

**BUSINESS OPPORTUNITIES AND CHALLENGES FOR SMALL AND
MEDIUM ENTERPRISES IN WASTE RECYCLING IN NAIROBI EAST SUB-
COUNTY**

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DECLARATION

Declaration by the Candidate

I hereby declare that this research project is my original work and has not been presented for a degree award in any other University.

Sign:

Date:

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Declaration by the Supervisor

This research project has been submitted with my approval as the project supervisor.

Sign:

Date:

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DEDICATION

To my almighty God;

For his insurmountable love.

My father, the Late Mwalimu Chrisantus Ondieki Mokuu for teaching us the value of education,

My beloved mother Pacifica Kemuma

My brothers,

My sisters,

My wife and friend, Jardine, daughter Kalya and son Themba;

For their prayers, moral support, encouragement and patience;

All of whom I attribute this academic achievement to.

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To God be glory.

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I am grateful to the participants who agreed to be interviewed and who completed the survey. It was their knowledge, experiences, and time that have constituted a great portion of the basis of this study.

To you all, this study has been possible.

Thank you and God bless!

ABBREVIATIONS

AfDB	African Development Bank
CBO	Community Based Organization
GAT	General Agreement in Trade
IE	Industrial Ecology
ILO	International Labour Organization
ISWMP	Integrated Solid Waste Management plan
JICA	Japan International Corporation Agency
KNBS	Kenya National Bureau of Statistics
MSWM	Municipal Solid Waste Management
NCC	Nairobi City County
NEMA	National Environment Management Authority
SMEs	Small and Medium Enterprises
UNEP	United Nations Environment Program
UNFPA	United Nations Population Fund
UNIDO	United Nations Industrial Development Organization

GLOSSARY OF TERMS

A challenge in this context refers to hard situations or complexities enterprises face in their daily operations.

Effort refers to the act or result of trying to do something to achieve certain desired results or accomplish some task.

Exploit refers to making full use of and deriving benefit from something e.g. resources.

Informal sector: In the waste management context, informal sector refers to waste scavengers, waste pickers, small buyers and recyclers of waste, in which activities are characterized as labor intensive, unregulated and uses traditional or low cost technology.

Medium enterprises refer to those enterprises with 51 to 100 workers.

Small enterprises refers to those enterprises with 11 to 50 workers

Waste recycling: this is the process for recovering waste products that can be used as inputs or resources for production of goods.

Opportunity: this is a set of exploitable circumstances, requiring commitment of resources and involving exposure to risk.

ABSTRACT

Waste management is one of the most visible urban services whose effectiveness and sustainability serves as an indicator for good local governance. Waste management therefore is a good indicator of performance of a municipality. The search for sustainable development, increased population pressure in urban areas, land limitations associated with difficulties in finding suitable sites for establishing landfills as well as decrease in raw materials compounded with challenges of waste collection and disposal, makes recycling a preferred option for solid waste management.

This research based on a survey design targeting entrepreneurs, employees and enterprises was conducted to examine the opportunities available for, and the challenges faced by, small and medium enterprises in their recycling effort in Nairobi East Sub-county with specific objectives of documenting the available opportunities and challenges for Small and Medium Enterprises involvement in recycling and the efforts made by Small and Medium Enterprises in exploiting such opportunities and overcoming challenges in the recycling sector.

To achieve this, questionnaires, interviews and naturalistic observation checklist were used to collect data. The semi-structured approach of the interviews employed allowed the researcher to achieve an in-depth approach of collecting data. This in turn helped in collecting many different views of the subject matter under study.

Various theories were used in addition to the data collected so as to give an interpretation and enhance understanding of the subject matter from findings obtained. Issues regarding relationships between environment, the economy, society and public policy have been anchored in Ecological Modernization theory whereas issues of waste minimization and/or resource use optimization goals and values; have been influenced by Waste management theory, built under the paradigm of Industrial Ecology. Ecological systems approach did assist with the deeper understanding of organizations in relation to contextual environmental factors such as “structure, size, technology, and leadership patterns and Organizational life cycle model, while SME development theory, helped clarify enterprises’ stages of life cycles and the transformation from one stage to another.

Data was analyzed using both descriptive and inferential statistics using SPSS and excel spreadsheets. The results indicate that about 86% of the respondents agree that there are opportunities to be exploited in the recycling sector while the many experienced challenges can be overcome. The enterprises have made effort to overcome the challenges by adopting various actions.

It is hoped that the findings of this research (section 4.4) will assist investors, entrepreneurs, authorities and policy makers on maximizing on the opportunities in the recycling sector through offering remedial actions to support this sector while promoting sound environmental management practices.

TABLE OF CONTENTS

DECLARATION	ii
DEDICATION	iii
ACKNOWLEDGEMENT	iv
ABBREVIATIONS	v
GLOSSARY OF TERMS	vi
ABSTRACT	vii
TABLE OF CONTENTS	viii
LIST OF FIGURES	xi
LIST OF TABLES	xii
CHAPTER ONE:INTRODUCTION	1
1.1 Background to the study	1
1.2 Problem Statement	3
1.3 Objectives	5
1.3.1 Study Objective.....	5
1.3.2 Specific Objectives	6
1.4 Scope and Limitations of the Study	6
CHAPTER TWO:LITERATURE REVIEW	7
2.1 Review of Empirical Literature	7
2.1.1 Municipal Solid Waste.....	7
2.1.2 Waste Management Enterprises.....	9
2.1.3 Waste Sorting and Recycling.....	10
2.1.4 Waste Management Enterprises-formal or informal sector?	11
2.1.5 Role of County Governments (formerly local authorities)	12
2.1.6 Waste Recycling in Africa	13
2.1.7 Waste Recycling in Developed Countries	14
2.2 Review of Theoretical Literature	16
2.2.1 Ecological Modernization Theory	16
2.2.2 Waste Management Theory	18
2.2.3 Ecological Systems Theory.....	19

2.2.4 Small and Medium Enterprises Development	21
2.2.5 Conclusion	23
2.3 Conceptual Framework.....	23
2.4 Research Questions	25
CHAPTER THREE: RESEARCH METHODS	26
3.1. Site Selection	26
3.2 Techniques of Data Collection.....	26
3.2.1 Target population	27
3.2.2 Unit of Analysis and Unit of Observation	27
3.2.3 Procedure for Respondent Selection.....	27
3.3 Techniques of Data Processing and Analysis	28
3.4 Ethical issues.....	29
3.5 Expected Outcome	29
3.5.1 Research Credibility.....	29
3.5.2 Reliability.....	30
3.5.3 Validity	30
3.5.3.1 External Validity.....	30
CHAPTER FOUR: DATA PRESENTATION AND ANALYSIS.....	32
4.1 Enterprises Status.....	32
4.2 Sources of Waste for Recycling.....	35
4.3 Opportunities and challenges for SME in recycling.....	37
4.3.1 Opportunities.....	37
4.3.2 Challenges and Limitations.....	39
4.3.3 Effort to exploit opportunities and overcome challenges	41
4.4 Discussion.....	45
4.4.1 Technology	46
4.4.2 Waste Policies and Legislations.....	46
4.4.3 Waste Segregation	47
4.4.4 Financial Services and Assistance	48
4.4.5 Operations	49
4.4.6 Human Resource.....	50

4.4.7 Marketing	50
4.4.8 Networking	50
4.4.9 Work Environment.....	51
4.4.10 Business Survival Tactics	52
4.5 Business Promotion Intervention Point	52
CHAPTER FIVE:SUMMARY, CONCLUSIONS AND RECOMMENDATIONS ..	53
5.1 Summary	53
5.2 Conclusion	54
5.3 Recommendations.....	55
5.4 Areas for further research	56
REFERENCES.....	57
APPENDICES.....	i
APPENDIX I: QUESTIONNAIRE	i
APPENDIX II: NATURALISTIC OBSERVATION CHECKLIST	vii

LIST OF FIGURES

Figure 2.1: Conceptual Framework	24
Figure 2.2: Recycling Supply Chain.....	25
Figure 4.1: Graphical Representation of the Number of Years Respondent Businesses have been in Operation	33
Figure 4.2: Sources of Waste for Recycling Enterprises	36

LIST OF TABLES

Table 4.1: Research Response Rate	32
Table 4.2: Number of Year's Respondent Businesses have been in Operation as enterprises	33
Table 4.3: Enterprise Involvement in other Business besides Recycling	34
Table 4.4: Period Organization has Engaged in Recycling Business	36
Table 4.5: Response to Opportunities in Recycling.....	38
Table 4.6: Response to Challenges Affecting Recycling Business	40
Table 4.7: Response to Efforts Made in Exploiting Opportunities.....	43
Table 4.8: Response to Actions Taken in Addressing Challenges	44

CHAPTER ONE

INTRODUCTION

1.1 Background to the Study

Waste management is a growing problem in Nairobi. Increasing urbanization, rural-urban migration, rising standards of living and rapid development associated with population growth have resulted in increased solid waste generation by industrial, domestic and other activities. The increase in solid waste generation has not been accompanied by an equivalent increase in the capacity of the relevant urban authorities to deal with this problem. The proper management of waste has thus become one of the most pressing and challenging environmental problems in the city (UNEP/UN-Habitat, 2007:64).

Waste management is identified as one of Nairobi's key environmental issues. The Nairobi City Council's present capacity to collect and dispose of waste cannot cope with the current situation, resulting in large amounts of uncollected solid waste, which is dumped along the back lanes and street corners within the city and its suburbs. In some areas of the city, there is total neglect. This situation creates hygiene, environmental as well as aesthetic problems (UNEP, 2004:3).

The general perception of the people has always been that it is the responsibility of the local authorities to collect waste, but clearly, Nairobi city county (NCC) has not achieved complete collection of waste. Of the 2400 tons of waste generated per day in Nairobi, the council manages to collect approximately 20% while waste recyclers and scavengers collect 14% daily (UNIDO, 2009:29).

The emergence of environmental issues over the past three decades strongly influences the tone of development in Nairobi. Nairobi City Council has been experimenting with several innovative and participatory methods of Reduce, Reuse and Recycle in partnership with other private entities (UNEP/UN-Habitat, 2007:75).

Local residents and the government have shown concern about the impacts seen and felt due to the lack of an adequate waste management strategy in Nairobi. There are a number of substantial

deficiencies in the institutional and organizational arrangements in Nairobi City County for solid waste management; and because of the lack of adequate and appropriate staff, the vision of the environment department about a clean and green Nairobi cannot be realized (JICA, 1998:2-4

The promotion of waste recycling and reuse thus becomes a more practical approach to solid waste management, especially in municipalities. Reuse and recycling of solid waste has the potential to contribute to the solution of solid waste management problems if the governmental authorities start to recognize the potential of the recovery activities carried out by the informal sector, in combination with efforts to minimize waste generation (Bjerckli, 2005:2).

Economies and enterprises operate as open systems, drawing raw materials from the environment and returning vast amounts of unused by-products in the form of pollution and waste. The products that firms market are only a small portion of what their processes turn out. A significant portion of their output eventually leaves the economy as waste and returns to the environment in forms that may stress it unacceptably. Increased economic output will hence cause increased environmental harm in such a frame of analysis (Ehrenfeld and Gertler, 1997:68), necessitating increased capacity for municipal solid waste management.

Environmentally sound municipal solid waste management must go beyond mere safe disposal. It should include minimization actions, reuse and recycling activities, proper treatment and finally safe disposal (Kohlscheen, 2003:1). An integrated approach, where various complementary practices are used at the same time, achieving safe and effective handling of municipal solid waste, is needed as a means to achieving sustainability. Recycling is such an approach (Kohlscheen, 2003:5).

Investment in recycling as business ventures started in the 1970s, as cost-cutting measures largely due to rising energy costs. Recyclable items include glass, paper, cartons, plastics, polystyrene, textiles and metals. Most recyclable items not only give significant energy savings when recycled feedstock is used, but also the advantage of reduced amounts of 'wastes' that go into disposal pits (Odegi-Awuondo, 1994).

1.2 Problem Statement

The inadequate handling of solid waste represents a source of water, land and air pollution affecting the urban environment and the health of the people living in the cities. It is a critical environmental problem that cities in Africa are facing today. The current capacity of most solid waste management systems in Africa is inadequate and too slow to meet the increasing demand for solid waste management services (Tadesse Kuma quoted in Bjekli, 2005:1) Widespread recognition of the deterioration of the environment has come, after many years of steadily accumulating pollution. Uncollected solid waste is one of Nairobi's most visible environmental problems. The municipal service seems to fail most strikingly in garbage collection and disposal, especially in the outskirts of the central business district and in the slum areas. Lack of adequate garbage collection and disposal, results in adverse psychological, health and environmental impacts (UNEP 2004:5 and Mwaura, 1991: 35).

The concept of recycling wastes has come into focus as a result of this widespread recognition. Agenda 21 (United Nations Conference on Environment and Development in Rio de Janeiro, 1992) includes an action plan for cities wishing to enhance urban sustainability. The action plan includes institutionalizing a participatory approach to municipal solid waste management and improving the urban environment by promoting social organization and environmental awareness. The consensus on sustainable development which emerged from the Earth Summit now must be transformed into action by engaging in a period of decentralized experimentation (Brugmann, 1994: 129).

Local residents and researchers are looking for solutions which not only mitigate the environmental problems of waste, but also enhance community development efforts by generating income, sharing information and labor, and uniting community members in collective action via small and medium enterprises (Peters, 1998:5).

A study on the state of garbage collection in Nairobi found that 26 per cent of households in high-income areas, 16 per cent of those in middle-income areas and 75 per cent of those in low-income areas, did not receive any service from NCC (JICA, 1998:2-4). Private companies served 45-73 per cent of the households, 32 per cent of the institutions, 50 per cent of the industries and 16.7 per cent of the commercial enterprises. About 81 per cent of the households served by

private companies lived in high and middle-income areas (largely the western part) of the city (JICA, 1998:2-4) The majority of the private companies were either small family ventures or a hybrid between a community based organization (CBO) and private firms (Ikiara et al, 2004:11). Broadly, the western part of the city-Hurlingham, Lavington, Westlands, Kileleshwa etc is well serviced by the private firms and the NCC while the eastern part is hardly serviced-Kayole, Dandora, Umoja etc (Magutu et al, 2010:3).

As urban environmental problems worsen in developing countries, non-conventional approaches to urban pressure points like waste management will have to be adopted. The recycling of solid and organic waste is one such approach which has positive ramifications for informal employment and which offers an environmentally sound solution to waste management problems (Peters, 1998:4).

Recycling and resource recovery already exist on an informal basis in all areas of Nairobi. Given that there is considerable demand for recyclables, recycling and resource recovery offers good scope for employment generation, with positive economic and environmental impacts. At present, there are many Micro and Small Enterprises involved in waste recovery and selling of materials to industries that recycle waste (Kuria, 2007:8).

With the increasing cost of raw materials, recycling provides a cheaper source of raw materials for manufacturing industries. This has given value to the otherwise worthless municipal solid waste and has encouraged a second look at it before making a decision to dispose. Sorting and separation of municipal solid waste is gaining importance in various sectors (Rotich et al 2006:98).

Although the City Council has developed a detailed policy document on recycling and reuse of waste generated in the city, it has not created formal structures that would facilitate its partnership with the numerous community groups as well as commercial enterprises involved in recycling and re-use of waste. Further, the Council is yet to introduce incentives to encourage reuse or recycling of waste in the city (KENAO, 2008: X).

Mr. Anders Lindgren, Tetra Pak's Eastern Africa managing director asserts that strengthening of recycling programs, not necessarily as immediate source of revenues but as potential future growth area for organizations, is worth every consideration for tapping into opportunities spawned by the global shift to eco-friendly products (Business daily 30th Sep 2009).

Waste recycling, often undertaken as a survival strategy when the urban poor are unable to obtain formal employment (Odegi-Awuondo, 1994:49), now offers an opportunity for exploitation as a business venture not only for income generation and job creation but also as a mitigation measure against environmental degradation in the low-income areas.

Throughout cities in Asia, Africa, and Latin America, varying numbers of poor individuals survive by salvaging materials from the waste stream. These people recover materials to sell for reuse or recycling, as well as diverse items for their own consumption. These individuals are generally known as 'scavengers' found on the streets or in garbage dumps of Third World cities, collecting all kinds of materials for reuse or recycling (Medina, 1997:1)

Many actors involved in recycling are operating without any guidance, control, or partnership from or with the NCC. Small private companies and informal actors, who are the only providers of service to the urban poor, are harassed instead of being encouraged and facilitated. The consequence of all this has been a chaotic solid waste management sector (UNEP, 2005:3).

In 2006, however, the Government through National Environment Management Authority (NEMA) developed and published sectoral regulations to govern waste handling, transport and disposal in an environmentally viable way. It remains to be seen if NEMA's regulation has assisted actors involved in recycling within Nairobi, in their business ventures. The study therefore, has examined possible business opportunities and challenges that waste recycling offers Nairobi's SMEs within the waste management legislation and regulatory framework.

1.3 Objectives

1.3.1 Study Objective

The main objective of this study was to examine the opportunities available for, and the challenges faced by, small and medium enterprises in their recycling effort in Nairobi East Sub-county.

1.3.2 Specific Objectives

The study was guided by the following specific objectives:

1. To analyze the available opportunities and challenges for Small and Medium Enterprises involvement in recycling.
2. To evaluate efforts made by Small and Medium Enterprises in exploiting opportunities and overcoming challenges in the recycling sector.

1.4 Scope and Limitations of the Study

This study attempted at collecting data to provide a context for understanding the capacity, opportunities and challenges that small and medium-sized enterprises have in undertaking recycling, a component in Municipal Solid Waste Management (MSWM). The study focused on small and medium enterprises that are directly involved in recycling in Nairobi East Sub-county, where many informal sector recycling enterprises are located, and only focused on recycling of municipal solid wastes.

Given this scope, the limitations of the study included non-disclosure of material information as regards full operations of the enterprise and/or entrepreneur from respondents. The choice of Likert type analysis probably affected the quality of research findings given the number of levels considered. The study did not independently consider level of education and gender perspectives of the respondents, but rather focused on their experience and knowledge in waste recycling. More importantly however, it is not possible to extrapolate the conclusions of the study's findings to the greater Nairobi County.

CHAPTER TWO

LITERATURE REVIEW

This chapter deals with literature review of previous research, existing theories that were considered in this study and conceptual framework that guided the study. Local, regional and global perspective of the problem area, is further discussed in length.

2.1 Review of Empirical Literature

Industrialization and globalization have increased the quantity and quality of goods that are produced and moved around the world mainly through trade. This has led to an increased generation of waste due to items discarded with no real attachment or need for repair, reuse or recycling, leaving some developing countries in a dilemma on how to handle the increasing waste given their weak economies (and thus low technical capacities and poor physical infrastructures), inability to enforce environmental legislation, financial mismanagement and poor administrative capacities (Wilson et al, 2006:797).

2.1.1 Municipal Solid Waste

Municipal Solid Waste (MSW) can be defined as solid waste which includes all domestic refuse and non-hazardous wastes from offices, hotels, shopping complexes/shops, schools, institutions, and from municipal services such as street cleaning and maintenance of recreational areas. The major types of MSW are food wastes, paper, plastic, rags, metal and glass, with some hazardous household wastes such as electric light bulbs, batteries, discarded medicines and automotive parts (UNEP, 2005:3; UNEP, 2004:5).

In recent years, the volume of waste has been increasing at an alarming rate posing formidable challenge to communities and governments. The complexities and magnitude of the challenges become evident when considering other waste types to be managed that include industrial solid waste, municipal wastewater, industrial wastewater, storm water and hazardous waste. Often, different government agencies are mandated to manage different waste sectors. This fragmented approach to waste management, coupled with a lack of clear definition and delineation of the

different waste types, makes current waste management practices in most countries difficult (UNEP, 2005:4).

Reporting on General Agreement on Trade in Services (GAT) on Kenya, Njoroge (2010) asserted that Kenya made commitments to developing service provisions in Financial, Tourism, Telecommunication, Education, Transport, Health and Energy sectors, making no commitments to the development of environmental service sector for lack of information about it. This apparent lack of interest and know-how on the part of the government, coupled with many sources and types of municipal solid waste generated from different settings and of different nature, calls for a common attention and operations strategy in municipal solid waste management (Magutu et al, 2010:4).

Municipal solid waste management (MSWM) is a complex task which depends on organization and cooperation between households, communities, private enterprises and municipal authorities as much as it does upon the selection and application of appropriate technical solutions for waste collection, transfer, recycling and disposal (Schübeler et al, 1996:15).

Municipal solid waste management encompasses the functions of collection, transfer, resource recovery, recycling, treatment and disposal of solid waste in urban areas. The primary targets of MSWM is to protect the health of the population, promote environmental quality, develop sustainability, and provide support to economic productivity (Rotich et al, 2006:93).

To meet these goals, sustainable solid waste management systems must be embraced fully by local authorities in collaboration with both the public and private sectors. Although in developing countries the quantity of solid waste generated in urban areas is low compared to industrialized countries, MSWM still remains inadequate (Rotich et al, 2006:93). A significant portion of the population does not have access to waste collection service thus, only a fraction of the generated waste is actually collected. Systems for transfer, recycling and/or disposal of solid waste are unsatisfactory from the environmental, economic and financial points of view (Schübeler et al, 1996:15).

In Kenya, local authorities are charged with the responsibility of collecting and disposing of solid and liquid municipal wastes within their areas of jurisdiction. At present, MSW is disposed in open dumps that lack proper environmental pollution control and monitoring mechanisms to mitigate the effects of the pollution (Rotich et al., 2006:94).

Solid waste recovery and recycling is carried out by many of Nairobi's poor who engage in waste picking as a means of income generation. The NCC does not operate any transfer station or composting plant where commercial recovery/ recycling could be implemented (AfDB, 2002:8) and does not have an official policy on community involvement in waste management (AfDB, 2002:59).

Lack of adequate capacity exhibited by NCC to manage municipal solid wastes has given rise to formal and informal sector entrepreneurs and enterprises dealing in municipal solid waste management, especially in recycling and disposal of waste. In Nairobi for example, where waste collection levels stand at 36%, the City Council collects 500 tons/day, private licensed companies collect another 500 tons/day while waste recyclers and scavengers collect 350 tons daily (NCC, 2008).

2.1.2 Waste Management Enterprises

There are over 150 private sector waste operators independently involved in various aspects of waste management, indicating a wider private sector involvement in waste management in Nairobi (UNIDO, 2009:26). By classification, the micro-enterprises involved have 10 or fewer workers, small enterprises have from 11 to 50 workers, and medium enterprises have from 51 to 100 workers. Micro-enterprises comprise the lion's share of enterprises involved with recycling in Kenya while there are only a few small and medium enterprises (Parker and Torres, 1994:7).

Since over 50 per cent of the waste generated is organic in nature, there are opportunities for organic waste recovery. Composting organic waste for reuse as manure in agriculture is one way of reducing the environmental problems linked to waste and also as a means of reducing urban poverty. Given the fact that Nairobi City Council has no capacity to collect all the waste generated, there seems to be ample opportunity for income generation by women and youth involved in recycling (UNEP/UN-Habitat, 2007:67).

Nairobi City Council has since developed a detailed policy document on recycling and reuse of waste generated in the city but has not yet created formal structures that would facilitate its partnership with commercial enterprises involved in recycling and re-use of waste. Further, the Council is yet to introduce incentives to encourage reuse or recycling of waste in the city. Much garbage that is not waste, estimated by recyclers to be as much as 80% of loads delivered at the dumpsite, is transported at high cost to the dumpsite only to be separated there under difficult circumstances and the recoveries transported back to their place of intended use at unnecessary expense to the residents of the city (KENAO, 2008:X)

2.1.3 Waste Sorting and Recycling

Sorting of waste for recovery and re-use is carried out at the main dumping site at Dandora and less intensely at collection points or unauthorized dumpsites in residential or commercial areas. The recovery is done by informal groups or individuals who sort the waste into economic lots for sale to recyclers or re-users. The council plays little or no role in this process since the recycling is done by the informal groups who sell the sorted lots to private companies (KENAO, 2008:22). Scavengers recover more than 30 different types of materials, with the major ones being ferrous metals (aluminium and copper). Industry operators have since, encouraged the setting up of recycling schemes (such as for aluminium cans, bottles, and polythene materials) to improve environmental conditions while also generating incomes to the poor (UNEP, 2005:16).

Recycling provides a cheaper source of raw materials for manufacturing industries, given the increasing cost of raw materials. This has given value to the otherwise worthless MSW and encouraged a second look at it before disposal. Sorting and separation of municipal solid waste is gaining importance in the private sector that includes a wide range of enterprise types, varying from informal micro-enterprises to formal large business establishments. As potential service suppliers, private enterprises are primarily interested in earning a return on their investment by selling waste collection, transfer, treatment, recycling and/or disposal services (Bjerkli, 2005:6).

2.1.4 Waste Management Enterprises-formal or Informal Sector?

According to the International Labor Organization (ILO) employment mission report on Kenya citing differences between the informal and formal sectors; informal activities are a way of doing things, characterized by ease of entry, reliance on indigenous resources, family ownership of enterprises, small scale of operation, labor-intensive, adapted technology and unregulated and competitive markets whereas formal-sector activities are the obverse of these, namely, difficult entry, frequent reliance on overseas resources, corporate ownership, large scale of operation, capital-intensive and often imported technology, formally acquired skills- expatriate and protected markets (through tariffs, quotas and trade licenses (ILO 1972: 6).

In the waste management context, formal sectors refer to those operating with official business license for managing, handling, and utilizing waste. Their activities are regulated by laws, and often use high cost and advanced technologies. On the other hand, informal sector refers to waste scavengers, waste pickers, small buyers and recyclers of waste, in which activities are characterized as labor intensive, unregulated and uses traditional or low cost technology (Atienza, 2010:106).

However, in the Kenyan context and world over, it is really difficult to draw clear boundaries between formal and informal sectors as many of those working in waste related jobs are operating in the so-called “grey area.” where some formal organizations operate in an informal way; while some members of the informal sector (waste pickers, etc.) form organizations and become recognized but still do activities informally (Atienza, 2010:107).

The formal sector is organized into small scale recycling industry, large scale recycling industry and micro-enterprises. Small-scale recycling industries involved in MSWM are mainly recyclers of waste material who purchase items like glass, metal cans and plastics and using these wastes as raw materials, manufacture saleable products. Their suppliers may be waste-pickers, itinerant and stationary waste buyers, or even micro-enterprises. These operations are self-sustaining thus remain in existence as long as there is demand for their products. They may have informal linkage with the public sector as buyers of waste from the public sector SWM workers (Ahmed and Mansoor, 2004:469)

Large-scale recycling industry includes large factories and industrial establishments that buy suitable waste material in bulk to use in their manufacturing process. Their suppliers may be itinerant/stationary waste buyers or any operator who can store waste until a saleable quantity is reached. These are profit-oriented operations whose sustainability depends on the market forces (Ahmed and Mansoor, 2004:470).

Micro-enterprises are for profit-making business operations run by entrepreneurs who are innovators and agents of change whose focus is on creativity, innovation and the constant search for new products or process ideas. They want to know what their customers want and strive to deliver that at the best competitive price (Ahmed and Mansoor, 2004:471).

According to Ahmed and Mansoor, micro-enterprises enter into MSWM activities because they see a gap in service delivery and existence of a demand for fulfilling that gap. They find this niche and charge for their services. For example, they may find a demand for house-to-house garbage collection (primary collection) that the municipality cannot provide, and seize the opportunity by providing the service in the neighbourhood at a fee to the households. Any item of value is salvaged and sold to small or large recycling industry to maximize profit. Their approach is highly demand responsive, and they keep close contact with their clients (Ahmed and Mansoor, 2004:471).

2.1.5 Role of County Governments (formerly local authorities)

To fulfill their solid waste management responsibilities, municipal governments normally establish special purpose technical agencies, and are also authorized to contract private enterprises to provide waste management services. However, local authorities remain responsible for regulating and controlling the activities and performance of these enterprises. Effective solid waste management depends upon the cooperation of the population and local governments who should take measures to enhance public awareness on the importance of MSWM; generate a constituency that supports environmental protection and promote active participation of users and enterprises in local waste management (Kuria, 2007:4).

In Nairobi, it seems that the role of local government in MSWM is wanting and a number of formal and informal entrepreneurs and enterprises have taken lead in service provision.

According to ILO analysis of micro and small enterprises waste management activities in Nairobi, Community based waste management activities are concentrated in the low-income high density settlements. These micro and small enterprises mobilize resources within the community to provide basic waste collection and disposal services. However, these services are delivered under unregulated competition (Kuria, 2007:8).

Based on literature review, especially from practices in other countries, it can be argued that recycling activities provides social, economic and environmental benefits to the populace, thus the need to recognize such activities and enterprises involved, for appropriate regulation and material support.

2.1.6 Waste Recycling in Africa

In Egypt for example, the garbage generation rate in Cairo is 9,000 tonnes per day, about 1/3 of which is collected and processed by the municipality and formal sector, 1/3 by street collectors and 1/3 by the Zabbaleen. The Zabbaleen (equivalent to scavengers in Kenya), the most inventive and efficient of these operators, survive through the resource recovery of various waste fractions by collecting relatively high-value waste from middle and high-income areas of the City, sort such materials as plastic and paper, reprocess and sell to a large number of micro-enterprises. Through the Zabbaleen Environment and Development Program, promotion of recycling and waste related enterprises has led to the creation of over 200 waste related micro-enterprises, quality of life has improved in a formerly neglected community; thousands of jobs have been created whereas an improved municipal waste collection and recycling system has been implemented. This has been possible with the introduction of a business model in 1980 that meant to regulate service delivery from informal family based waste management enterprises to formal enterprises (AfDB, 2002:37).

In Ghana, waste recovery and recycling of metals, glass and certain types of plastics is carried out, on a small scale, by waste pickers. For various reasons, informal resource recovery, either by micro-entrepreneurs or by communities, has not received the support it deserves. In Accra and Tema, where unregulated dumping is the cheapest means of waste disposal, activities in this field are poorly stimulated and supported by local governments given that municipal policies undermine small-scale recovery activities. Basically, there is only a limited proportion of

recoverable material in the waste stream in Accra. Most material is kept away from the waste at the household level where such items as empty bottles, plastic containers, metal cans, etc, are salvaged and kept for domestic use. Occasionally, they are collected on site and sold for a small profit to the middleman who collects recyclables (AfDB, 2002:54)

In South Africa, there is a high recycling rate of industrial waste because of its profitability especially for metal, paper and glass. A deposit system is used to encourage the return of bottles, tin and aluminum cans, in addition to specially marked receiving containers placed at “Greens Depots” for the drop off of bottles and cans. The country has a sizeable tin mining and processing industry, with a demand for the recycled material (AfDB, 2002:82).

Recycling of residential and commercial waste that takes place in Cape Town is done largely in an informal way, meaning there is no underlying policy, mandate or programs that are led by any levels of government. Recycling of materials from the residential and commercial waste stream is driven by poverty and as a means of survival occurring at a fairly large scale, but often unorganized and conducted in unsafe and unhealthy conditions, and through means that are not necessarily environmentally sound. The industry response to the use of recycled materials as a "raw material" is greater than any movement towards recycling being incorporated as part of the everyday lifestyle (AfDB, 2002:84). Though most of the recycling occurs in the industrial sector, only an estimated 6.5% of the waste is recycled. With significant mandates and programs in place for recycling, a recycling rate of 20 to 25% of the domestic and commercial waste is expected to be achievable by the year 2030 (AfDB, 2002:84).

2.1.7 Waste Recycling in Developed Countries

In North America, the integration of recycling into integrated waste management has resulted in development and adoption of models like; the community recycling centre model like Urban Ore in Berkeley (California), the Resource Centre in Chicago, and R2B2 in the Bronx in New York City that are not only offering curbside and business collection services to cities, but also to commercial generators; the MRF model that takes mixed recyclables and either employs or contracts individuals who were previously picking waste; the second-hand shop, attic clean-out, or repair model where informal entrepreneurs focusing on reusable goods have evolved into semi-formal or formal businesses that pick reusable's from waste collection set-outs or offer a

free removal service and repair services; and the “take it or leave it” model. Many rural communities in the US have a depot-type solid waste facility that combines recycling, waste disposal, and drop-off of organic waste, reusable’s, white, brown and grey goods, and the like. In certain parts of the US there are parts of the depot which are designed to facilitate free exchange of reusable items. Households can bring furniture, appliances, books, clothing, auto parts, but they are also free to take those things. Take-it or leave-it also serves as informal centres for recycling (Scheinberg, 2008:13).

In the Netherlands, solid waste management has a hygiene focus which was institutionalized in the 19th century initiated by the crisis narrative of contaminated soil in the 1970s, which made waste management a “hot political issue”, within a more general process and policy of environmental planning and protection. The discussions of the 1970s led to the formal adoption to the so-called “Ladder of Lansink” as the main policy guideline for waste management. This is a “hierarchy” or pyramid approach, which says that waste must first be prevented, then reused, then recycled, organic waste composted, then energy recovered, and only then disposed of in safe landfills. The Dutch has an absolute commitment to the total elimination of landfilling for recyclable and burnable materials (Bartelings, 2003:57).

In addition, the Netherlands waste landscape is characterised by a number of institutions like *kringloops* that are neither strictly public nor strictly private. The *kringloops* are second-hand shops which are integrated with and co-financed by the municipal cleansing companies. They have three functions: collection of reusable’s and bulky waste (and in some cities waste paper); repair or dismantling for recycling; and retail and wholesale marketing for reuse in second-hand shops. For this the *kringloops* receive a diversion credit, that is, they can claim a part of the avoided cost of disposal from their host municipality (Scheinberg, 2008:19).

Most *kringloops* have a strong social profile, and serve as sheltered workshops for “socially weak” individuals who are physically, psychologically, or socially unable to participate as regular workers in the labor market. *Kringloops* absorbs informals who do collection and other small jobs from the informal waste sector. There is also some informal recovery activities related to the collection and recovery of construction and demolition waste, though in general the

informal sector in the Netherlands has, indeed, largely disappeared over the years (Scheinberg, 2008:19).

In Hungary and other State Socialist countries in Europe, Gille (2007) argues that recycling is a kind of cult within the state socialist production sector and the separation from urban cleansing was so absolute that ‘waste’ in Hungary during socialism was defined as consisting only of metal. This process has continually sought to re-define the recycling sector as an adjunct to the solid waste system. The private recycling supply chain, appears to be interesting as an alternative to disposal, an institutional space where materials can be removed to and the sector has already achieved an industrial identity as completely separate from public sector urban cleansing activities (Scheinberg 2008:19).

2.2 Review of Theoretical Literature

In order to develop a sound theoretical approach as a base to this study, four theories namely Ecological Modernization Theory, Waste Management Theory, Ecological Systems Theory, and SMEs development theory were considered to assist understand the opportunities and challenges of the SMEs involved in recycling activities.

2.2.1 Ecological Modernization Theory

Ecological Modernization Theory was born in the 1980s primarily from the works of Joseph Huber and Martin Jänicke of Germany. Ecological modernization is a social theory that aims to reconcile the tension that exists between economic growth and environmental degradation within modernity. That is to say that it is possible for a capitalist economy to function while at the same time protecting the environment (Tymchak, 2010:6).

Ecological modernization as a theory is a view about relationships between environment, the economy, society and public policy pieced together from various sources, who’s consolidated ideas have been highly influential in shaping many environmental policies, plans and management systems through its links to sustainable development (Howes et al, 2009:4).

The core argument of EM is that although democracy, the state and the market have gone astray, they can be preserved by restructuring in a way that will make them sustainable (Howes et al, 2009:4). In this way, as Mol and Sonnenfeld will argue, there is a consistency within EM that technology and industrialization are not to be viewed as mere sources of ecological damage but as a means to be used with social transformations and economic institutions to develop a society that is more environmentally benign (Tymchak, 2010:6).

EM identifies a positive-sum game between economy and ecology. Rather than seeing environmental protection as a brake on growth, EM promotes the application of stringent environmental policy as a positive influence on economic efficiency and technological innovation and is especially important in a world largely determined by free trade, capital mobility and an overall commitment to market liberalization (Berger, 2006:45).

As theory, ecological modernization is concerned with relations between economic development, environment and environment induced social change, to mean that environmental crises provide the impetus for social institutions to change (Mol and Spaargaren 2004:3).

As a practice, ecological modernization, seeks to develop methods and models for reducing environmental impacts, through such means as emissions and waste reduction, resource substitution and minimization of resource consumption, while encouraging practices such as “strategic environmental management”, “cleaner production”, “industrial life cycle analysis”, and “environmental quality assessment” systems such as ISO 14001 (Jay and Morad, 2006:3).

Clearly, in ecological modernization, changes are motivated for purely or largely environmental reasons independent of their economic impacts, science and technology get a new impetus and a new role, changes are institutionalized in new arrangements between social actors, between users and providers, between governments and citizens, and these new arrangements stimulate a shift in responsibility and activities between government, civil society, and the private sector. (Scheinberg, 2008:8).

In North America, for instance, ecological modernization changed the relationship of local government to waste management and the private sector. Towns, cities, and counties seeking to

lower their reliance on land filling adopted recycling ordinances, passed local laws, bought recycling vehicles, and instituted collection programmes. As soon as it was clear that the landscape was going to place strong pressure on municipalities to recycle and recover yard wastes, the solid waste providers and their suppliers began to innovate and educate themselves. Some early adopters – both private and municipal – were able to show that high-participation recycling collection was affordable, feasible, and reliable, but that it relied on different technology and different communication strategies (Scheinberg 2008:11).

EM theory is useful not only because it provides a broad theoretical framework from which to discuss the responses of small firms to recycling, but because it has a particular significance within environmental policy debates.

2.2.2 Waste Management Theory

Theory of Waste Management is a unified body of knowledge about waste and waste management, and it is founded on the expectation that waste management is largely about preventing waste from causing harm to human health and the environment and promoting resource use optimization. Waste Management Theory was constructed under the paradigm of Industrial Ecology as Industrial Ecology is equally adaptable to incorporate waste minimization and/or resource use optimization goals and values. It is an evolving theory whose key proponent is Eva Pongrácz. It is an effort to organize the diverse variables of the waste management system as it stands today. At the present stage of WMT development, scientific definitions of key concepts have been offered, and evolving of WMT under the paradigm of Industrial Ecology is in progress (Pongrácz *et al* 2004:1).

Prevention of waste creation is the main priority of waste management, which corresponds to the principal goal of waste management: conservation of resources. Moving toward waste minimization requires that the firm commits itself to increasing the proportion of non-waste leaving the process. It has been argued, borrowing from the laws of thermodynamics, that producing by-products is concomitant of a main product (Baumgärtner and de Swaan Arons 2003:116). For this reason, industrial firms have to look beyond their factory walls, and seek for external utilization of their waste, in accordance with the principles of Industrial Ecology (IE). If we accept that waste minimization and resources use optimization is the most important

objective of waste management (Pongrácz, 2002:18), it is essential that WMT is be considered together with IE, as resource use optimization considerations reach beyond the tradition scope of waste management, taking into consideration its concepts.

The first concept of ISWM is based on lifecycle assessment of a product from its production and consumption point of view. The reduction in consumption, and utilization of discarded products within the production system as a substitute for new resources, can lead to reduced end-of-cycle waste generation; thus, less efforts and resources would be required for the final disposal of the waste. The second concept of ISWM is based on its generation from different sources including domestic, commercial, industrial and agriculture. This waste could be further classified as hazardous and non-hazardous waste. The former has to be segregated at source and treated for disposal in accordance with the strict regulations. 3R approach (reduce, reuse and recycle) is applicable both at source as well as at the different levels of solid waste management chain including collection, transportation, treatment and disposal. The third concept of ISWM is based on its management which includes regulations and laws, institutions, financial mechanisms, technology and infrastructure, and role of various stakeholders in the solid waste management chain.

2.2.3 Ecological Systems Theory

The ecological systems approach focuses on populations of organizations to examine the effect the environment, market forces, technology, natural resources and geographical locations have on organizational forms and structures; growth, maturity, and mortality rates; and adaptation and selection strategies. The unit of analysis for ecology is on populations or groups instead of units or individuals. Ecology views organizations as communities having interdependency relationships among multiple and diverse populations. Ecological systems determine the rise and fall of organizations and shape the conditions that develop homogeneity, diversity, stability, change and growth among them (Astley, 1985:224).

The ecological approach puts emphasis on environmental characteristics and conditions as determinant factors for organizational evolution and change. Burrell and Morgan (1979:2) suggested that the ecological assumptions that structures evolved over time, and that these changes fit environmental selection, followed the structural functional deterministic approach.

Child (1997:45) elaborates that the ecological approach gives little attention to management choice and decisions as factors influencing organizational evolution. Because the ecological approach “considers that units which do not have organizational forms characteristic of their sector or ‘niche’ have a poorer chance of survival,” it underscores the role of decision makers in the organizational adaptation process. He argues that because organizations as social systems benefit from learning, which results in knowledge creation, they are capable of environmental adaptation. Although the ecological framework concentrates on selection, birth and organizational mortality rates; it does not exclude from the analysis that adaptation and growth involves both learning and technological changes. It considers technological development as the primary determinant factor in societal transformation processes.

The ecological systems approach studies organizations in relation to contextual environmental factors such as “structure, size, technology, and leadership patterns concerned with articulating patterns of contingent relationships among collection of variables that appear to figure in organizational survival” (Smirch, 1983:44). The systems approach views organizations as being composed of several systems that are functional, purposeful and interdependent, where a change in one or more parts of the system will affect the entire system.

Organizations as systems comprise individuals, groups/teams, structures, systems, and policies (Boulding, 1967:127). The systems model looks at organizations as comprising four major components (subsystems). These include: “the tasks (work to be done in the organization), individuals (who perform the work in the organization), formal organizational arrangements (processes that motivate people to work or achieve organizational goals),” and a set of informal organizational arrangements that deal with “communication, power, influence, values, and norms” (Nadler, 1981:193). The structural functional model assumes the four parts are inter-related, with functional relationships that promote congruence and system maintenance. They develop adaptive structures as they interface with environmental changes.

Organizations as ecological systems are affected by organizational and environmental changes. They are always in flux to attain a state of equilibrium to preserve and maintain system characteristics. Organizations process inputs and transform them into outputs. The transformation process requires organizations to sustain themselves by adapting to external

environmental changes. Sustainability enables organizations not only to survive, but also to improve their organizational performance over time (Sisaye, 2001:98). Systems are defined by internal and external processes linking them to their environment. The continued interaction between an organization and its environment introduces what Thompson and McEwen (1969:176) referred to as environmental control, which brings about changes or even alteration of goals. Accordingly, the level of environmental control over the organizational goal-setting process depends on sustainability strategies of adaptation, competition, bargaining, cooptation or coalition. While environmental changes affect organizational systems, structures, strategies, functions, procedures, and day-to-day activities; the impact of these changes on current performances of the organization depends whether or not they are minor or significant (Williamson, 1987:551).

As Haveman (1992:48) noted, environmental changes can have either a considerable or a peripheral impact on organizational core activities. When the changes are considered significant, it can have a negative effect on organizations' core activities of accountability, reproducibility, and performance, which could increase mortality rates. On the other hand, if the changes are minimal and peripheral, it is likely to have a positive effect on improved performance by enabling organizations to enter into new markets or develop related products. It is this surviving tendency that causes inertia to persist as organizations interface with their environment.

Managing environmental change is dependent on the ability of organizations to adopt innovations to improve their operating technological capabilities in response to their competitive environment. Competitive strategy thus becomes a process through which a firm utilizes its resources or competencies to maximize environmental opportunities, while minimizing potential threats raised by the environment (Porter, 1980:41). Competitive performance is thus dependent on the ability of the organization to handle and process these environmental changes.

2.2.4 Small and Medium Enterprises Development

Small and medium sized Enterprise (SME) development is crucial for sustained and equitable development of any economy. Evidence from more economically developed nations demonstrates that SMEs have considerable potential for driving economic growth. Under the right conditions, entrepreneurs, regardless of background, can start and grow SMEs, generating

profits and creating employment opportunities. SMEs drive industrial progress, improve an economy's ability to deal with shocks and are recognized as breeding grounds of innovation.

SMEs and entrepreneurship are now recognized world-wide to be a key source of dynamism, innovation and flexibility in advanced industrialized countries, as well as in emerging and developing economies. They are responsible for most net job creation in developing countries and make important contributions to innovation, productivity and economic growth. However, trade liberalization at the global and regional levels and the new information and communications technologies (ICT) have entwined to create rich opportunities as well as formidable challenges to all interdependent countries and enterprises.

In firm development approaches, firms are seen as temporal phenomena which are born, grow, mature, decline and die. Firm growth is the basic dimension of the models of organizational life cycles (Greiner, 1998:63 and Mintzberg, 1979:6). Numerous models of organizational life cycles have been presented, for instance, a three stage model (Smith et al., 1985), four stage models (Quinn and Cameron, 1983; Kazanjian, 1988:275), five stage models (Scott and Bruce, 1987:47), and a seven stage model (Flamholtz, 1986:9). These multistage models use a diverse array of characteristics to explain organizational growth and development. An organizational life cycle model is one application of the configurational approach in describing the stages of life cycles and the transformation from one stage to another (Mintzberg et al., 1998).

Common to these growth pattern models is the claim that changes in an organization follow a pattern characterized by discrete stages of development (Dodge et al., 1994:130). Typical of these patterns are the sequence of events that show how things change over time, a hierarchical progression that is not easily reversed, and a composite of a broad range of organizational activities and structures. Organizational life cycle models are important in understanding the differences in success factors of the firm between the stages of the life cycle. However, organizational life cycle models have been criticized because of their extreme simplification of reality: in some cases not all stages of development are found, some stages of development may occur several times, the stages of development may occur in an irregular order, and there is a lack of empirical evidence to support the theories (Gibb and Davies, 1990:22; Bridge et al., 1998: 105). In addition, on the basis of the results of their study of high-growth firms, Willard et

al. (1992:196) concluded that “the applicability of conventional wisdom regarding the leadership crisis in rapid growth entrepreneurial firms may no longer be valid, if, in fact, it ever was”.

Despite the critiques of organizational life cycle models, strategic management and entrepreneurship research has demonstrated that life cycle models are one of the most powerful tools for understanding and predicting venture performance. According to Greiner (1998:43), for example, a firm’s failure to adapt to a series of crises caused by growth is one of the principal causes of firm failure.

2.2.5 Conclusion

To be able to design and adopt the most appropriate study model to understand opportunities and challenges in waste management systems and recycling in particular, a proper theoretical background was established. When one is looking for a scientific systematization, and ultimately aiming at establishing an explanatory and predictive order among the domain opportunities and challenges of recycling in waste management, a theory or sets of theories is required.

For this study, various components were borrowed from all the theories discussed above to enable a deeper understanding of the subject matter. Ecological modernization as a theory is a view about relationships between environment, the economy, society and public policy; Waste management theory, built under the paradigm of Industrial Ecology, incorporates waste minimization and/or resource use optimization goals and values; Ecological systems approach studies organizations in relation to contextual environmental factors such as “structure, size, technology, and leadership patterns and Organizational life cycle model, in SME development theory, helps describe the stages of life cycles and the transformation from one stage to another. All this components were important in this study.

2.3 Conceptual Framework

Sustainable development is at its heart the simple idea of ensuring a better quality of life for everyone, now and for generations to come. One of the greatest challenges facing modern society is the need to combat present unsustainable trends, both in the consumption of resources and the equally unsustainable production of waste. Sustainable development pursues a threefold goal of

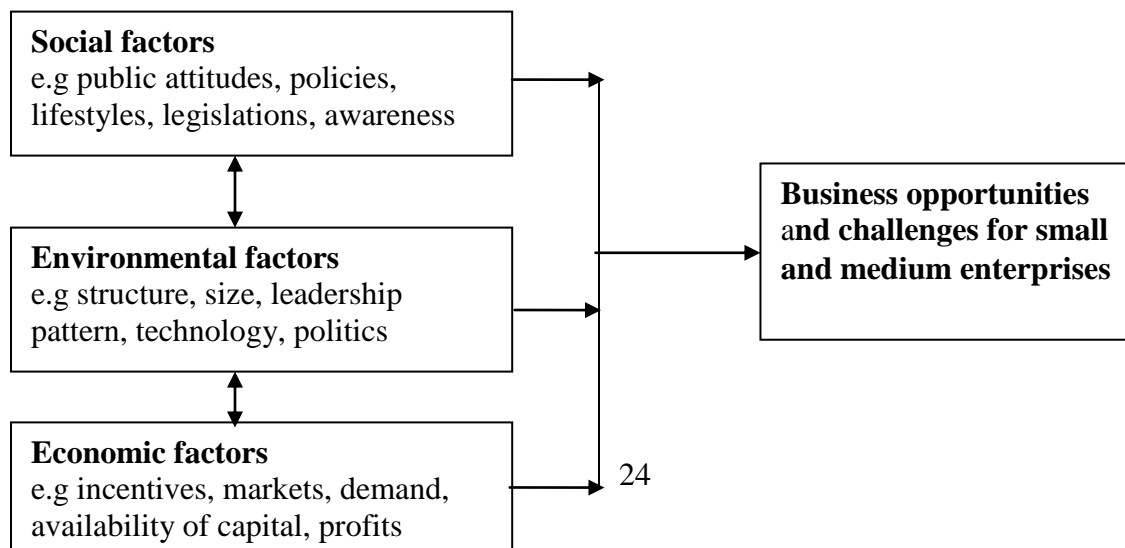
improving economic efficiency, protecting and restoring ecological systems, and enhancing the wellbeing of all people.

Small-Medium Sized Enterprises (SMEs) are important engines of economic growth, employment and development and are a rapidly growing section of the business community. Collectively they contribute significantly to a country’s economy and are responsible for considerable resource consumption. They are substantial contributors to environmental pollution. The relationship between sustainability and business has emerged as one of crucial concern in recent times. This emergence of environmental concerns in business has been driven by the following:

1. There’s an increased awareness of the seriousness of the environmental consequences that have resulted from previous economic growth. The attitude that the environment is a provider of free goods to business and not a set of precious resources is no longer tenable.
2. Industrial accidents and crises have accentuated the awareness of the environmental implications of business.
3. The varying degrees of emphasis which have been placed on environmental issues, reflected in legislation blurs the terms of trade and places an uneven burden on public and private sectors, for instance, in some countries businesses are required to incorporate the costs of good environmental practice within their economic structure (Roberts, 1995: 2).

Looking at the theories explored and emergence of environmental concerns in business, this study in understanding and documenting available opportunities for and challenges faced by SMEs involved in recycling incorporates all social, economic and environmental linkages that could have a bearing on entrepreneurial ethic of the recycling sector.

Figure 2.1: Conceptual Framework

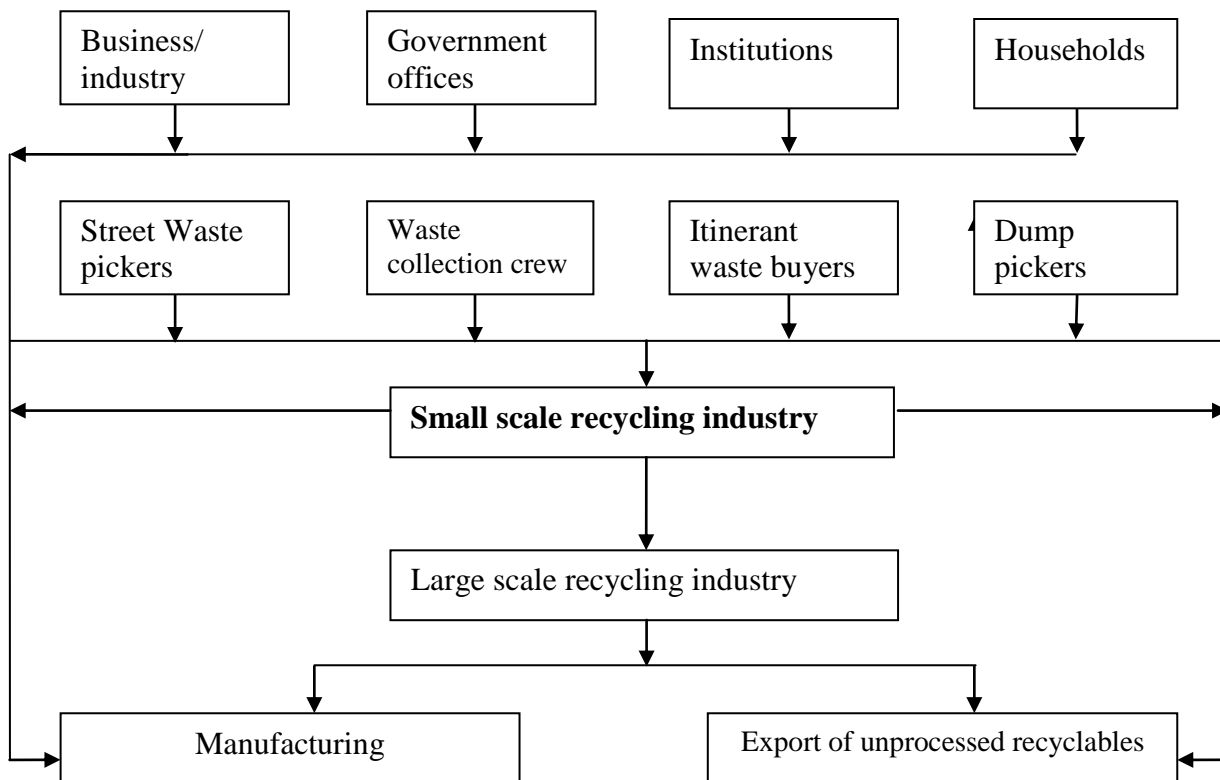


In this study, the conceptual framework as represented in figure 1 above is considered in guiding the study in answering the research questions.

2.4 Research Questions

1. What opportunities and challenges are available for Small and Medium Enterprises in recycling?
2. What measures are small and Medium Enterprises involved in recycling taking to exploit opportunities and overcome these challenges?

Figure 2.2: Recycling Supply Chain



Adapted from Marchand, 1998 with alterations in Scheinberg, 2008:12

CHAPTER THREE

RESEARCH METHODS

In this research study, both qualitative and quantitative approaches were used. Interviews and questionnaires were used as the primary means of data collection. The study adopted a descriptive research design to secure information and understand the opportunities for and challenges faced by small and medium enterprises in waste recycling.

3.1. Site Selection

The study was carried out in Nairobi East Sub-county. Nairobi East is the largest of the three Nairobi Sub-counties with the highest concentration of industries, slums, number of unemployed youth and amounts of waste generated. The Dandora dumpsite is located within this sub-county and has the largest concentration of scavengers, itinerant buyers and small and medium enterprises involved in recycling of metals, plastics, glass and paper. For this study, Nairobi East thus become a natural choice based on access to relevant information as well as its ability to show characteristics typical to both the formal and informal Small and Medium Enterprises that would favor this study.

3.2 Techniques of Data Collection

Survey method was used. The survey approach is the most suited method for gathering descriptive information as it involves asking participants questions on how they feel, what their views are, and what they have experienced (Babbie, 2002). In a survey, the investigator examines those phenomena which exist in the universe independent of his or her action (Kothari, 2004). Its advantage is that, it allowed the collection of large amounts of data from a sizeable population in a highly effective, easily and in an economical way, often using questionnaires.

To help minimize interference to study findings, the researcher created an environment that encouraged objective answers from the respondents. This study also used naturalistic observation of the enterprise environment and activities to help correlate with the respondents' responses, thus employing a triangulated research strategy.

3.2.1 Target Population

The study targeted actors involved with recycling activities especially waste buyers and small and medium scale recycling enterprises in Nairobi East Sub-county.

3.2.2 Unit of Analysis and Unit of Observation

In their path-breaking article, Low and MacMillan (1988:141) suggest that entrepreneurship be defined as the ‘creation of new enterprise’. The purpose of entrepreneurship research should be to ‘explain and facilitate the role of new enterprise in furthering economic progress’. Such a delineation, they held, would encourage researchers to consider both micro and macro perspectives. They argue that researchers must acknowledge that entrepreneurship studies could and should be carried out at multiple levels of analysis and that these analyses complement each other. The reasons for studying entrepreneurship on multiple levels of analysis lie in the characteristics of the entrepreneurial phenomenon itself. Entrepreneurship takes place and has effects on different societal levels simultaneously.

Schumpeter (1934) already linked the entrepreneurial initiatives of individuals to the creation and destruction of industries as well as to economic development. Several other scholars like Moran and Ghoshal (1999), Shane and Venkataraman (2000), have contributed to increasing our understanding about entrepreneurship on different levels of analysis, ranging from the individual to the economy-at-large (in Davidson et al, 2001:84). This study had two units of analysis; the enterprise and individual entrepreneur. The units of observation were the enterprise environment, the entrepreneur and employees.

3.2.3 Procedure for Respondent Selection

Rosco (1975) proposes a rule of thumb for determining a sample size and says that a size of 30 to 500 is appropriate for most researches (in Magutu et al, 2010:10). There are 50 recyclers, 20 waste transfer stations and 22 composters from among whom, using purposive sampling, 15 enterprises in Nairobi East with requisite expertise, specialized knowledge in waste recycling and registered by NEMA to carry out waste management business were selected to participate in the survey. Further, two respondents from each of these organizations, the operations in-charge or owners of these enterprises and an employee were purposively selected as respondents. The

employees gave valuable information on the enterprise and the working environment besides what the entrepreneur offered to the researcher.

3.3 Techniques of Data Processing and Analysis

The research instrument was semi-structured with both open and closed ended questions in all three sections. The instrument therefore collected both quantitative and qualitative data. The data processing and analysis was therefore done using both quantitative and qualitative methods.

The first section of the questionnaire comprised of general information that captured important characteristics of respondents and enterprises. The other two sections sought information on opportunities and challenges and the efforts put in place to exploit opportunities as well as overcoming identified challenges respectively.

Likert scale type questions were incorporated into the questionnaire with five potential choices (strongly agrees, agree, not sure, disagree, and strongly disagree) each assigned a numerical value. A mean figure for all the responses was computed with the average score representing overall level of respondents' agreement with specific statements. This analysis enabled the researcher to document the available opportunities and challenges for Small and Medium Enterprises involvement in recycling. It also enabled documentation of efforts made by Small and Medium Enterprises in exploiting opportunities and overcoming challenges in the recycling sector. Descriptive statistics such as percentages, frequencies, and mean scores were used to analyze quantitative data from closed ended questions.

Qualitative data from open ended questions was analyzed into themes. This entailed identifying, analysing, and reporting patterns (themes) within data. Responses were arranged according to these themes and conclusions made from the data. Text was coded into manageable content categories. By breaking down the contents of materials into meaningful and pertinent units of information, certain characteristics of the message was analyzed and interpreted. Results have been presented in a narrative format. The two methods (quantitative and qualitative), complemented each other in data analysis to enable documentation of available opportunities, challenges and efforts in place for exploitation by Small and Medium Enterprises in recycling.

3.4 Ethical issues

Ghauri and Gronhaug (2010) defined ethics as the moral principles and values which have an effect on the approach of the researcher or a group of researchers to conduct any particular activities (in Kulecho and Khan 2012:20). In this study, special attention was paid to the ethical issue related to the interviewees comfort to participate in the survey and the management of confidential business information given to the researcher.

The researcher gave a written declaration to assure the respondents of the confidentiality of their information and that such information would be used only for purposes of learning and stimulating discussion and furthering research in the area of waste recycling entrepreneurship. A letter authorizing data collection for purposes of this study from the university affirmed this position further.

The researcher used simple language allowing the respondent enough time to respond. Equally, the respondents were given complete liberty to refuse to answer any question they felt uncomfortable with.

3.5 Expected Outcome

The study examined available opportunities for small and medium enterprises and gave suggestions on how best such opportunities could be utilized to the benefit of players in the recycling sector. It also looked at the challenges faced by the SMEs in this sector and gave recommendation on how they can overcome such challenges. The results of this study is expected to stimulate intellectual discussion and encourage further research on the impacts the SMEs have on the economy and how such a sector is impacted by the various policies in place. In ensuring the research is sound, research credibility and validity were looked into.

3.5.1 Research Credibility

Whereas in quantitative research the credibility of data depends on the instrument construction, in qualitative research the researcher is considered as an instrument of credibility (Patton 2002). Credibility deals with how findings have been arrived at and how much they resemble reality. Lincoln and Guba (1985) further argue that the quality of the research depends upon

trustworthiness which has some defined dimensions which can be linked to validity. Thus, to collect data of good quality, researchers have to focus on two major areas; reliability and validity. According to Merriam (1995), qualitative research approach is based on different assumptions which are consistent with reliability and validity.

3.5.2 Reliability

In any social sciences study reliability is the more problematic issue since it measures consistency in research findings. Robson (2002) argue that there are four major threats to reliability; participant error, participant bias, observer error and observer bias. Being conscious of these threats, the researcher is capable of then minimizing the errors that can occur in the data collection and in the analysis (Saunders et al, 2007), leading to high reliability (Kumar, 2005).

In this study, the researcher followed scientific techniques and methods and it is hoped that consistently following these methods, the study generated reliable data and results. Further selection of respondents targeted only those persons in the organizations who had enough experience and were conversant with the operations of the SME in its recycling business.

3.5.3 Validity

Saunders et al, (2007) argue that for research to achieve validity, findings must be accurate and according to design and the research and data must be presented free of false statements. The researcher must take into consideration maturation, history, instrumentation, testing and mortality threats that affect research validity (Kulecho and Khan 2012:19).

To achieve the validity of the research, the interview questions were framed based on theoretical framework. Further, all respondents were given a complete detail about the research under study and the role they could play in the successful completion of the research. The study was never affected by maturation, instrumentation, testing and mortality threats.

3.5.3.1 External Validity

According to Ghauri and Gronhaug (2010) cited in Kulecho and Khan (2012:19), external validity refers to what extent the findings can be generalized and how much these finding are applicable to other cases. The research study targeted the Nairobi East Sub-county. The

researcher does not intend to generalize the findings of this research considering the defined setting, time and specific circumstances. However, the findings can be used to build onto future studies.

CHAPTER FOUR

DATA PRESENTATION AND ANALYSIS

This chapter consists of the presentation and interpretation of data obtained from questionnaires administered to entrepreneurs and employees of organizations involved in recycling enterprises in Nairobi East Sub-county.

This data is based on results from a survey study done in Nairobi East Sub-county in the months of August and September 2013, targeting 15 companies selected purposively from among a list of companies involved in recycling operating within Nairobi East Sub-county and duly licensed by NEMA to undertake such business venture. 30 questionnaires were distributed (2 per company) and filled during data collection.

This data analysis is essentially based on the use of numerical data in the form of numbers, levels and categories. Numerical data was analyzed by use of descriptive statistics and the output presented through the use of tables and pie charts. All data in the tables were generated from the field unless otherwise stated.

Table 4.1: Research Response Rate

No of respondents targeted	No. of respondents met	Companies targeted	Companies met
30	29	15	15

4.1 Enterprises Status

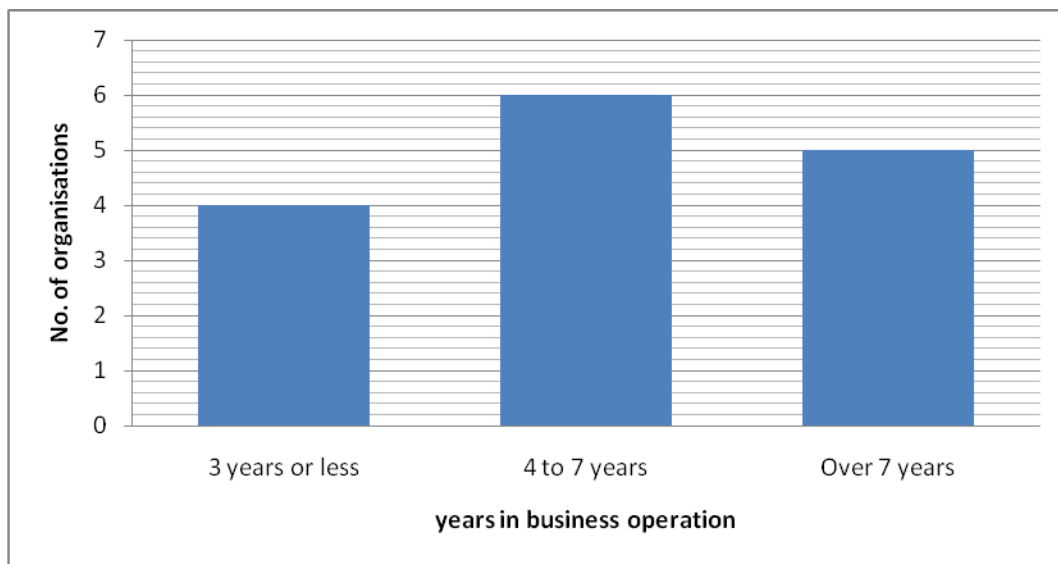
The researcher had intentioned to know the number of years each company had been operational, moreso their engagement in the recycling sector. This was to set basis for understanding and appreciating what individual entrepreneurs and employees perceive as opportunities and challenges, as could be determined by their level of exposure to the business in Nairobi East Sub-county. Table 4.2 below shows the number of years each company has been in business.

Table 4.2: Number of Year’s Respondent Businesses have been in Operation as enterprises

Years of operation	No. of Organization	No. of respondents	Percentage of respondents
3 years or less	4	8	26.6
4 to 7 years	6	11	40
Over 7 years	5	10	33.3
Total	15	29	100%

Five of the companies surveyed had been in operation for over 7 years representing 33.3% while those that had operated between 4 to 7 years and less than 3 years represented 40% and 26.6% respectively. Interesting to note is that the respondents from (organizations) with over 7 years of operation were freer, flexible and more willing to fill the questionnaires as well as interact with the researcher given their quest for new ideas in their daily recycling activities.

Figure 4.1: Graphical Representation of the Number of Years Respondent Businesses have been in Operation



This information was also related to the number of employees who work in these waste recycling organizations aimed at providing a baseline for comprehensive understanding of the research

being undertaken in relation to opportunities available for, and challenges faced by, small and medium enterprises in their recycling effort in Nairobi East Sub-county.

From the data collected, it is realized that 3 organizations representing (20%) have employed 11-20 workers, 1 organization having 1-10 employees representing (6.67%) , 1 organization having 21-30 employees representing 6.67%, 2 organizations having 31-40 employees representing 13.34% and 8 companies have employed more than 51 employees representing (53.33%) respectively. This means that the work force in the recycling industry and opportunities for employment are only but at average level.

While establishing respondent’s business status, the researcher went further to find out if the targeted recycling companies were engaged in any other business activities besides their core activity of recycling. The results are shown in table 4.3 below.

Table 4.3: Enterprise Involvement in other Business besides Recycling

Response	No. of companies	No. of respondents	Percentage (%)
Involved in other business	5	9	33.33
Not involved in other business	10	20	66.67
Total	15	29	100

From table 4.3 above, it is observed that the highest percentage (66.67%) of respondent organizations are not involved in other business besides recycling while only 33.33% are engaged in other businesses. The researcher noticed various other enterprise activities that are dependent on the environment/site where the organization is located or the market demand of related services to the core recycling activity. These include food kiosks, mobile phone airtime voucher sales and money transfer kiosks.

Based on questionnaires filled, the researcher was able to note confusion among the individual entrepreneurs and employees. Whereas the entrepreneurs could state as a matter of fact on the position of the organization as regards the question of involvement in other businesses, we found contradicting information from the second respondent in the same organization.

Worth noting is that some organizations have set up branches in other places/towns to help them achieve their goals and expand their market share targeting a wide range of clientele. According to the data collected, 7 organizations representing (46.67%) have opened branches in other areas whereas the remainder 8 organizations representing (53.33%) do not have branches elsewhere.

This therefore shows the low rate in growth and expansion of recycling industry among the small and medium industries in relation to a very thorough and involving activity of sourcing for raw materials, sorting, cleaning and processing which is time consuming as well as quite costly. Therefore the entrepreneurs are not able to get time to start-up or involve themselves in other activities. However, among the organizations that have branches, one of the organizations has extended its operations to Tanzania, while others have established their branches in Kajiado and Nairobi.

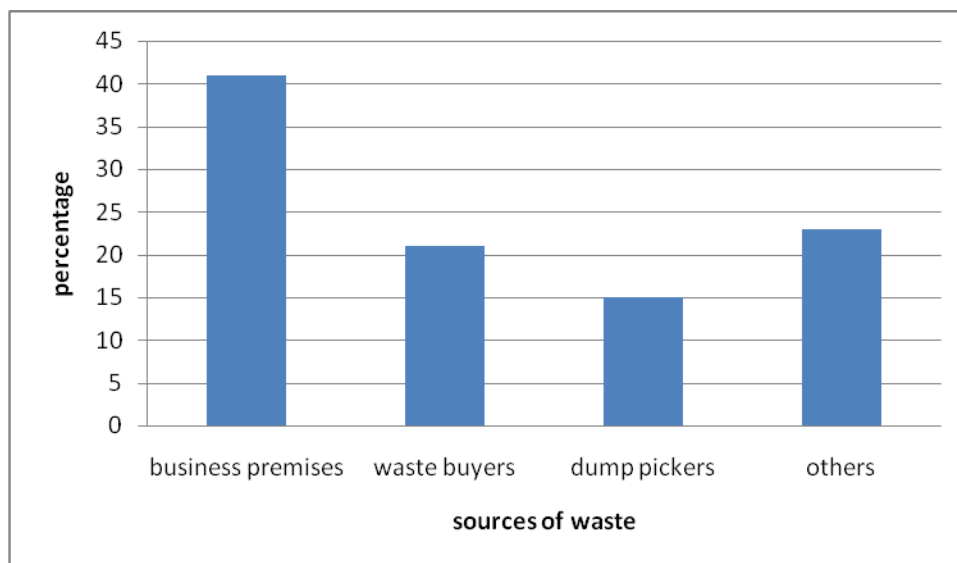
4.2 Sources of Waste for Recycling

Both small and medium enterprise waste recycling industries in Nairobi East Sub-county source their raw materials through various avenues; households, dump pickers, waste buyers, government offices, businesses, street waste pickers, and waste collection crew among other institutions. These sources are however scattered all over Nairobi City, metropolitan areas and its environs.

From the field data, the highest percentage of wastes are sourced from various business premises and outlets contributing about 41%, followed by waste received from waste buyers about 21% and 15% from dump pickers respectively. The remaining percentage is utilized by waste pickers, waste collection crew and households among others sources.

Most enterprises combine all the sources of waste avenues to meet their target for the industry in order to avoid shortage of raw materials. This commitment and strategy has seen most organizations survive and stabilize even during low market seasons and tough economic periods.

Figure 3.2: Sources of Waste for Recycling Enterprises



The highest numbers of organizations interviewed as per the data tabulated have engaged in recycling business for 3 years and below representing 40% while those that have been in operation between 4-7 years and above 7 years represent 26.67% and 33.33% respectively. This therefore shows that most organizations are still new in this field of recycling thus still face several challenges. They also do not fully understand the dynamics of waste recycling business, where to get raw materials, how to handle such waste, legal implications as well as health and safety issues. The results are summarized in table 4.4.

Table 4.4: Period Organization has Engaged in Recycling Business

Period	No. of companies	No. of respondents	Percentage (%)
3 Years and below	6	11	40
4- 7 Years	4	8	26.67
7 Years and above	5	10	33.33
Total	15	29	100

Two business entities representing 13.33% of the respondent enterprises did indicate they had ventured into recycling business way after they had set up. They were driven to the switch by

perceived opportunities in the recycling sector, particularly availability of market for recyclable items and sustainability options for the business.

4.3 Opportunities and challenges for SME in recycling

4.3.1 Opportunities

Entrepreneurs and their employees agree (86.67%) to the fact that there are more opportunities in the recycling business that they can exploit. With such a high response rate in support of the existing opportunities, growth in regards to the waste recycling sector is promising today and in the future.

On a scale of 1-5 where 1 was strongly disagree and 5 was strongly agree, respondents were asked to indicate their level of agreement with a number of statements regarding opportunities for their recycling business. They strongly agreed with the statements that there are more efficient technologies that could be utilized to boost the business (Mode=5, SD=1.356); the business has endured economic challenges (Mode=5, SD=1.163) Waste management regulations are fair and work in the interest of the business (Mode=5, SD=1.246) and waste management policies have encouraged business (Mode=5, SD=1.177).

The respondents agreed to the statements that there is room for business expansion (M=4, SD=1.187); more demand for recyclables than they can handle (M=4, SD=3.93); business is sustainable with predictable revenue sources (M=4, SD=1.162); labor is readily available (M=4, SD=1.178) and social factors like lifestyle changes have favored this business (M=4, SD=.985); The respondents indicated they were not sure that waste segregation will boost business (M=3, SD=1.099) and extended producer responsibility will boost business (M=3, SD=.889).

The respondents disagreed with the statements that staff are well trained on handling waste (M=2, SD=1.401); support from authorities (M=2, SD=.967); financial institutions are supportive of this business venture (M=2, SD=1.211); there is accessibility to market data for business (M=2, SD=1.086); and the business environment is conducive and not affected negatively by political factors (M=2, SD=.471).

There are three important opportunities in recycling that come out from the study findings. They include room for business expansion, efficient technologies that could be utilized to boost recycling business and the ability of recycling business to endure economic challenges. The implication of these unexploited opportunities could translate into a vibrant industry once exploited. Availability of room for business expansion has potential for jobs, improved environment and economic growth owing to increased productivity. Efficient technologies would equally encourage growth and sustainability of recycling industry while endurance to economic challenges of recycling industry translates into certainty that would encourage even more entrepreneurs to get involved in recycling. The end result would be clean and sustainable environment in Nairobi East. The results are summarized in table 4.5 below.

Table 4.5: Response to Opportunities in Recycling

Statements indicating opportunities in recycling business	Mode	Median	Mean	SD	Percentage				
					SD	D	NS	A	SA
There are more efficient technologies that could be utilized to boost the business	5	5.00	4.14	1.356	13.8	-	-	31.0	55.2
The business has endured economic challenges	5	4.00	4.07	1.163	20.7	-	-	31.0	48.3
Waste management regulations are fair and work in the interest of the business	5	4.00	3.86	1.246	27.6	-	-	31.0	41.4
Waste management policies have encouraged business	5	4.00	3.79	1.177	20.7	-	17.2	24.1	37.9
There is room for business expansion	4	4.00	4.14	1.187	10.3	-	-	44.8	44.8
There is more demand for recyclables than we can handle	4	4.00	3.93	.884	13.8	-	-	65.5	20.7
Business is sustainable with predictable revenue sources	4	4.00	3.72	1.162	-	27.6	-	44.8	27.6
Labor is readily available	4	4.00	3.62	1.178	31.0	-	-	44.8	24.1
Social factors like lifestyle changes have favored this business	4	4.00	3.55	.985	20.7	-	17.2	48.3	13.8
Waste segregation will boost business	3	4.00	3.72	1.099	3.4	6.9	34.5	24.1	31.0
Extended producer responsibility will	3	3.00	2.83	.889	10.3	17.2	51.7	20.7	-

boost business									
Staff are well trained on handling waste	2	2.00	2.97	1.401	10.3	44.8	3.4	20.7	20.7
Support from authorities	2	2.00	2.69	.967	-	65.5	-	34.5	-
Financial institutions are supportive of this business venture	2	2.00	2.59	1.211	20.7	37.9	3.4	37.9	-
There is accessibility to market data for business	2	2.00	2.41	1.086	17.2	51.7	3.4	27.6	-
The business environment is conducive and not affected negatively by political factors	2	2.00	2.31	.471	-	69.0	31.0	-	-

Key: SD-strongly disagree, D-disagree, NS-not sure, A-agree, SA- strongly agree

Such opportunities as identified by the respondents include; availability of technology that could boost business, endurance of business to economic challenges, waste management regulation and policies that promote business, room for business expansion, demand for recyclable materials, predictable revenue sources and streams, availability of labor and social lifestyle changes that ensure a steady supply of raw materials.

4.3.2 Challenges and Limitations

On the other hand, entrepreneurs and their employees as sampled out during the study are of the opinion that there exist several challenges and limitations which hinder waste recycling organizations from exploiting the opportunities which are available in this sector.

On a scale of 1-5 where 1 was strongly disagree and 5 was strongly agree, the researcher asked respondents to indicate their level of agreement with a list of challenges affecting their recycling business. The respondents strongly agreed with the statements that waste transport costs are high (M=5, SD=.435); lack of incentives for recycling business e.g. tax subsidies (M=5, SD=.678); waste classification and sorting is cumbersome (M=5, SD=1.205); economies of scale is not conducive for this business (M=5, SD=1.152) and low profit margins (M=5, SD=1.545). The respondents agreed with the statements that; operational costs are high (M=4, SD=.509); harassment by the authorities (M=4, SD=.998); there is no appropriate technology for recycling in place (M=4, SD=1.207); poor hygiene and sanitary conditions (M=4, SD=.979); lack of

capital to expand (M=4, SD=1.090); shortage in cash flow (M=4, SD=.967); and regulations and licensing are punitive (M=3.10, SD=1.589).

Respondents disagreed with the statements that business is seasonal (M=2, SD=1.175) and strongly disagreed that there is lack of viable market for recyclables (M=1, SD=1.263).

The study findings illustrate four key challenges to recycling business. High waste transport costs, lack of incentives for recycling business (e.g. tax subsidies), cumbersome waste classification and sorting, and high operational costs forms the quartet that poses a major challenge to recycling business in Nairobi East. However, were the existing opportunities to be exploited, most of these challenges would be dealt with. First, high waste transport costs and cumbersome waste classification and sorting could be addressed through use of efficient technologies. Incentives such as tax subsidies would make recycling industry even more sustainable hence employing people in hard economic times. These incentives would also lower the operational costs that form part of the challenges for recycling businesses. The findings are presented in table 4.6 below.

Table 4.6: Response to Challenges Affecting Recycling Business

Statements suggesting challenges affecting recycling business	Mode	Median	Mean	Std. Dev.	Percentage				
					SD	D	NS	A	SA
Waste transport costs are high	5	5.00	4.76	.435	-	-	-	24.1	75.9
Lack of incentives for recycling business e.g. tax subsidies	5	4.00	4.36	.678	-	-	10.3	41.4	44.8
Waste classification and sorting is cumbersome	5	5.00	4.10	1.205	-	20.7	3.4	20.7	55.2
Economies of scale is not conducive for this business	5	4.00	3.93	1.152	-	17.2	13.8	24.1	41.4
Low profit margins	5	4.00	3.62	1.545	17.2	10.3	6.9	24.1	41.2
Operational costs are high	4	4.00	4.48	.509	-	-	-	51.7	48.3
Harassment by the authorities	4	4.00	3.93	.998	-	17.2	-	55.2	27.6
There is no appropriate	4	4.00	3.79	1.207	-	27.6	-	37.9	34.5

technology for recycling in place									
Poor hygiene and sanitary conditions	4	4.00	3.62	.979	-	20.7	10.3	55.2	13.8
Lack of capital to expand	4	4.00	3.48	1.090	-	24.1	24.1	31.0	20.7
Shortage in cash flow	4	4.00	3.31	.967	3.4	20.7	20.7	51.7	3.4
Regulations and licensing are punitive	4	4.00	3.10	1.589	27.6	13.8	-	37.9	20.7
Business is seasonal	2	2.00	2.10	1.175	31.0	51.7	-	10.3	6.9
Lack of viable market for recyclables	1	2.00	2.10	1.263	44.8	27.6	-	27.6	

Key: SD-strongly disagree, D-disagree, NS-not sure, A-agree, SA- strongly agree

The entrepreneurs agree to the fact that transport costs for wastes (raw materials), operational costs for a waste recycling business, lack of incentives for recycling business like tax subsidies from government, low profit margins and waste classification and sorting being cumbersome as their greatest challenges. Of importance to note is that seasonality of business and lack of viable market for recyclables were disagreed upon as challenges affecting this industry.

Waste recycling has to some extent contributed substantially to how waste is managed with some reduction in waste volumes and improved livelihoods. Locally the impacts are not widespread but cumulatively and globally impacts are great in relation to global warming and climate change as well as alternative sources of employment.

4.3.3 Effort to Exploit Opportunities and Overcome Challenges

All businesses face challenges in their area of operations and are affected by organizational and environmental changes. To sustain themselves, organizations/businesses must adopt to this changes. Thompson and McEwen (1976:176) argue that continued interaction between an organization and its environment leads to organizations environmental control that lead to use of sustainability strategies of adaptation, competition, bargaining, cooptation or coalition.

On a scale of 1-5 where 1 was not at all and 5 was to a very great extent, respondents were asked to indicate the extent they have put efforts in exploiting opportunities for their business in a number of areas. The respondents indicated that they have put great effort in marketing of products (M=4, SD=1.113) and employment of additional employees to enhance productivity (M=4, SD=1.145). They indicated they have put moderate effort on networking with other businesses for information sharing and marketing (M=3, SD=1.022); compliance with the regulations and licensing requirements (M=3, SD=1.004); segregating waste at source (M=3, SD=.940); and seeking funds to expand business (M=3, SD=1.081).

Respondents indicated they have put little efforts in use of appropriate technology for efficiency in recycling (M=2, SD=1.012) and no effort at all in charging collection and disposal of waste (M=1, SD=1.402).

There are no significant efforts made to exploit recycling business opportunities as can be derived from the study findings. However, there is evidence of moderate efforts towards marketing of products, adding employees to enhance productivity, networking with other businesses for information sharing and marketing, compliance with the regulations and licensing requirements, as well as segregating waste at the source. Little efforts are evident towards seeking funds to expand business, use of appropriate technology for efficiency in recycling and charging collection and disposal of waste.

The findings underscore the failure to exploit existing opportunities. This could be attributed to lack of know how among the entrepreneurs or lack of incentives towards exploiting these opportunities. Although it is evident that recycling business entrepreneurs have sought financial help, perhaps financial institutions have not responded favorably hence making investment in exploiting available opportunities hard. These are characteristics of an industry that is not maximizing its opportunities for growth. A detailed analysis is needed to ascertain the factors that inhibit this reluctance to exploit opportunities. Table 4.7 summarizes the results.

Table 4.7: Response to Efforts Made in Exploiting Opportunities

Statements indicating effort put in exploiting opportunities in recycling business	Mode	Median	Mean	Std. Dev.	Percentage				
					NA	LE	ME	GE	VGE
Marketing of products	4	4.00	3.90	1.113	6.9	3.4	13.8	44.8	31.0
Additional employees to enhance productivity	4	3.00	3.10	1.145	10.3	20.7	24.1	37.9	6.9
Networking with other businesses for information sharing and marketing	3	3.00	3.48	1.022	3.4	10.3	37.9	31.0	17.2
Compliance with the regulations and licensing requirements	3	3.00	3.31	1.004	-	24.1	34.5	27.6	13.8
Segregating waste at source	3	3.00	3.21	.940	-	20.7	51.7	13.8	13.8
Seeking funds to expand business	3	3.00	2.90	1.081	10.3	24.1	37.9	20.7	6.9
Use of appropriate technology for efficiency in recycling	2	3.00	2.90	1.012	-	48.3	20.7	24.1	6.9
Charging collection and disposal of waste	1	2.00	2.41	1.402	37.9	13.8	31.0	3.4	13.8

Key: NA-not at all, LE-little extent, ME- moderate extent, GE-great extent, VGE-very great extent

General feeling of the sampled SMEs is that , if they can exploit the opportunities available to them like marketing, engagement of additional workforce, networking with other businesses, complying to regulations and lisencing requirements, waste segregation at source, use of appropriate technology and access to financing, then their involvement in recycling will be gainful.

Critical to businesses is the realization that they can overcome challenges and turn them to opportunities to their gain. From the study findings, sampled SMEs, have taken a decision to adapt to the challenges faced, using various innovative ideas so that they remain in business.

On a scale of 1-5 where 1 was strongly disagree and 5 was strongly agree, the researcher requested respondents to indicate their level of agreement with a number of statements regarding addressing challenges facing their recycling business.

Respondents strongly agreed with the statements that they have joined an umbrella organization to champion their interest (M=5, SD=1.354). They agreed to the statement that they employ workers on casual basis to lower costs (M=4, SD=.759) and that they have sought financial help (M=4, SD=.802). The respondents disagreed with the statement that they have engaged in other businesses to cater for low seasons (M=2, SD=1.353).

There are many challenges facing recycling business. Two prevalent actions taken to address these challenges include employing workers on casual basis to lower costs and seeking financial help. However, the findings indicate that entrepreneurs have not engaged in other businesses to cater for low seasons. This lack of diversification can be attributed to the ability of recycling business to endure economic challenges and perhaps lack of credit facilities. The findings are presented in table 4.8.

Table 4.8: Response to Actions Taken in Addressing Challenges

Statements indicating actions taken in addressing some challenges facing recycling business	Mode	Median	Mean	Std. Dev	Percentage				
					SD	D	NT	A	SA
Have joined an umbrella organization to champion our interest	5	4.00	3.76	1.354	10.3	10.3	10.3	31.0	37.9
Employ workers on casual basis to lower costs	4	4.00	4.17	.759	-	6.9	-	62.1	31.0
Have sought financial help	4	4.00	4.00	.802	-	10.3	-	69.0	20.7

Have engaged in other businesses to cater for low seasons	2	2.00	2.48	1.353	24.1	44.8	-	20.7	10.3
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Key: SD-strongly disagree, D-disagree, NS-not sure, A-agree, SA- strongly agree

4.4 Discussion

Livelihood needs, creativity, financial demands as well as market demands for recyclables with change in consumption habits have indeed encouraged waste recycling in Nairobi East Sub-county targeting plastic bottles, polythene and stationary papers, carton boxes, metals, e-waste, batteries and many more.

Several opportunities are therefore available to small and medium enterprises in the recycling sector to grow, though with various challenges as well, hence the focus for this investigation by the researcher.

The number of years an organization has been under operation, number of employees, branches, sources of wastes, any opportunities identified by respondents, how they have tried to exploit such opportunities, challenges faced, actions taken to overcome these challenges and any support required by these entrepreneurs to maximize on profits in their business ventures have been considered while trying to answer the key research questions: what opportunities and challenges are available for small and medium enterprises in recycling?, and what measures are small and medium enterprises involved in recycling taking to exploit opportunities and overcome these challenges?

From research findings, most of the enterprises in recycling business are fairly young (7 years and below) and as such face a myriad of challenges as much as they have opportunities awaiting exploitation. Opportunities, challenges, efforts in place to exploit such opportunities and actions taken to address the challenges have been grouped into themes, combining primary with known secondary data to answer the research questions.

4.4.1 Technology

As much as the respondents strongly agree that there is efficient technologies that can be utilized to boost business, they posit that currently appropriate technology is not in place to aid recycling business. Of interest, they have put little effort in utilizing or using technologies to boost their business. They tend then to use more manual labor to carry out functions, resulting in slow outputs.

Most of the efficient, effective, reliable and safe technology to support the waste recycling sector is neither readily available on the local market nor is it cheap on the international/outside market, therefore most small and medium enterprises in these business line do rely on “jua kali” made technology which could be lacking on standards and perfection. This indeed could explain why the demand for recyclables is higher than they can fulfill attributed to output inefficiencies. To address this problem, the entrepreneurs have proposed appropriate training and equipping of staff involved in recycling with right technology and provision of tax incentives especially on equipments that can be used in the industry, as key focus areas to promote use of technology.

Technological improvements in the recycling sector adds value, saves on time and to some extent saves on operational costs of recycling enterprises. Getting the appropriate technology that does all this work at times poses a challenge to the sampled SMEs because of the cost of acquiring all these equipments for use in recycling. Most of the sampled SMEs to a great extent believe that appropriate and improved technology will add value to their operations and aid in overcoming the challenges but its adoption and consequent use depends on costs of its acquisition.

4.4.2 Waste Policies and Legislations

We noted that respondents are appreciative of the various waste regulations and policies in place that work in favour of their business thus encouraging entrepreneurship in recycling. Though the regulations and policies are supportive of investment in the sector, respondents were of the opinion that these policies and regulations are punitive hence many of the sampled organisations have put moderate effort to be in compliance with the regulations and licensing requirements. They encouraged enforcement of this regulations by NEMA and other relevant government

departments but decried the harassment that comes with such actions from law enforcers, police and city council authorities who take advantage of their ignorance of bylaws and other waste sector management regulations. They indicated that they have devised ways to remain afloat as far as enforcement is concerned that includes working at night and weekends when not under watch and if necessary, giving handouts to law enforcers as protection fee to be allowed to be operational.

Kasozi and Blottnitz (2010) argue that beyond the mandatory licenses and permits, there are no regulations guiding private sector involvement in waste management. The over 115 private firms and enterprises in Nairobi are operating “in open competition with each other on a purely ‘willing-buyer-willing-seller’ basis.”

Majority of the sampled SMEs are however, willing to make effort to comply with different regulations and licensing requirements for the SMEs so as to exploit the available opportunities for their business. Of the sampled entrepreneurs, 75% feel that to a great extent when they comply with the regulations they will be taken serious and this will be good for their businesses as compared to the 25% who strongly believe it will work so much to their disadvantage. In general the business operators agree that compliance to policies and regulation governing this sector is inevitable.

4.4.3 Waste Segregation

Waste classification and sorting of waste is a cumbersome exercise in recycling business, thus the need to engage in waste separation at source. Though the respondents are not sure how active waste segregation will boost their business, they are putting moderate efforts in segregating waste at source.

Though there is no infrastructure in place to support waste separation at source, its implementation is called for in order to facilitate downstream recovery of reusable materials, reduce the amount of waste channeled toward dumpsites, and avoid the labor intensive mechanical separation systems used currently by many businesses. Through introduction of collection charges for unsorted wastes, source separation can be encouraged. Of all the sampled

organizations, only 5 representing 33.33% are charging collection fees on wastes and this is because they are handling highly specialized recyclables.

While there is a temptation to have waste collection paid for in Nairobi using flat or fixed rates as is the case traditionally in many other areas globally, the sampled SMEs, though keen to know how this issue will translate to improving their business, are not viewing it as an appropriate opportunity to explore now. However they urge the authorities to introduce charges on municipal solid waste as an economic means to reduce the generation of mixed wastes at source.

As evident from the experience in individual developed cities with such a charging system in place, waste charging is effective in achieving waste reduction and waste separation. In order to make this charging a success, there is need for community consensus promotion on every aspect of the system and also a need for behavioral change in the public psyche as regards disposal practices. Waste separation at source is expected, once implemented, to save entrepreneurs costs in transport and employment, besides increasing turnover since little time will be spent separating their raw materials at the holding sites.

4.4.4 Financial Services and Assistance

The waste recycling business faces a challenge from non supportive financial institutions as noted from the level of disagreement with the statement that financial institutions are supportive of this ventures. The entrepreneurs agree that there is shortage in cash flows and lack of capital to expand business. They have put moderate effort in seeking funds to expand business. Many of the respondents actually pump money into these ventures, not obtained from the financial institutions but personal savings and soft loans from friends and relatives.

The business endures economic challenges as well as shilling turbulence, has sustainable and predictable revenue sources with room for expansion. This can be attributed to Kenya's rapid industrialization since independence that has generated immense benefits and economic opportunities for many, accompanied by growth of wastes generation and environmental pollution. In this respect, improper waste disposal has generated widespread concern, calling for need to salvage and re-use waste resources by adopting economically viable waste disposal

practices such as reduce, re-use and recycle. It's this concept that has created opportunities for a vibrant waste recycling entrepreneurial ethic.

For any business entity to grow and expand, injection of additional capital and funds is a must. All the sampled entities were in agreement that more finance will most definitely create an avenue for opportunity exploitation; adopting appropriate technologies, establishing more branches and general improvement of the business.

4.4.5 Operations

The respondents sampled strongly agree that high transport costs, low profit margins, uncondusive economies of scale for the recycling venture and lack of incentives like tax exemptions for equipment, result in high operational costs for some businesses in this sector. This is worsened further by lack of accessibility to market data especially in areas of research, market valuation, value addition among others, lack of support from authorities and negative effects from political activities.

With such challenges affecting operations, one wonders what keeps them in business. The entrepreneurs are driven by profit motivation. It's worth noting that the business is not seasonal, thus they are operational year round, they have a ready supply for raw materials and market for recyclables, actually with demand more than they can sustain to supply.

Waste production has skyrocketed to 3120 tons/day, and total collection rates are just 50%. However, of the 1510 tons/day that are collected, 150 tons are recycled and 830 tons/day are disposed of at the city's municipal landfill, which leaves 580 tons/day of collected waste unaccounted for. This means that a total of 2140 tons/day, or just fewer than 70% of total waste generated each day, is uncollected and/or inappropriately disposed of, presumably ending up in the city's estimated 60 illegal dump sites (Kasozi and Blottnitz 2010). This data is supportive of a steady supply of raw materials to this sector.

4.4.6 Human Resource

Effective and committed employees contribute a lot to any kind of an establishment. The respondent entrepreneurs agree that labor is readily available for the SMEs in recycling and that they put great effort in employing additional employees wherever opportunities arises, more so casuals to reduce on operational costs. Mostly though, the available labor is untrained-citing lack of adequate knowledge among workers contracted to work in these business entities thus the business has to invest in training its employees both casual and permanent, further increasing the cost of operation.

From the data collected, it is realized that 3 organizations representing (20%) had employed 11-20 workers, 1 organization having 1-10 employees representing (6.67%) , 1 organization having 21-30 employees representing 6.67%, 2 organizations having 31-40 employees representing 13.34% and 8 companies have employed more than 51 employees representing (53.33%) respectively. This means that the work force in the recycling industry and opportunities for employment are largely unexploited. A good investment into this sector can create enormous job opportunities for the unemployed masses in Kenya.

4.4.7 Marketing

All the sampled SMEs appreciate the importance of business marketing. This sector enjoys availability of a steady and viable market for recyclables. The respondent entrepreneurs are putting great efforts in marketing their products. They are taking marketing as a serious tool for survival, in a very dynamic and changing recycling demand driven environment. They are concentrating in building a market data for recyclables as to enable them know what and when particular items are in high demand, to enable planning. While planning however, the entrepreneurs are least concerned about the gains they bring to the environment through recycling but rather, very much concerned about the financial gains they accrue from their business.

4.4.8 Networking

All the sampled SMEs were in agreement on the really important aspect of joining an umbrella body to champion their interests and networking as to exploit more opportunities available and

overcome many and more challenges which might rise up during their operational periods. They believe that championing for their interests as a group is more beneficial than fighting as a lone ranger. Further, networking aids in improving their business environment, increase in profits and knowledge base through constant idea exchange among different entities with common business interests.

The ISWMP (proposed blue print for waste management in Nairobi County) emphasizes the need for a stronger recycling sector, and highlights the opportunity to integrate the sizeable community of informal recyclers into this process. Given their already substantial share of the recycling industry and the enormous impact the waste sector has on their livelihoods, the ISWMP makes the informal sector a central focus for possible reforms and improvement.

Though extended user responsibility lies in the grey area as an opportunity for exploitation, any plan for waste recycling should incorporate this concept in view of the emerging challenges of e-waste management as well as sharing of new ideas and information.

4.4.9 Work Environment

Respondents agree to the fact that poor hygiene and sanitary conditions is indeed a big issue. Occupational health and safety concepts in the work place are still largely ignored, posing health challenges to the ignorant masses both at the workplace and without the workplace. For the established SMEs that have been in operational over 7 years, it was observed that the working areas are in good condition suitable for the workers to carry out their activities, in observance to Occupational health and Safety standards, providing appropriate personal protective equipment, using appropriate technologies and equipments. A few of organizations that have been operational for between 4-7 years and all that have been operational for less than 3 years had the worst operational areas, majority being in the open air., providing little if any of the personal protective equipments and majorly relying on casual laborers to handle their work.

Through education, training and provision of protective equipment wherever possible, while observing the provisions of Occupational Safety and Health Act, 2007, the work environment can be improved significantly.

4.4.10 Business Survival Tactics

As much as these challenges and limitations were pointed out, the respondents in ensuring they remain afloat as businesses, indicated that they strive in ensuring they comply with relevant regulations and licenses, engage waste pickers to minimize transport costs, invest more personal money (capital) in the business, reduce labor costs by employing casuals, engage in aggressive marketing, enroll into '*chamas*' to enable them access to financing, use of innovating '*Jua kali*' technology albeit insufficient and cumbersome, use of unorthodox means like giving handouts to law enforcement officers (protection fee) and opting to work at night away from authorities watch. Through good planning, information sharing and strong feasible business ideas and plans in tandem with financial regulations and standards that attracts funding from financial players, most of the challenges are overcome and opportunities exploited.

4.5 Business Promotion Intervention Point

Notably, each SME sampled require different support needs to operate optimally and exploit available opportunities in the recycling sector while overcoming the challenges that present themselves during their operations.

The respondents suggested the need to have a sufficient waste transport system to ensure availability of recyclables, appropriate training and equipping of staff involved in recycling, provision of tax incentives especially on equipments that can be used in the industry, availability of accessible financing to the entrepreneurs, enforcement of relevant regulations by NEMA, increased taxation on importation of finished products whose raw materials are available locally, establishment of factories that can utilise the recyclable materials, establishment of a marketing agency for the recyclables outside Kenya, promoting use of appropriate technologies and harmonised licensing regime.

CHAPTER FIVE

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

This chapter presents the summary of research findings, recommendations and suggestions for further research.

5.1 Summary

The government of Kenya has recognized the problem of waste management and disposal affecting many towns in Kenya. National Environmental Management Authority (NEMA), the primary government agency which is responsible for the formulation and enforcement of policies related to the environment, published the Waste Management regulation of 2006 which spells out procedures in controlling generation, handling, transportation, storage, or disposal of waste that threatens public health, the environment and natural resources. NEMA is equally tasked to develop guidelines that address emerging issues on waste recycling and material recovery, more so now, in view of emerging challenges on e-waste.

Waste management globally is a headache and a very big challenge facing not only developing countries but also developed countries. Improper disposal creates health hazards, pollution of the environment and resource waste. In this respect, waste disposal has generated widespread concern, calling for need to salvage and re-use waste resources by adopting economically viable waste disposal practices.

Waste recycling by small and medium enterprises has brought about a great intervention process and engineered creativity which has benefited not only human needs but the environment at large. The utilization of waste products preserves valuable resources while solving potential environmental pollution problems. Waste recycling also reduces the amount of waste going into the environment, reduces green house gas emission that can contribute to climate change as well as saves energy.

Opportunities available for exploitation by enterprises in recycling include; availability of technology that could boost business, endurance of business to economic challenges, waste management regulation and policies that promote business, room for business expansion,

demand for recyclable materials, predictable revenue sources and streams, availability of labor and social lifestyle changes that ensure a steady supply of raw materials.

The **challenges** faced by these entrepreneurs and enterprises include high transport costs for wastes (raw materials), high operational costs, lack of incentives like tax subsidies from government, low profit margins, cumbersome waste classification and sorting exercise, harassment by government agencies and lack of capital to aid business expansion.

Sampled SMEs opine that , if they can exploit the opportunities available to them like marketing, engagement of additional workforce, networking with other businesses, complying to regulations and licensing requirements, waste segregation at source, use of appropriate technology and access to financing, then their involvement in recycling will be more gainful. To achieve this, the entrepreneurs have joined an umbrella organization to champion their interest, employ workers on casual basis to aid lower operational costs, have sought financial help especially loans to assist with expansion programs but clearly have refuted as to their engagement in other businesses to cater for low seasons.

5.2 Conclusion

Domestic waste recycling in Nairobi East Sub-county is largely fuelled by informal waste trade. This paper has documented the available opportunities and challenges for Small and Medium Enterprises involvement in recycling, efforts made by Small and Medium Enterprises in exploiting opportunities and overcoming challenges therein, in the recycling sector.

Though not exhaustive, the paper has highlighted the key and salient issues like the need to have a sufficient waste transport system to ensure availability of recyclables, appropriate training and equipping of staff involved in recycling, provision of tax incentives especially on equipments that can be used in the industry, availability of accessible financing to the entrepreneurs, enforcement of relevant regulations by NEMA, increased taxation on importation of finished products whose raw materials are available locally, establishment of factories that can utilise the recyclable materials, establishment of a marketing agency for the recyclables outside Kenya and promoting use of appropriate technologies and harmonised licensing regime, that need to be addressed to

help improve the recycling sector. It has focused and borrowed various components from the theories discussed earlier to enable a deeper understanding of the subject matter.

Issues regarding relationships between environment, the economy, society and public policy have been anchored in Ecological Modernization theory whereas issues of waste minimization and/or resource use optimization goals and values; have been influenced by Waste management theory, built under the paradigm of Industrial Ecology. Ecological systems approach did assist with the deeper understanding of organizations in relation to contextual environmental factors such as “structure, size, technology, and leadership patterns and Organizational life cycle model, while SME development theory, helped clarify enterprises’ stages of life cycles and the transformation from one stage to another.

This study thus indicates that waste recycling is an entrepreneurial activity worth venturing into. Recycling presents an opportunity for extracting economic and environmental benefits from wastes. Opportunities available include availability of labor, availability of market for recyclables, conducive waste sector legislations, business ability to endure economic challenges and supply of raw materials. With sound management and innovations on the part of the entrepreneur, the challenges like high operational cost can be overcome with ease. The sector is a source of employment for many people impacting their livelihoods through gain in incomes, while restricting environmental pollution.

5.3 Recommendations

By encompassing the principles in the waste hierarchy of reduce, re-use and recycle, we can turn waste materials into resources to be valued, reduce the need for increasing extraction of raw materials and fossil fuels, generate employment, increase incomes at household levels, and improve occupational and environmental health in general while promoting human development via available opportunities.

There is need to formalize the operation and roles of actors involved in waste recycling and associated trading activities through a participatory approach that targets social equity, inclusiveness and environmental sustainability. The regulators and entrepreneurs need to agree

on the best formula to use to promote the sector as a business enterprise while impacting positively on livelihoods.

The researcher recommends the enactment and implementation of a policy on source separation to enhance and promote waste recycling. Public education on advantages of using recycled products including its environmental benefits needs to be promoted extensively among the masses, thus expanding the market for recycled products. Financial, technological and technical assistance should be given to all entrepreneurs and enterprises involved in recycling to promote business expansion and efficiencies and ensure swift and consistent enforcement of existing legislations and by-laws to promote recycling. Government incentives to entrepreneurs and investors in the recycling business will go a long way in impacting positively on the environment while supporting entrepreneurship in the recycling sector especially in Nairobi East Sub-county.

5.4 Areas for further research

Further research needs to be done by both waste recycling entrepreneurs and academia to fill up the knowledge gaps existing on recycling sector entrepreneurship. Education and gender perspectives in the waste recycling enterprises require to be interrogated further, in future studies.

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APPENDICES

APPENDIX I: QUESTIONNAIRE

Introduction

This study seeks to examine the opportunities available for, and the challenges faced by, small and medium enterprises in their recycling effort in Nairobi East Sub-county. Your organization has been chosen to participate in the study. The information provided will remain confidential and will be used exclusively for academic purposes. The questionnaire has three sections; section A seeks general information, B seeks to document opportunities and challenges, and section C seeks to find out the efforts in place to exploit opportunities and mitigate challenges. Kindly tick or fill in the spaces provided as appropriate. Thank you for participating.

Section A: General Information

1. How long has your organization been in operation?

3 years and below 4-7 years 7 years and above

2. How many employees does your organization have?

1-10 employees 11-20 employees 21-30 employees

31-40 employees 41-50 employees 51 and above

3. Besides recycling, does your organization engage in any other business activity?

Yes No

4. Kindly indicate the location(s) from where your organization operates.

.....
.....

5. Do you have branches?

Yes No

6. If yes, how many and where?

.....
.....

7. What are your sources of waste for recycling?

Source (tick as appropriate)		Area of the city the source is located
Household		
Dump pickers		
Waste buyers		
Government offices		
Businesses		
Street waste pickers		
Waste collection crew		
Other institutions		

8. For how long has your organization engaged in recycling business?

3 years and below 4-7 years 7 years and above

Section B: Opportunities and Challenges for SMEs in Recycling

9. Do you feel there are more opportunities in recycling business than you have been able to exploit?

Yes No

10. If yes above, what are some of these opportunities that you would want to exploit?

.....
.....
.....

11. What limits you from exploiting these opportunities?

.....
.....
.....

12. Kindly indicate your agreement with the following statements as opportunities for your recycling business.

Statements suggesting opportunities for recycling business	Strongly Disagree	Disagree	Not sure	Agree	Strongly Agree
Support from the authorities (e.g. Nairobi city county and government agencies like NEMA)					
Business is sustainable with predictable revenue sources					
There is more demand for recyclables than we can handle					
The business environment is conducive and not affected negatively by political factors					
The business has endured economic challenges					
Social factors like lifestyle changes have favored this business					
There are more efficient technologies that could be utilized to boost the business					
Waste management policies have encouraged business					
Waste management regulations are fair and work in the interest of the business					
Labor is readily available					
There is room for business expansion					
Financial institutions are supportive of this business venture					
Staff are well trained on handling waste					
There is accessibility to market data for business					
Waste segregation will boost business					
Extended producer responsibility will boost business					

13. What do you consider the main challenges in recycling business?

.....

14. Have you managed to overcome these challenges?

Yes [] No []

If yes, how?

.....

If no, why?

.....

15. Kindly indicate your level of agreement with the following challenges affecting your recycling business.

Statements suggesting challenges for recycling business	Strongly Disagree	Disagree	Not sure	Agree	Strongly Agree
Regulations and licensing are punitive					
Business is seasonal					
There is no appropriate technology for recycling in place					
Economies of scale is not conducive for this business					
Harassment by the authorities					
Lack of capital to expand					
Shortage in cash flow					
Low profit margins					
Lack of viable market for recyclables					
Waste classification and sorting is cumbersome					
Waste transport costs are high					
Operational costs are high					
Lack of incentives for recycling business e.g. tax subsidies					
Poor hygiene and sanitary conditions					

Section C: Efforts to Exploit Opportunities and Overcome Challenges

16. What are you doing to ensure you maximize on opportunities in recycling business?

.....

17. To what extent have you put the following efforts in exploiting opportunities for your business?

Statements indicating efforts put	Not at all	Little extent	Moderate extent	Great extent	Very great extent
Compliance with the regulations and licensing requirements					
Segregating waste at source					
Use of appropriate technology for efficiency in recycling					
Additional employees to enhance productivity					
Seeking funds to expand business					
Marketing of products					
Charging collection and disposal of waste					
Networking with other businesses for information sharing and marketing					

18. To what extent have your efforts to maximize on these opportunities contributed to your recycling business?

Not at all [] Little extent [] Moderate extent []
 Great extent [] Very great extent []

19. Kindly indicate your agreement with the following statements on addressing challenges facing your recycling business.

Statements indicating actions taken	Strongly Disagree	Disagree	Not sure	Agree	Strongly Agree
Have joined an umbrella organization to champion our interest					
Have engaged in other businesses to cater for low seasons					
Employ workers on casual basis to lower costs					
Have sought financial help					

20. To what extent have you been successful in overcoming these challenges?

Not at all [] Little extent [] Moderate extent []
 Great extent [] Very great extent []

21. What kind of support would you require to exploit opportunities in recycling business?

.....

22. What kind of support would you require to overcome challenges?

.....

Thank you.

APPENDIX II: NATURALISTIC OBSERVATION CHECKLIST

General Environment	
Office Premises	
Size	
Lighting	
Aeration	
Arrangement	
Other	
Number of employees involved in actual recycling	
Other issues concerning employees	
Personal Protection Equipment	
Gloves	
Eye gear	
Overalls	
Dust masks	
Industrial/ safety boots	
Other	
Equipment/machines	
Appropriate working tool provided	
Jua kali made	
Imported machines	
Other	
Type of materials being recycled	
Plastic	
Paper	
Scrap metal	
Organic (market/kitchen waste)	
Batteries	
Bottles	
Others	