments in raising recycling rates and fulfilling the 2013 deadline set by the European Union to reduce the amount of biodegradable waste sent to landfill sites (Lochhead, 2010).

The Scottish government has set a lofty goal to increase recycling and decrease waste by 2025, starting in 2010. Scotland sought to cut the total amount of waste generated by 15% compared to 2011 levels, the amount of food waste by 33% compared to 2013 levels, recycle 70% of the residual waste, and send no more than 5% of the remainder to landfills (Scottish Government, 2023). Scotland has been successful in reducing the tonnage of biodegradable municipal solid waste sent to landfill below the 1.26 million tonnes target for 2020, successful in reducing the percentage of waste generated below the 85% of the 2011 baseline target for 2025 and has experienced a downward trend towards the less than 5% target on all waste sent to landfill by 2025 (SEPA, 2021).

## 2.3 Sustainable Waste Management Strategies

### 2.3.1 Extended Producer Responsibilities

The polluter pays principle (PPP) served as the foundation for the development of the Extended Producer Responsibilities (EPR). Implementing EPR requires that the manufacturer accept responsibility for any environmental problems related to their products at any point of their lifespan (Forslind Citation 2005). According to Shan and Yang's (2020) development of a tripartite game model for producers, recyclers, and the government to choose their strategies as well as the methods used to implement an EPR system in China, an increasing number of nations are using EPR systems to manage MSW to reduce environmental contamination.

In Scotland, the EPR has been identified as a potent tool for speeding up the transition to a more circular economy, where products are made to be reused, repaired, and remanufactured rather than thrown away, while also assisting Scotland in meeting Sustainable Development Goal 12, with 74% of Scotland's carbon footprint caused by the consumption of goods and services (ZERO waste Scotland, 2019).

### 2.3.2 Waste Hierarchy

The waste hierarchy idea, which is popular in waste and resource management, places an emphasis on practices including waste prevention and landfill management (Pires and Martinho, 2019). The waste hierarchy (Figure 2.4) is described by the European Waste Framework Directives as the priority sequence of waste management activities from prevention, preparation for reuse, recycling, other recovery (including energy recovery), and disposal (WFD2008).

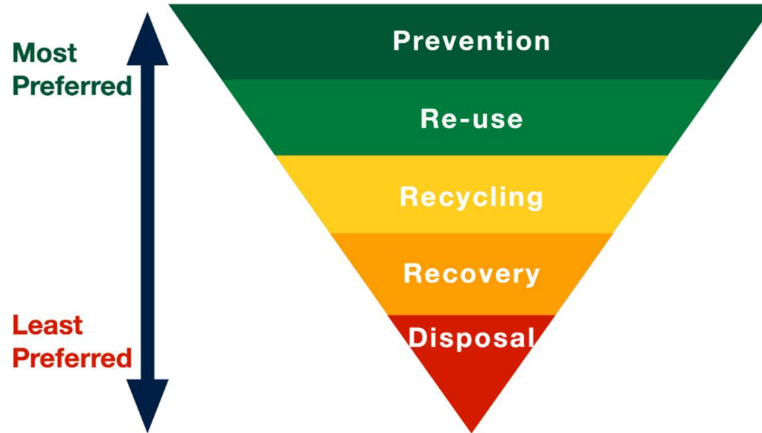


Figure 1. Waste Hierarchy by the European Waste Framework Directives

### 2.3.3 Source Separation and Recycling

Municipal solid waste (MSW) management can be made more sustainable by separating recyclable materials at the source, but most developing nations struggle with a lack of recycling infrastructure and a low degree of source separation practises (Vassanadumrongdee and Kittipongvises, 2018). Following the implementation of separate collection in the 1990s, resource recovery of materials and energy significantly increased (Rousta, Bolton and Dahlén, 2016). It would seem that source separation and recycling have been well promoted in Scotland towards achieving the target of 70% recycling of all waste and reducing waste to landfills to a maximum of 5% by 2025.

### 2.3.4 Circular Economy Approach

The circular economy is a framework for sustainable economic growth that emphasises resource and energy efficiency, waste reuse, and recycling. It involves developing a link between economic growth and ecological sustainability that is mutually beneficial (Dumlao and Halog, 2017). This is supported by Banda, Mwanaumo, and Mwanza's (2023) report, which identifies the circular economy as a means of ensuring that all the drawbacks of the linear economy are mitigated or avoided at source while promoting pollution reduction.

## 3. METHODOLOGY

### 3.1 Philosophical View

This study used fundamental social approaches to investigate the issue at hand after discovering how important it is to start thinking about social research from a philosophical perspective. Since it is an observable event in the immediate physical and social environment in which people live and interact, MSW can be generically referred to as a social phenomenon and a reality. An inability of social connection amongst the numerous actors involved in its operations might be seen as the root cause of the issues with municipal solid waste. On that note, interpretivism, a philosophical school that is frequently associated with Max Weber's theories, serves as the intellectual foundation for this study.



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The ontological stance of interpretivism is relativism, or the notion that reality is subjective and differs from person to person. Human senses serve as filters for realities, i.e., they are individually constructed, and without consciousness, nothing in the universe makes sense. Since the world does not exist independently of how we see it, interpretive epistemology is subjectivism that is based on actual events (Scotland, 2012). For instance, waste is constructed as waste by human beings through the associations they make with it.

### **3.2 Approach to Theory Development**

This study adopted inductive reasoning in exploring stakeholders' perspectives on MSWM in Lagos and Scotland to provide a better understanding and interpretation of what is embedded in the collected qualitative data set. The collected qualitative data set served as the basis for the theory formulation in this study.

### **3.3 Methodological Choice**

A qualitative research strategy is an inductive approach to a research problem used to get a thorough grasp of the issue a study is trying to solve (Bryman, 2016). This study employed a multimethod qualitative approach to data collection and analysis of the relationship between theory and research, and it produced research understanding by considering the viewpoints of many actors involved in the management of MSW in Lagos and Scotland. In adopting a qualitative research approach for this study, reflexivity, which can be defined as the potential influence of the researcher's origins, principles, and mindset on the research, was prioritised by maintaining the balance between the researcher's view and the interviewee's perspective throughout the research to minimise unconscious bias.

### **3.4 Research Strategy**

The case study strategy was adopted in this study to learn more about the uniqueness of waste practice in Lagos and Scotland. It further helps in the understanding of the pathways resulting from the adoption of unique initiatives to address waste problems and the gaps that existed in the Lagos solid waste policies.

### **3.5 Data Collection Method**

#### **3.5.1 Sampling Techniques and Research Instrument**

In response to Bryman's (2016) assertion that it will be extremely difficult to develop a probabilistic sampling frame and that random selection would not be feasible when there is no accessible sampling frame for the population intended to be included in the case study and the population is large, the decision to use non-probabilistic sampling for this study was made. This was further influenced by the exploratory nature of this research and the difficulty in recruiting participants for the interviews.

A total of eight interviews were conducted among the stakeholders involved with the administrative management of MSW in Scotland and Lagos to gather information for the study. The choice of eight interviewees was influenced by the time constraint in completing the task. The agencies interviewed included the Lagos Waste Management Authority (LAWMA), the Private Sector Participation (PSP), the Scottish Environmental Protection Agency (SEPA), and Zero Waste Scotland.

### 3.6 Data Analysis

Thematic analysis was used for the analysis of the primary data collected from the interview by searching for patterns and abstracting relationships between these patterns to provide a detailed explanation for the study. Well-known theme analysis qualitative researchers like Braun and Clarke (2006) have provided a basic set of guidelines for using thematic analysis as a research methodology in assessing contextual data.

## 4. DATA PRESENTATION

Table 1 provides the summary of the excerpt from the interview conducted with actors involved in MSW management in Lagos and Scotland.

**Table 1: The list of key findings that emerged from the thematic analysis**

Themes	Key Findings
Waste collection	According to authorities, waste collection activities are organised by the PSPs and LAWMA in Lagos. Inadequacy of proper storage systems, collection facilities and indiscriminate waste disposal attitudes among the people complicated the collection problem. Getting accurate information on the amount of waste generated is difficult. Waste collection activities are organised by each local council in Scotland, although some engage the service of a private waste collector for commercial waste and a small amount of household waste. Collection service varies across the local council area in Scotland; however, every local council has a good collection system in place.
Management practice	MSW practice in Lagos is rated poor across the city, especially in the high-density areas. Each household has the duty of providing waste storage; however, this is lacking in most places and, where available, is not adequate to support waste segregation. In Scotland MSWM is the responsibility of the council, as provided in the 1990 Environmental Act. Each council provides every householder with bins for storage and separation, and information about what goes into each bin is provided from time to time.
Waste treatment	Most of the collected waste in Lagos ends up at landfill sites, where sorting takes place by the informal recycler and non-recyclable waste is landfilled. Most of the resource recovery plans are still in the planning stage, awaiting technological and financial backing to promote them. Waste separation is promoted at the source in Scotland. However, mixed waste goes into MRF for sorting, food waste and garden waste go into composters and AD, and other non-recyclable waste goes into energy for waste facilities as an alternative to landfills. Majority of the sorted waste is sold abroad because of the lack of reprocessing facilities in Scotland.

Themes	Key Findings
Policies and initiatives	<p>The existing policies on MSW management are more focused on waste disposal, while information on sustainable MSW practices and recycling is lacking, with no evidence of implementation where the information is available. The authorities are working towards a circular economy in Lagos and reducing waste to landfills.</p> <p>The increase in landfill tax has helped in keeping waste out of landfill thereby promoting recycling. The proposed CE bill would help in promoting more recycling by taking forward householder duty of care, eliminate the difference in collection service and mandate the voluntary recycling chartered.</p>
Barriers	<p>According to authorities, the attitude and behaviour towards MSW management are generally poor in Lagos. The available facilities are limited compared to the quantity of waste generated in Lagos. Biometric data on each house is lacking, which makes it difficult to deploy CCTV for monitoring offenders. Funding for waste by the government is inadequate, and the overdependence of foreign ideas complicates waste management problems.</p> <p>Experts identified the major barrier as the disparity in the waste collection service across the local councils, which created a lot of confusion for the people and led to the failure of the Scottish material brokerage system. The lack of reprocessing facilities and the funding requirement for promoting recycling are other barriers to increasing waste recovery.</p>
Environmental and Economic	<p>Authorities claimed that indiscriminate disposal of refuse in drainage channels and water bodies has complicated the issue of flooding in Lagos and the loss of endangered species. The landfill gases are a source of pollution for the underground water system and cause global warming. MSW has generated a lot of brown-collar jobs in Lagos.</p> <p>Authorities claimed that MSW has been helping to keep money in the economy through the sale of recyclables and a reduction in the cost of procuring new raw materials. Compost from food waste has greatly improved soil quality and reduced the impact of climate change.</p>

## 5. DISCUSSION OF FINDINGS

### 5.1 Waste Collection

In Lagos the PSP are businesses that are registered with LAWMA for the collection of waste from households and commercial businesses across Lagos. LAWMA's waste collection is inefficient despite its weekly average evacuation exercise, as waste accumulation exceeded the existing storage and collection facilities (Onuminya and Nze, 2017). Poor collection systems would make the aggregation and characterisation of waste generated difficult and even propel a negative attitude towards waste management.





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The authority in Scotland rated the collection system as good, as every local council has the duty by law to collect MSW from households, and this is encouraged by government policy. The public's attitude towards making source separation and recycling a habit is one of the most significant problems in source separation and recycling practice (Moh and Abd Manaf, 2017). However, Scotland has improved a positive attitude towards waste separation as each council provides every household and business with storage, which is collected weekly with a special arrangement for food waste.

### **5.2 Management Practice**

To improve the quality of service delivery in Lagos, waste collection became the full responsibility of PSPs, with LAWMA providing supervision and landfill site management. However, with the overdependence on government funding (Wang et al., 2023) and the inability to generate money internally through effective waste bill collection, both the PSP and LAWMA service delivery have been poor. Each household has the duty of care of providing adequate storage and paying waste bills, and there is difficulty in achieving this in high-density areas, which are characterised by high population, urban poverty, and sprawl (Ezeah and Roberts, 2012). Consequently, this results in indiscriminate disposal of waste and the rating of Lagos State's MSWM system as ineffective, inefficient, and unsustainable (Ayadi and Alo, 2020). There are different sources of funding for waste management in Scotland, which include council tax, central grants, and waste contracts, among others. Making payment via council tax reduced the stress of payment per uplift during collection and also enhanced the council's obligation in terms of bin provision. Consequently, the availability of bins for both householders and businesses make directives on waste separation effective, creates a positive attitude towards waste management, and improves management practice in Scotland.

### **5.3 Waste Treatment**

The Lagos government's full attempt to promote the recycling operation in 2014 includes plans like increasing the treatment capacity of the Odoguyan composting site to process the food waste generated in Lagos; encouraging private investor participation in the material recovery business; converting the Epe landfill site to a material recovery station; and establishing LAWMA recycling programmes and a waste-to-energy facility at Ikosi as an alternative to landfills (Adenaike and Omotosho, 2020).

However, it would seem that most of these programmes are still in the planning stage or not yet in existence, as the majority of the waste generated in Lagos still ends up in landfills for recycling and sorting by scavengers, which is regarded as a labour-intensive method of MSW treatment (Keng et al., 2020). There is a need to consider other sustainable treatment options while shifting resource recovery activities, which presently focus on plastic and nylon pelleting, landfilling, and composting in Lagos (Olukanni and Oresanya, 2018). Landfills, which are best categorised as open dumps situated for convenience, are the simplest and most commonly used method of disposing of municipal solid waste in Lagos (Aderemi and Falade, 2012).

MSW is considered a resource and treated sustainably using capital-intensive treatment methods like Pyrolysis, Anaerobic Digestion, and material recovery facilities, among others, in the Scotland (Kabir and Khan, 2020). There is a present shift towards moving waste out of landfills in Scotland as energy to waste facilities are now being considered as an alternative to landfills.



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Also, the key lesson from the circular economy idea, which is the judicious use of waste to produce secondary goods with the lowest energy loss and more effective investments while reducing the pollutant footprint, is evident in Scotland (Hoang et al., 2022). Scotland has differentiated its MSWM from regular management practice by introducing business and economic realities to waste product handling, as evident in the sale of paper, plastic, and cardboard abroad (Romero-Hernandez and Romero, 2018).

#### **5.4 Policies and Initiatives**

The existing policies in Lagos are more directed towards environmental sanitation while information on sustainable waste practices, the processing of waste, or the significance of sustainable waste management is missing, and where available, evidence of implementation is lacking. However, recycling programmes and circular economy initiatives have become more evident in Lagos over the past seven years. LAWMA Academy has been successful in influencing a change through the sensitization of children, as age distribution has been identified as an important predictor of transitioning from a linear economy to a circular economy (Marques, 2022). The buyback programmes, recycling banks, and the Pakam app, which promotes smart enforcement, earning as you waste, paying as you waste, and serving as an awareness tools are only evident in some geographical areas because of the financial requirement involved (Iruuaga's 2012).

Scotland has been able to promote more recycling operation by addressing the lack of financial support from the government, ineffective MSW-related legislation and regulations, citizens' low levels of education, and a lack of information dissemination about waste recycling (Wang et al., 2023). According to authorities, the financial driver has been the major element in promoting recycling. Increasing the landfill tax over the years has help in promoting integrated solid waste management employing a variety of technologies in Scotland (Pujara et al., 2019). However, the reuse of plastic bags has been a good source of awareness about discouraging single-use products. The extended producer responsibilities approach to consumer waste in Scotland could be complemented with a tax on producers for the non-collected waste fraction, as such a tax internalises the cost of waste disposal (Dubois, 2012). The proposed CE bill, once it becomes an act, has been identified by authorities as a tool that would induce citizens to improve the waste sorting process and promote more recycling operations (Allevi et al., 2021).

#### **5.5 Barriers to Sustainable Municipal Solid Waste Management**

Most Lagos residents had no idea on how waste generation contributed to the depletion of natural resources and believed that waste management was the sole responsibility of the government (Olatubosun et al., 2023). This justify the reason why compliance level is still very low in Lagos. MSWM in Lagos is further limited by the staff capacity and facilities in carrying out effective monitoring and enforcement. Significantly, it emerged that the lack of biometric data on every household living in Lagos and the increase in migration has complicated the problem of managing and tracking offenders. Concern was raised over the budgetary allocation received for waste management in Lagos, which is very low and insufficient to address the waste problems in Lagos. However, with well-promoted circular economy initiatives, more funding would be generated internally to support MSW management.



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In Scotland, it would appear that CE can be more promoted with more investment in recycling infrastructure (Vassanadumrongdee and Kittipongvises, 2018). Turning other waste streams into finished products rather than sending them abroad would increase the recycling rate and also improve the quality of the waste generated. The need for understanding the demographic characteristics and activities before adopting any storage or collection strategy (Odeyemi, 2013) has been demonstrated by Ipsos Mori in focusing on people aged 16 to 30, who have been identified as potential homeowners who would oversee putting stuff in the bins. The difficulty of disposal of MSW is further exacerbated by organic waste dominance (Ike et al., 2018), so there is a need to focus more on addressing the difficulty encountered in food waste collection. The major barrier to promoting more recycling in Scotland is the disparity in the waste collection service across the local councils, which led to the failure of the Scottish material brokerage system, which could have assisted councils in negotiating more contracts for the sale of separated waste.

### **5.6 Environmental and Economic Impact**

The higher the source separation level, the lower the overall environmental impacts (De Feo et al., 2017), thereby necessitating the need to promote source separation in Lagos. MSW management in Lagos has created a lot of brown-collar jobs for people in Lagos, and more white-collar jobs can be created for graduates with more investment and technological involvement in waste management. There are numerous technologies available to create electricity from MSW (Moya et al., 2017), and this could offer a solution to the epileptic power supply in Lagos. The authority in Scotland claimed that MSW has helped keep money in the economy by reducing the cost incurred in procuring raw materials and providing a good source of revenue.

## **6. CONCLUDING REMARKS**

In conclusion, this research uses the insights gathered from the key stakeholders in MSW management in Lagos and Scotland to understand the current waste practices and propose a model that would improve waste management practice in Lagos. The data analysis reveals poor attitudes and behaviours among people, poor funding, a lack of biometric data and separation facilities, and a lack of policy towards resource recovery as the main problems impeding effective MSW practice in Lagos, while the data analysis justifies Scotland as a good example of best practice and identifies a lack of commonality in council service, poor investment in reprocessing facilities, and funding as barriers to promoting more recycling in Scotland.

## **7. CONTRIBUTIONS TO KNOWLEDGE**

In an attempt to improve MSW practice in Lagos, this study proposed a roadmap using the causal loop diagram. The model demonstrates actions that can promote sustainable MSW practice in Lagos, using the experience of Scotland. The main drivers of this model, upon which success is dependent, are monitoring, evaluation, continuous improvement, enforcement, funding, a landfill tax or ban, and public participation. However, this model could be implemented in phases, with the first phase focusing on upstream activities like more awareness and education on the reasons for sustainable MSW practice, bin provision, encouraging waste separation from source, and enforcement.

This should be followed by downstream activities like composting and resource recovery, which would conversely promote more economic and environmental growth in Lagos. Scotland should focus on investing in more reprocessing facilities and discourage the idea of selling recovered materials abroad. More effort should be put into businesses and household food waste collection in Scotland through food waste regulation.

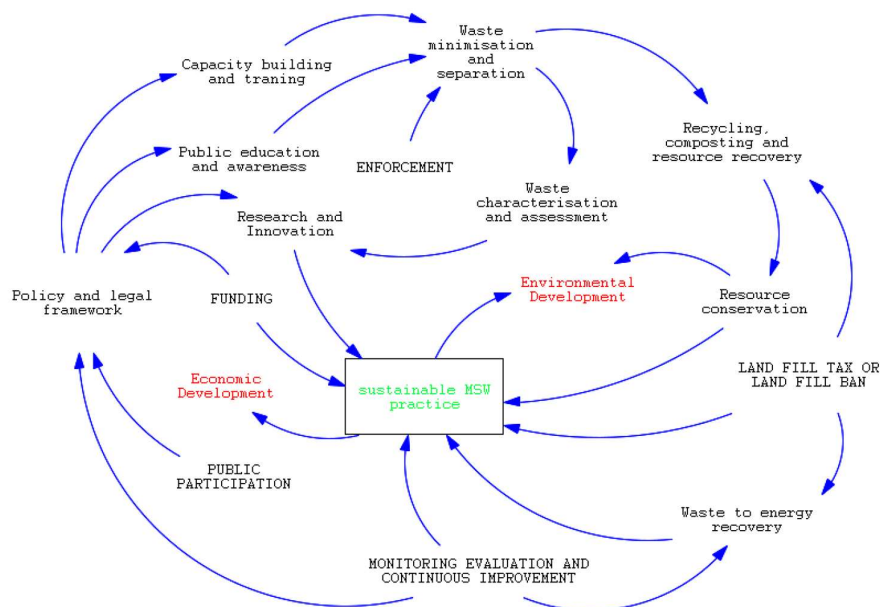


Figure 2: A proposed roadmap for achieving sustainable MSW practice in Lagos.

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