STRATEGIC FACTORS AFFECTING SUSTAINABLE INDUSTRIAL WASTE MANAGEMENT IN KENYA: A CASE STUDY OF NAIROBI BOTTLERS LIMITED

BY

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UNITED STATES INTERNATIONAL UNIVERSITY - AFRICA

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A Research Project Submitted to the Chandaria School of Business in Partial Fulfillment of the Requirement for the Degree of Masters in Business Administration (MBA)

UNITED STATES INTERNATIONAL UNIVERSITY - AFRICA

SUMMER 2016
STUDENT’S DECLARATION

I, the undersigned, declare that this is my original work and has not been submitted to any other college, institution or university other than the United States International University - Africa in Nairobi for academic credit.

Signed: ___________________________ Date: ___________________________

Ruth Amondi Ochoro (644314)

This project has been presented for examination with my approval as the appointed supervisor.

Signed: ___________________________ Date: ___________________________

Prof. Peter Lewa

Signed: ___________________________ Date: ___________________________

Dean, Chandaria School of Business
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ABSTRACT
The main purpose of this study was to examine the strategic factors that affect sustainable industrial waste management at Nairobi Bottlers. The study attempted to answer the following research questions; How does waste reduction strategy contribute to sustainable waste management? To what extent does waste reuse strategy lead to sustainable waste management? And how does recycling of waste help in sustainable waste management?

This study adopted a descriptive research design. The study adopted this design owing to the inability to manipulate the collected data. Quantitative methods were used to analyze collected data. After data had been data collected via the questionnaires, it was examined for completeness then coded. It was then entered into Statistical Package for Social Sciences (SPSS) for subsequent analysis. The sample frame for the study was obtained from the human resource payroll listing. The sample was classified into several strata as the researcher used simple random sampling technique to select the desired sample size from each stratum of the population. A sample of 20% of the entire population was used since the employees in the different lines of operations were homogenous in terms of the knowledge they possess with regards to waste management.

The study shows that the onus and costs of managing waste streams should be placed on ‘producers’ of the waste and that, municipal solid waste management system has changed from being efficient to the current status that displays a lot of inefficiencies. It also showed that, storage, collection, transportation and final treatment/disposal of wastes has become a major problem in urban centers and that, the global trend of increased use of electrical and electronic goods has led to an increase in E-waste becoming a significant threat to our environment and human health.

The study revealed that, a sustainable method of waste management involves looking for opportunities to reduce waste even during the product life cycle and implementation of simplified leaness evaluation metrics can be used to reduce waste and improve effectiveness and efficiency in organizations. It also showed that, availability of adequate garbage disposal in urban area can improve community development and cohesion of waste management and organizations should involve communities around them in waste management programs to promote publicity on waste management.
The study showed that reusing waste is the best strategy of creating a sustainable waste management by companies and an effective way to reuse solid waste is through burning materials that are combustible and melting down non-combustible materials through the company’s incinerators. It also showed that, waste ash from incineration can be used to improve soil fertility on urban areas and disposal of both non-degradable and degradable wastes separately can be used to safely use the generated wastes for agricultural purposes.

The study revealed that, the country has put in place institutions to address climate change, biological diversity and combating desertification and that, the Kenyan Government has put in place a wide range of policy, institutional and legislative frameworks to address the major causes of environmental degradation and negative impacts on ecosystems emanating from industrial and economic development programmes. The study also showed that, private sector involvement can facilitate efficient municipal solid waste management services as compared to the public and that, public waste awareness and support facilitates the success of companies in managing industrial waste.

The study concludes that, waste management in the urban centers has been subjected to enormous commercial and legal changes over the last two decades and the country has a sustained and multi-faceted legislative and policy attack on landfill, and waste management both at the domestic and international level. The study also concludes that behavioral instruments could be used in implementing waste management strategies through initiatives that inform and educate and waste awareness and participation and that recycling can also be used by companies at waste recycling plants as a strategy of creating a sustainable waste management system.

The study recommends that the policy makers in both government and companies make use of behavioral instruments that could be used in implementing waste management strategies through initiatives that inform and educate and waste awareness and participation. They can achieve this using recognition programs, and door-to-door awareness, and it also recommends that industries should involve and train the public to help them manage their waste.
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<th>Abbreviation</th>
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<tr>
<td>C&amp;I</td>
<td>Commercial and Industrial</td>
</tr>
<tr>
<td>CIPS</td>
<td>Chartered Institute of Purchasing and Supply</td>
</tr>
<tr>
<td>IE</td>
<td>Industrial Ecology</td>
</tr>
<tr>
<td>KNCPC</td>
<td>Kenya National Cleaner Production Center.</td>
</tr>
<tr>
<td>NBL</td>
<td>Nairobi Bottlers Limited</td>
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<tr>
<td>NEMA</td>
<td>National Environment Management Authority</td>
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<tr>
<td>PET</td>
<td>Polyethylene Terephthalate</td>
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<td>SPSS</td>
<td>Statistical Package for Social Sciences</td>
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<tr>
<td>SWM</td>
<td>Solid Waste Management</td>
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<tr>
<td>UK</td>
<td>United Kingdom</td>
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<td>USEPA</td>
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CHAPTER ONE

1.0 INTRODUCTION

1.1 Background of the Problem

The rise in population over many cities and towns and industrialization has become an increasing contributor to waste disposal. Waste disposal became problematic with the rise of towns and cities where large numbers of people started to congregate in relatively small areas in pursuit of livelihoods (Shafiul & Mansoor, 2003). Until recently waste management was never held in high regard. It was a subject that was not considered as important in many municipalities and government offices especially in developed countries (Pitchel, 2005). Increasing number of industries producing different kinds of waste have since been a great contributor to environmental pollution causing governments to control waste that is being discharged into the natural environment. In most developing countries, the urban authorities are responsible for waste management. Proper waste management is normally a Key Performance Indicator of good governance in an industry and municipality at large (Spaargaren et al., 2012). The scope of waste management is not well understood and understanding it well, would help in designing strategies for waste management.

Industrial activities are increasingly in confrontation with ecological systems. Continued natural resource exploitation and environmental impacts of resource use and pollution are cause for concern around the world. One broad approach emerging in response to these concerns is called Industrial Ecology (IE). IE offers important goals and organizing principles for reforming industry, providing concepts which are gradually being embraced by leaders in industry, academia, and government agencies. IE signals a shift from "end-of-pipe" pollution control methods towards strategies for more comprehensive prevention and planning of environmentally sound industrial development. IE is advanced as a holistic approach to redesigning industrial activities (O’Rourke, Connelly & Koshland, 1996).

Environmental issues have attracted the attention of many people. People are becoming increasingly conscious of variety of problems like global warming, acid rain, pollution in air, water and land etc. All these issues have been of concern to many nations and citizens at large (Nag, 2005). Solid waste result from human domestic activities, social and
industrial activities for the purpose of improving in the standard of living, increase in population and development of technology.

A major problem encountered in big cities is industrial municipal, industrial, healthcare and also hazardous waste management. Industrial and hazardous waste management are the most important among them all since there is often lack of proper planning and management thus leading to immense pollution of water, soil and even atmosphere in the surrounding environment (Hoveidi et al., 2013).

A great problem that the world is facing today is the cost of protecting the environment vis-à-vis the return that would be yielded from that cost. The current practice of controlling pollution, waste treatment and good proper disposal or recycling mechanisms are considered very expensive ventures. Traditional approach to industrial waste management for clinical waste, agricultural waste, industrial waste and municipal solid waste could be actually considered disastrous since it led to depletion of natural resources due to the fact that the disposal was not done properly (Salah, 2007). This is the reason why proper sustainable waste management measures should be taken to curb the issue. Waste generated in very large quantities is very difficult and expensive to dispose of. Most of the large sources of such wastes are industries and residential places. Such waste will always pollute and intoxicate the air and water sources in a way that causes a threat to the health of human being and even animals and plants. The dynamic and ever changing environment leads to many new and unique types of wastes produced; the challenge becomes the cost of managing and disposing this waste in an environmental friendly way (Muniafu & Otiato, 2010).

In recent years there has been growing concern about the negative impacts that industry and its products are having on both society and the environment in which we live. The concept of sustainability and the need to behave in a more sustainable manner has therefore received increasing attention. With the world’s population growing rapidly and generally improving wealth, the consumption of materials, energy and other resources has been accelerating in a way that cannot be sustained. With issues such as global warming also now more openly acknowledged as being significantly influenced by our activities, there is a clear need to address the way society uses, and often wastes, valuable resources (Hester, Harrison & Gassy 2008). Sustainable development encompasses economic,
social, and ecological perspectives of conservation and change (Hediger, 2000). These are the main areas that form the basis of environmental sustainability. According to Salah, (2007) For any solution related to environmental sustainability to be successful there should be focus towards economic benefit, available technology and it should comply with social and environmental norms as defined by each specific country.

Salah (2007) indicated that sustainable waste management solutions would employ regulations that would reduce waste at the source, reuse, recycle, recover and finally rethinking and renovating whereby people should rethink about the wastes they generate closely before taking any actions to dispose. They should hence innovate by coming up with innovative measures of disposing or recycling the waste in an environmentally friendly manner and possible derive value from the waste.

Ndum (2013) recommends a bottom up approach to waste management. He indicates that a top down approach to waste management cannot be effective without sufficient engagement and ownership of the community and users. Involvement of community reduces conflicts and resistance when it comes to implementation of waste management strategies. The result of his study shows that capacity building, focus group initiatives and access to waste information is critical towards waste management sustainability. In addition it is also important to carry out awareness campaigns and allow citizens to participate and also provide solutions to waste management (Ndum, 2013). Deficiency that is mentioned from previous researches is that there was lack of a comprehensive system of managing waste, most studies proposed a single solution to achieve a final disposal of all kind of industrial waste. It has hence been proven that an integrated system of managing waste is key to ensuring industrial waste management sustainability.

It is important for industries to put up sustainable waste management systems that will be practical and environmentally, economically and socially acceptable (Hoveidi et al., 2013). An integrated approach to waste management is paramount. Implementation of an integrated waste management decision support system is key. This model should be all round in order to cater for social, economic and environmental factors. This should include source separation methods, waste collection, treatment, disposal and any potential environmental impact that may be experienced.
Over time waste management has been a forgotten topic in most organizations. Top management often focuses on increasing revenues, reducing costs and hence improving the profitability of a business. The same applies to Nairobi Bottlers Limited where waste management has not been the key priority of management. However looking at the social, environmental and legal implications, Industrial waste management has recently been a problem area that has threatened to have serious financial implication from an environmental and legal perspective. Hence its proper management to ensure sustainability is of great importance.

1.2 Statement of the Problem

There are a number of Solid Waste Management (SWM) projects that have been done in the developing countries. Many of these projects are often funded; hence once the funding are completely depleted these projects fail since they are not able to self-fund themselves hence there is a risk of un-sustainability of such projects. In Kenya most of industrial waste is deposited at Dandora dump site and most of the adjacent areas are quite disadvantages due to the many operations that are undertaken at the dumpsite. The existence of this dumpsite has led to several issues like poor infrastructure, including roads and drainages, unending dumping of industrial waste, medical and household waste. In addition, the dumpsite has posed significant pollution of adjacent rivers, air and soil pollution is also exhibited. The dumpsite has also posed risk on the health of people and domestic animals living around there (Muniafu & Otiato, 2010).

Waste separation at source is on key area of focus that is recommended to ensure industrial waste sustainability. In most industries, we have wastes such as scrap metals, plastics and cardboards that can be of great value if separated at source and availed to focus women groups who creatively use the waste to make nice jewelry, hats, baskets, door rugs and mats. These items can be sold as unique crafts to the local community and hence act as income generating source for such women groups (Spaargaren et al., 2012).

In essence, the problem of waste has continued to suffice in the modern environment. This has therefore translated to high wastes associated costs as charged by governments on the production of wastes through various industrial processes. Organizations therefore need to adopt and implement waste management practiced owing to the fact that wastes will always be there. Nevertheless, optimal productions processes will significantly
reduce wastes at source thus improving on the chances of re-use and re-cycle of wastes. Production will be able to continue undeterred and at the most optimal efficiency level that strives to cut wastes significantly (Spaargaren et al., 2012).

A huge gap therefore exists when it comes to waste management since knowledge about its full scope and also on how to correctly handle and dispose waste in an environmental friendly manner is limited. Previous managers in East African and Kenya in particular have ignored the concept of waste management on the notion that it is non-viable (Spaargaren et al., 2012). This study therefore sought to add to the already few existing literature on waste management by examining the strategic factors that affect sustainable industrial waste management at Nairobi Bottlers.

1.3 Purpose of the Study
The main purpose of this study was to determine the strategic factors that affect sustainable industrial waste management at Nairobi Bottlers Limited.

1.4 Research Questions
1.4.1 What is the meaning and scope of industrial waste management in industries?
1.4.2 Does waste reduction strategy contribute to sustainable waste management in industries?
1.4.3 To what extent does waste recycling strategy contribute to sustainable waste management in industries?
1.4.4 Does sustainable development goals strategies contribute to sustainable waste management in industries?

1.5 Significance of the Study
1.5.1 Organization
According to the Chartered Institute of Purchasing and Supply (CIPS), industrial waste management is important in assisting companies in environmental sustainability. This is an indicator that the company is socially responsible to the community and more often than not can guarantee a sustainable future for the company. In essence proper industrial waste management would lead to reduction in pollution. This study may be beneficial in enforcing measures that would ensure strict adherence to proper Industrial waste management practices and to derive monetary value from Industrial waste and ultimately
increase profitability. Proper management of industrial waste leads to environmental sustainability.

1.5.2 Employees
Proper industrial waste management often leads achievement of environmental, financial and social results. This is majorly achieved through waste recycling which is the best and most efficient and effective method of industrial waste management. Recycling leads to reduction in raw material costs since industrial waste such as plastic, metals and even glass which would have been thrown away can be recycled and hence reduce subsequent cost of raw materials (The United States Environmental Protection Agency, 1999). When profitability of a company increases, the employees may benefit since they may receive bonuses and profit share.

1.5.3 Researcher
The research findings may enable the researcher get a better picture of the current level of waste sustainability in the county. Important waste management methodologies have been brought to the attention of the researcher through the analysis of data collected. These insights have enabled the researcher to make adequate and well thought recommendations with regards to the attainment of sustainable waste management.

1.6 Scope of the Study
The study covered industrial waste emanating from production, operations and administration and will be targeting employees of Nairobi Bottlers Limited. The different types of waste were classified as; operational - plastic PET bottles, glass cullets, administration – paper and production scrap. Currently NBL has not put so much focus on industrial waste management. This was an opportunity area that may assist in ensuring more sustainability from an environmental perspective. The research was carried out between the months of January 2016 to June 2016.

1.7 Definition of Terms
1.7.1 Waste
Waste is a left-over, a redundant product or material of no or marginal value for the owner and which the owner wants to discard (Christensen, 2010). Waste are materials that are thrown away because they have been fully utilized and have ceased to be useful.
Industrial solid wastes are the end products of a material that comes from a large manufacturing industry or production (Awomeso et al., 2010).

1.7.2 Waste Management
This includes all the activities and actions required to manage waste from its inception to its final disposal (Hariz & Bahmed, 2013). This includes amongst other things the collection, transport, treatment and disposal of waste together with monitoring and regulation (Awomeso et al., 2010). It also encompasses the legal and regulatory framework that relates to waste management encompassing guidance on recycling (Hoveidi et al., 2013).

1.7.3 Waste Management Strategy
This is a plan of action or policy designed to achieve a major or overall aim of managing waste from its inception to its final disposal (Hariz & Bahmed, 2013).

1.7.4 Industrial Waste
Industrial wastes are waste coming from the Industrial or manufacturing process, the waste could be from several industries like chemical products industry, paper and printing, non-metallic. The wastes examples include paper and cardboard, glass, plastic and wood among others classified as non-hazardous waste. Hazardous waste include waste from batteries, paint, car oil, disinfectants among others (Hariz & Bahmed, 2013).

1.7.5 Municipal Solid Waste
This can be defined as waste that includes all house hold waste and refuse that is both hazardous and non-hazardous in nature, industrial, commercial and institutional waste. Manifestation of such waste is what will determine their treatment and being either hazardous or non-hazardous in nature (UNEP, 2005).

1.7.6 Controlled Waste
These are all waste inclusive of household, industrial and clinical waste that requires a company to have a waste management license for treatment, transfer and disposal. Several waste control measures are attached to the management of such waste (Learning & Disclaimer, 2007).
1.7.7 Universal Waste
Universal waste can be defined in a number of different ways. The United States Environmental Protection Agency defines universal waste as a set of hazardous materials that is generated in a wide variety of settings, by a vast community, which is present in significant volumes in nonhazardous waste systems (USEPA, 2005).

1.8 Chapter Summary
This chapter provides a brief introduction to Industrial waste management and its basic definition. Importance of waste management is also highlighted. The chapter goes ahead to give the purpose of the research which is to determine the strategic factors that affect sustainable industrial waste management at Nairobi Bottlers Limited. The significance of this research may ensure proper environmental sustainability and reduce costs of production due to effective recycling measures. Research questions have also been highlighted in this chapter focusing on the three waste management strategies which are waste reduction at source, reuse and waste recycling.

Chapter two handled the literature review, chapter three focused on the research methodology, chapter four provides the study results and findings and chapter five handles the study conclusion and recommendations.
CHAPTER TWO

2.0 LITERATURE REVIEW

2.1 Introduction

This chapter is organized as follows: section 2.1 is introduction; section 2.2 examines the meaning and scope of industrial waste management in industries; section 2.3 discusses waste reduction contribution to sustainable waste management in industries; section 2.4 focuses on waste reuse strategy towards sustainable waste management in industries; section 2.5 examines the sustainable development goals strategies on waste management in industries; and section 2.6 offers the chapter summary.

2.2 Meaning and Scope of Industrial Waste Management in Industries

2.2.1 Meaning of Industrial Waste

Industrial waste has been defined by different scholars in various parts of the world. In United Kingdom the Deposit of Poisonous Waste Act 1972 was replaced by the Control of Pollution Act 1974 (COPA) which brought about a more comprehensive way of handling waste. The COPA act defined waste as any given kind of substance that contains a scrap material or an effluent or other strange substance coming from the application of any process, it goes ahead to indicate that waste is any substance or article which ideally should be disposed of as being broken, worn out, contaminated or otherwise spoiled.

Solid waste is defined primarily from an East African perspective as waste from the offices, retail shops existing within a town, different warehouses and even hotels. Industrial waste in the same content is highlighted to be waste coming from packaging materials, food waste, waste from plastics, metals textiles and even fuel ash waste. It goes ahead to define street waste as waste generated from cleaning process in the streets including drain cleaning, sand, litter and even actual dead animals. In addition construction waste is defined as demolition waste that includes waste from the construction process for example pipes, bricks, masonry and all waste materials obtained method of collecting, handling, treatment and final disposal of such waste (Cossio et al., 2012).

From a Kenyan perspective municipal solid waste has been defined as solid waste that includes all domestic and local hazard and non-hazardous waste for example waste emanating from commercial and institutions, street and construction waste including food
waste, plastic, metal and even glass. These solid waste is also seen as coming from offices, hotels, schools and even social complexes (Magutu & Onsongo, 2010).

2.2.1 Scope of Industrial Waste

Deutsch (2012) asserted that EU has identified solid waste stream as a major scope of industrial waste management, this includes a number of waste streams which are increasing in volume and unless regulated will pose increasing risks to the environment. The EU has determined critically, for a number of reasons, that the onus and costs of managing these waste streams should be placed on ‘producers’ of the product (for example: manufacturers, importers, retailers, distributors and packer/fillers) and not on the consumer or taxpayer. This means that the producer will be responsible for targeted amounts of the waste management costs of their products when they reach the end of their life. These are generally referred to as producer responsibility obligations.

Similarly solid waste remaining an important aspect of industrial waste we see that the United States is facing a huge solid-waste disposal problem, especially in urban areas. US citizens produce more than (2 kg) of waste per person per day, more waste than can be disposed of in an environmentally sound but economic and local manner. Currently totals represent an increase of more than 60% over 2014 per capital waste generation. Most landfills are within 5 to 10 years of closing unless current facilities are expanded or new landfills opened (Duncan, 2013).

Solid waste management in urban centers of East Africa has for a long time been centralized (Liyala, 2011) with the use of imported refuse truck (Rotich, 2006) that collect wastes from sources or transfer point and deliver to designated waste dumps. Municipal solid waste management (MSWM) system in East Africa has changed from the colonial days in the 40s, 50s and early 60s when it was efficient because of the lower urban population and adequate resources (Okot-Okumu & Nyenje, 2011) to the current status that displays inefficiencies. The centralized waste management system has evolved into the current management mixtures that include decentralized as well as the involvement of the private sector.

The storage, collection, transportation and final treatment/disposal of wastes are reported to have become a major problem in urban centers (ADB, 2012; Kaseva, 2014). The
composition of wastes generated by the East African urban centers is mainly decomposable organic materials based on the urban community consumption that generates much kitchen wastes, compound wastes and floor sweepings (Oberin, 2011). This calls for efficient collection system to avoid health, aesthetics and environmental impacts. The global trend of increased use of electrical and electronic goods is also evident in EAC where E-waste is becoming a significant threat to the environment and human health in EAC urban centers.

In Kenya the high decomposable bio-waste contents and the optimal moisture content (for aerobic decomposition) of the solid waste make it suitable for composting (Chakrabatrti et al., 2009; NEMA, 2007; Kumar, 2014). Composting is being practiced in more than 11 urban councils of Uganda under the Clean Development Mechanism (CDM) pilot project promoted by the World Bank (NEMA, 2007; Kumar, 2006). In Dar es Salaam composting was initiated by women CBO (KIWODET) operating in Kinondoni (Oberlin, 2011). The KIWODET composting project was suspended because of land use pressure and negative consumer attitude. (Oberlin, 2011) argue that even though successful composting can arise from local community capacity, lack of municipal integration and support leaves such technically viable initiatives vulnerable to external factors. Aerobic composting is apart from economic benefits that may accrue are environmentally important because it eliminates GHG emission that would occur during waste decomposition at dumpsites or landfill (NEMA, 2007; Kumar, 2011). EAC countries should consider composting as an option for the implementation of an integrated approach to solid waste management.

Scope of waste management could also be generalized and could be assumed to describe the exact status of waste management, any changes in waste management especially those affected by population and commercial changes and how these changes can be addressed. Actions that different industries must take to eradicate waste is also included in the scope. In addition the planned waste management systems will be included such systems include collection systems, transportation recovery and treatments systems together with the monitoring and evaluation system that would ensure sustainability (Grzesik, 2007).
Referring to Sustainability as part of the scope of Industrial waste management, in Asia continent for instance, in Indian waste management rules are founded on the principles of "sustainable development", "precaution" (measures should be taken to avoid environmental degradation and hazards) and "polluter pays" (polluter must bear costs for damages and harm caused to environment by his own acts). These principles form an integral part of Indian environmental law jurisprudence, as observed by the Supreme Court of India in various decisions. These principles mandate companies and industrial units to act in an environmentally accountable and responsible manner and for restoring the balance, if the same has been disrupted by their business processes. Bearing the essence in mind and the increased levels of waste generation as a by-product of development, various subordinate legislations for regulating the manner of disposal and dealing with generated waste are made by MoEF under the umbrella law of Environment Protection Act, 1986 ("EPA").

According to Slocum (2014) the waste management sector in Western Europe has been subjected to enormous commercial and legal changes over the last two decades (at least), with these changes continuing to occur. The once dominant position of landfill as the activity of choice for waste management has been well and truly broken. This has been brought about by a sustained and multi-faceted legislative and policy attack on landfill, primarily from the EU but also at the domestic level. Indeed, in some senses, the waste management industry is a living example of how far legislation can impose transformational change on a sector. Legislative change, primarily (but not exclusively) from the EU, has imposed, and continues to impose, structural challenges on the waste management sector across the EU. Whilst this sector in Western Europe is generally mature (having experienced decades of development in its waste management infrastructure), CEE is at a comparatively preliminary stage of implementing the recent EU Waste Diversion Legislation which seeks to divert waste from landfill and drive its management further up the waste hierarchy (Berg, 2013).

Sitkin (2011) asserts that urban areas lack space for new landfills due to the associated urban sprawl of affluent suburbs that uphold a NIMBY, “Not-In-My-Back-Yard”, mentality. Sanitary landfills are designed to “concentrate and contain” our solid waste at a specific site and minimal environmental cost. Each day, a layer of waste is compacted by heavy machinery and buried under a layer of earth or clean construction debris to keep
out the vermin, confine the refuse, reduce the odors, and divert leachate forming rain water from entering the landfill. Once the site is full, the entire landfill is covered by a thick layer of earth, and the land is typically used for other purposes, including parks, pastureland, parking lots, golf courses, and other uses not requiring excavation.

The simplest way to reduce waste is to prevent it from becoming waste in the first place. Source reduction is the practice of careful design, manufacture, purchase, use, and reuse of material goods so that the amount of waste and the degree of toxicity of the waste stream is significantly reduced. This is a major change in current “output” waste disposal ideology, i.e., dispose of everything dumped into the waste stream in a sound and efficient manner, to instead, an “input” ideology that focuses on and significantly reduces the input or creation of waste in the first place (Sitkin, 2011).

Hazardous waste treatment is a flourishing industry in India and large quantities of such waste are imported for recycling and treatment. With the objective of regulating illegal traffic of hazardous wastes, it is provided under Rule 17 that prior permission of Central Government must be obtained for importing such waste and further, the import must conform to the shipping details. In the event that the permission is obtained through fraudulent means or the import results in dumping of waste in breach of Basel Convention and the general principles of international environmental law (such as sustainable development), inference of illegal traffic would be drawn. The rules provide for detailed responsibilities for the concerned parties with respect to recycling, storing, importing, exporting, transporting and labelling of hazardous waste. Non-compliance vests SPCB with the power to cancel and suspend the authorization issued (Bolaane, 2006).

Williams (2008) asserted that various practical problems have emerged in the implementation of these rules. The applicable law is spread over a number of rules. These rules have mandated separate authorizations for each scenario. It would have been far easier to adhere with conditions and comply with applicable law, if a unified legislation was notified and requirement for a single license for disposal of different kinds of wastes was put in place.

Kahn (2014) posits that another issue faced by industrial units is the unreasonably long time taken by SPCB and its officials to issue or renew authorizations. Once the
application is made, there is no mechanism through which status of processing of applications can be tracked. More often than not, facilitator payments are resorted to obtain permits and this acts as a major disincentive. Further, there is lack of predictability regarding the regulatory approach of various SPCBs resulting in speculative risk assessment. Large part of inspection by SPCB is aimed at big industrial units who are put under constant scrutiny while small and medium enterprises are left to function in a lack a deistical manner (Joardar, 2000).

Kahn (2014) argue that there is no uniform set of conditions which are imposed under authorizations for all categories of entities and this results in absence of a nationwide monitoring mechanism for compliances. There are no reliable statistics on the exact number of prosecutions and revocations of authorizations, although generally industry intensive states are more proactive in enforcing the legal mandate. There is also a lack of professional environmental audit firms specializing in risk assessment involved in setting up business units at particular places. These all contribute to invoke skepticism in investors. Furthermore, maintenance of records and filings with SPCB are yet to be adapted into an IT enabled system and the physical maintenance becomes a mammoth task due to the sheer volume (Tsai, 2007).

2.3 Waste Reduction Contribution to Sustainable Waste Management in Industries

2.3.1 Waste Reduction at Source

One of the sustainable methods of ensuring sustainable waste management is the integrated method of waste management method which seeks to reduce waste at source before it goes on to the next level. It also involves looking for opportunities to reduce waste even during the product life cycle. Once waste is generated, then it is recovered for reuse and if there is still waste, then it is finally recycled. In addition, methods are put in place to look for more environmentally friendly materials (Stasiskiene, Gaiziuniene & Zidoniene, 2011). Waste reduction or minimization is key in effectively managing waste, it is most important to reduce the waste from source. In the European Union (EU) waste hierarchy and legislation, prevention and minimization of waste is given the highest priority. For instance, Council Directive 75/442/EEC on waste states that ‘Member States shall take appropriate steps to encourage firstly the prevention or reduction of waste production and its harmfulness (Staniskis & Stasiskiene, 2005).
A set of system indicators ought to be developed to help look at hazardous waste management sustainable methods. This system can motivate and encourage the reduction of the amount of hazardous waste products. Companies would be better placed to identify the prevailing inefficiencies in the production processes hence find cost saving solutions that would further help in improving profitability through waste management. It also aims to support economic benefits in an organization since hazardous waste is often a signal of inefficiencies however effective waste management leads to reduction in costs. The criteria leading to economic benefits include reductions in energy consumption, increase in recycling, and waste reduction at the source (Stasiskiene et al., 2011). Karim and Arif-Uz-Zaman (2013) brings in the idea of a systematic lean implementation methodology for manufacturing organizations. The study proposes implementation of simplified leanness evaluation metrics to reduce waste and improve effectiveness and efficiency in an organization. Continuous Performance Measurement has been proposed as a matrix that should be used to assess manufacturing leanness.

Today, Nairobi's two main images stand in marked contrast to one another. The first is of a well-planned garden city in which salubrious suburbs, the preservation of open space, and the presence of wide, landscaped boulevards dominate the city's physical layout. Equally visible nowadays is what Hake (1977) calls the "self-help city": it includes make-shift housing, roadside Jua Kali shops and industries, and small, cultivated plots along undeveloped or under-utilized urban land.

Uncollected solid waste is one of Nairobi's most visible environmental problems: The Nairobi County service which seems to fail most strikingly is garbage collection and disposal because it causes littering and untidiness which has an immediate adverse psychological impact. The lack of adequate garbage disposal in an area often results in negative attitudes that contribute to a general deterioration of community development and cohesion (Mwaura, 1991).

**2.3.2 Waste Awareness Contributions**

Successful industrial waste management is often attributed to many reasons arising from policy implementation; however the main reason why most companies have succeeded in industrial waste management is due to public waste awareness and support (Babalola, 2010). In addition involving communities in waste management programs often promotes
publicity with tips on waste management hence eventually minimizing waste (Young, Ni & Fan, 2010). Similarly Wilson (2010) indicates that two main underpinning group of drivers of waste management include public awareness and responsibility issues. Waste awareness is critical in ensuring that there is waste management sustainability. Its starts from people knowing which waste elements exist in a company and which methods are to be used to effective manage, reduce and properly dispose of the waste. One of the challenges facing proper waste management in Nigeria is lack of proper public waste awareness. This is also observed by the fact the public has a negative attitude towards waste management, hence the government should carry out campaigns to enlighten the public on waste and waste management (Babalola, 2010).

Behavioral instruments play a role in waste management strategies through initiatives that inform and educate, some of these initiatives include waste audits, school programs, advertising, training, and competitions. Education has been shown to be a critical component in encouraging public participation in recycling programs (Bolaane, 2006) advocates for waste educational programs that would ensure that communities are involved by increasing awareness and commitment towards waste, increasing capability of different staff in identifying opportunities that would lead to waste minimization and avoidance and ensuring that operational staff are adequately trained for foster compliance with relevant waste regulations and be able to report any negative implications or observations.

Raising awareness about different waste management programs can have positive effects, but there are several methods which can be used to change Behavior to improve participation or correct problems (Timlett & Williams, 2008). Once new initiatives are introduced, people will need time to adjust until the new plan becomes normal Behavior, but once this Behavior is established it is difficult to break (Timlett & Williams, 2009). Awareness of impacts of waste has not been enforced in most areas, we see many companies and communities littering everywhere, this is evidence of lack of proper awareness in most areas when it comes to waste management. One of the goals of National Waste Management is to create awareness on waste management issues and to add practical waste projects to basic education curricula. Enforcing anti littering campaigns and waste separation at source at critical to waste sustainability (Department Environmental Affairs, 2011).
Waste awareness and participation can also be enhanced more by creating recognition programs such as the cleanest town competitions, coming up with specific performance evaluation criteria and reward and recognition. In addition, producer responsibility must be aligned to the overall waste management plans and consumer awareness programs should also be incorporated into industry waste management plans (Department of Environmental Affairs, 2011). Waste awareness can also be created through door to door awareness and motivation programs which involve establishing contact with participants and providing feedback, it also helps in reducing the time lag that would be created between information communication and when the actual waste collection begins. Importance of door to door awareness campaigns is that communication is effectively passed on to the participant and often reduces any elements of rumor mongering, building confidence of the participants and also assisting in clarifications of any issues of concern (Zhu et al., 2007).

Waste awareness can also be created through rallies as people get very excited with rallies and street plays and they tend to attract a large crowd to come and witness what it is all about. Embedding waste management into school programs is also a plus since children are the future of tomorrow, this is a more sustainable tool toward effective waste management (Zhu et al., 2007). Motivating individuals towards waste intolerance is a plus since; the individuals will exert pressure to the companies and authorities that will ensure proper waste management support and implementation. Public education and waste awareness is also a critical method of ensuring waste management and sustainability. (Muniafu & Otiato, 2010).

2.3.3 Consumption Behavior Shifts
Establishing certain behavior patterns in transient populations such as student groups and military populations, and also in high density residential areas can be challenging. Targeted strategies which are aimed at specific areas and groups (Purcell & Magette, 2010) and which focus on providing instructions on how, what, and where efforts should be focused can result in greater success rates (Smyth et al., 2010).

Participation and perception towards different waste management plans can be impacted by a variety of factors including: the level of knowledge regarding the impacts of current and suggested actions; access to adequate facilities; adequate knowledge and expertise to
carry out what is being asked; concern for the community and knowledge of the consequences or benefits of their actions (Davis, 2006).

### 2.3.4 Waste Management Policies and Legislature

One method to ensure effective waste management is having proper waste management systems which are included in the policies and procedures within a company (Muniafu & Otiato, 2010). The establishment of the National Environment Management Authority (NEMA) has seen it having bigger mandate in enforcing and ensuring compliance with broader environmental laws (Muniafu & Otiato, 2010). NEMA adheres to safeguard and improve the quality of environment through coordination, facilitation and enforcement while at the same time it encourages individuals and corporate to work towards sustainability of the environment.

One of the most effective ways of minimizing or reducing waste is through introduction of a tax policy that will ensure that individuals are taxed based on the amount of waste they produce. In addition higher taxes can be imposed on raw materials that contribute most to waste to encourage manufacturers to produce goods that generate less waste (Hariz & Bahmed, 2013). In addition Ministerradet (2009) indicates that reduction of VAT on items with environmental friendly labels could help in reducing the amount of waste from a production and a consumer perspective. Goals for waste prevention and incorporation of such goals in the waste strategies and policies are key in promoting sustainability. It may be a tough for to enforce waste prevention measures when dealing with consumption but it is definitely a key measure when it comes to waste legislation and policy making (Ministerradet, 2009).

The major shortcomings in the management of waste is inability to force waste generators reduce the amount of waste being generated, since that is the first step to effective waste management (Muniafu & Otiato, 2010). Instilling waste discipline is another loophole, there is no system in place that would ensure people are responsible for the waste they generate and that they are liable for their actions. Putting up effective systems to ensure individuals are held accountable for the amount of waste generated would be a plus (Muniafu & Otiato, 2010). Environmental assessment audits are also not adequately done both within the companies and outside. These assessments would be important in
identifying whether individuals and companies comply and that they adhere to the safety standards (Muniafu & Otiato, 2010).

2.3.5 Good Housekeeping Strategies
Good housekeeping is also referred to as good operating practices and depends on reducing wastes from the source. It implies all the measures that a company can take to minimize waste and emissions (Salah, 2007). According to Salah (2007), good housekeeping involves either reducing potential wastes or conserving natural resources through optimizing the process and eliminating spill, leakage, overheating or any fault that would result in unnecessary losses. This can be achieved by following a regular preventive maintenance program for the production process or raising staff environmental awareness or through an incentive mechanism.

Meanwhile, good housekeeping could be implemented at a very low cost or no cost through procedural instructions in production, maintenance, storage and material handling. The UNEP lists several good housekeeping measures that industries could adopt to enhance efficiency, which could be summarized in the following points (UNEP, 2000/2001): Minimize wastes and emissions by repairing all leakages from equipment and spillage. Keep taps closed when not in use. Separate the hazardous wastes from the non-hazardous to avoid mixing the two to decrease the volume of the hazardous wastes. Reduce the loss of input materials due to mishandling, expired shelf life and proper storage conditions. Perform employee training and incentives to encourage all employees to continuously strive to reduce wastes.

2.4 Waste Reuse Strategy towards Sustainable Waste Management in Industries
Comparing UK and England, the waste generation in the UK constitutes up to 47,567,000 tons while in England the total C&I waste is 38,976,000 tonnes (Waste Statistics, Regulation Return, 2012). Many countries that have incorporated waste management in their sustainability plan often reap a lot of benefits. According to Bates, Phillips and Phillips (2006), United Kingdom has adopted a waste management hierarchy that will assist them in reducing waste obligations as much as possible.

Reusing waste is the process of using materials repeatedly. This is where a company takes a material and after it has gone through its useful life it is used again for other purposes.
Reusing also refers to putting waste material directly to another purpose other than its original intended purpose without making any changes to the raw materials prior to it being used. Waste is a representation of both material and energy loss. When so much waste is generated this is a sign of inefficient processes in a company (Staniskis & Stasiskiene, 2005). Waste is generated by several human activities this is because over the years people have a desire to have a better quality life. Of all waste generated in Europe only 1% makes the hazardous wastes, however it presents the to the environment and to people and hence has to be treated and disposed in a safe manner (Stasiskiene et al., 2011).

Bates et al. (2006) goes ahead to indicate that reusing waste occurs when waste that was going to be disposed of is put back into good use. A good example is obtaining plastic soda bottles and using them to store milk or water. This drives sustainability. According to Zhu et al. (2007), reuse happens when something that already fulfilled its original function is used for another purpose. However, reuse does not involve reprocessing or transforming the item. For example, typical reuse strategies are the deposit refund system for glass bottles or Polyethylene Terephthalate (PET) water bottles, old tires that are used in fences or as boat fenders, steel drums that are reused as compost bins, or plastic bags that are reused as liners for household waste bins.

2.4.1 Methods of Waste Reuse in Industries
Vidrovitch (2011) asserted that different countries have different kinds of waste generated from their industrial and manufacturing processes. In Europe and United Kingdom, construction waste is identified to contribute highest about 50% of the total country waste generated. Followed by Commercial and Industrial (C&I) waste at 24%, house hold waste at 14% and other type of waste at 12%. Bates et al. (2006) explains waste reduction as the act of minimizing waste as much as possible, this is mostly done from the source where the waste is coming from. Waste reduction is always a factor that enhances waste sustainability. According to Zhu, Asnani and Zurbrugg (2007), waste should be avoided. However, waste prevention is most effective if it is considered in the product design and production processes. By optimizing production processes, manufacturers can reduce waste or even allow it to be reused by another manufacturer. Valuable natural resources can therefore be saved.
Another effective way to reuse solid waste is through burning materials that are combustible. Additionally, non-combustible materials can be melted down at the company’s incinerators. The resulting residue after such incineration can be dumped in landfills. Combustion can be defined as the burning of waste in a controlled environment in a bid to reduce waste volumes that are sent to landfills. This process can also generate electricity. This technique is effective especially where wastes cannot be recycled and are generated in large quantities. Key to note is that the waste combustion process can lead to the emission of toxic air emissions, but they can be controlled through the installation of control equipment for instance fabric filters and acid gas scrubbers and in waste combustors (USEPA, 2002). In addition research carried out in the United States of America also indicates that 13% of the Municipal Solid Waste produced are not just used to burn trash however the heat generated is used to generate electricity (Nkwachukwu, Chidi & Charles, 2010).

Incineration reduces waste volumes by 80% to 90%. The salvaged metals, plastics and glass together with generated waste energy as a result of combustion can be consequently used to generate readily affordable electricity and even heat to nearby buildings. Incineration does not pollute underground water reserves, it also adds very little to current levels of air pollution if proper equipment to control air pollution control during combustion are installed as per prevailing environmental laws. Since urban areas are running out of enough landfills, incineration will be the most preferred choice to dispose waste since it is way much economically attractive than maintaining current limited landfills (Vidrovitch, 2011).

Pasquini et al. (2005) examined the efficient use of urban waste ash to improve soil fertility on Jos Plateau, Nigeria. The study advocated for the disposal of both non-degradable and degradable wastes separately so as to safety use the generated wastes for agricultural purposes. The study placed focus on the combustion household solid wastes to generate ash that could be used to on improve soil fertility. The study however did not give or recommend any mechanisms for the handling of non-combustible inorganic household wastes. This way the waste generated does not pollute the environment and is in turn converted into ash for use in agriculture reducing the costs associated in farming.
Recycle unlike reuse is the process of using materials to make new products. Recycling is mostly carried out by companies at waste recycling plants. The old used materials are taken through a process that will yield new products (Festus & Ogoegbunam, 2012). In my opinion recycling means taking a materials and subjecting it to other processes that will entirely change the raw materials and put it in a totally different form. Mostly this is the final strategy of waste management. Bates et al. (2006) explains that recycling is obtaining waste elements and taking them through a process that will eventually yield a totally new item. Sustainability needs companies to think of new and better ways of producing and consuming goods and services. Industries are tasked with the responsibility of providing goods and services that reduce negative environmental and social impact all through the product life cycles from design, production, consumption and ultimate disposal (United Nations, 2003).

2.4.2 Public Participation
Kaloki (2015) examined the role that public participation plays with regards to solid waste management in Mlolongo Town. The study adopted a descriptive research design whereby a total of 196 households were randomly sampled. The study findings revealed that, solid waste management was carried out by cart pushers, resource merchants, private solid waste collectors, public, and neighborhood and estate associations. It was further found out that the County Government collects and then transports waste to a specific dumping site. Waste collection, transportation, sorting, financing and finally recycling were the major tasks that the public undertook to manage wastes in the study area. Potential roles that the public played were waste separation, composting, distribution of solid waste containers and subsequent re-usage of collected and separated wastes. Various challenges however suffice in attempts to enhance sustainable waste management for instance; inadequate resources, averseness, poor attitudes and solid waste management knowledge gap. The study recommends various methodologies to ensure sustainable solid waste management; public sensitization, the enhancement of social interactions with like-minded individuals, the prioritization of solid waste management during company’s annual budgets and subsequent plans to close the existing knowledge gaps of waste management.

Tsai (2007) opine that in order to ensure homesteads readily participate in waste re-use, quality of environmental education ought to be good, an efficient waste collection regime
and attitudes and subsequent enforcement scheme sought to be enhanced. Waste collection regimes therefore need to receive adequate environmental education and attention in order to ensure that the public embrace waste re-use with ease. This will consequently translate to a ready market of re-used products thus ensuring that the demand levels for such related products are sustainable. If the public can be associated and readily involved in waste re-use projects so as to contribute their own efforts, sustainability of waste management programs can be achieved hence yield success. Relevant authorities ought to consider the social and economic status of the community involved in waste management so as to ensure that started waste management projects are successful in the immediate surroundings (Tsai, 2007).

Various social factors for instance higher income and education levels elicit the public will to readily participate in proper solid waste management programs for instance waste re-use since they know that these efforts are geared to protect the environment. Joardar (2000) argued that waste re-use strategies that are based on door-to-door collection charge regimes can indeed support waste sorting and re-usage. This system can stimulate there-usage of wastes hence significantly reducing on waste generation at source. Further, these charges can be charged to commercial and residential establishments with special considerations to household size (Joardar, 2000). Chung and Poon, (2001) further added that the establishment of a clear charges structure that governs waste disposal and collection may indeed work as a waste reduction.

### 2.4.3 Reuse in Relations to Environment

When we observe the environment, we determine that almost all kinds of waste can be recycled however the difference then comes in the value that is generated from the recycled material, the value of the materials recycled also majorly vary depending on the demand for such recycled material, materials that have high demand levels often have a higher sale value compared to materials with low resale value. Material recycling mostly depends on the policies that a company has enforced on recycling and also the availability of buyers (Zhu et al., 2007). There are several advantages of recycling. For waste managers, recycling helps in the overall reduction of the waste volume, there is a lot of cost saved from handling, collecting, transporting such waste and disposal of the waste in general. The economy will also benefit from recycling through reduction of cost of
fertilizers since organic waste can easily be transformed into fertilizers, in addition the economy benefits since more people will get employment.

The environment is the overall beneficiary of recycling since there will be an overall sustainability of environment and waste going into storage sites will be reduced resulting to a more manageable system (Zhu et al, 2007). The authors further opine that, recycling means the reprocessing of used materials that would otherwise become waste. It breaks material down to its main component and produces new products. Recycling is most common for valuable materials or materials that are costlier if produced from virgin raw materials (such as metal, plastic, glass, and electronic waste). Recycling of organic matter produces compost, which can be used as a soil.

It is not possible to have uniform methods of managing waste in an organization. The various methods used differ in one way or another because individual waste management methods cannot deal with all potential waste materials in a sustainable manner (Staniskis, 2005). Conditions vary; therefore, procedures must also vary accordingly to ensure that these conditions can be successfully met. There is need to ensure that there is flexibility in waste management systems with regards to the ever dynamic economic, environmental and social conditions. Many a times there are several processes involved in waste management which are closely related and hence present an integrated approach which is better to design other than having individual systems that are not value adding (Staniskis, 2005).

A major type of waste that has raised concern when it comes to the environment has recently been identified to be e- waste. Bhutta, Omar and Yang (2011) defines e-waste as “any white goods, consumer and business electronics, and information technology hardware that is in the end of its useful life.” E-waste can also be defined as obsolete items generated from the use of electronic technology such as televisions, cell phones, computers and many other electronically used (Electronic Recyclers of America, 2006). There is no single option that can be used to effectively and efficiently deal with e-waste being generated by the company. Manufacturers of electronic equipment are not being given incentives to recycle or buy back electronic waste. To make it worse we see that electronic devices have continued being cheaper in the market hence need to replace old items and leaving an e-waste sustainability gap (Shephard, 2008).
Waste segregation at source is a key step towards effective recycling. Segregating plastics from paper at source can enable companies to find better ways of recycling paper and plastic (Festus & Ogoegbunam, 2012). One of the most difficult activities in the recycling process is the mixture of the different types of waste; these could be mixtures of paper, plastic, and even food stuff. It is difficult to effectively recycle waste when it is not separated or segregated at source, in addition, mixing of different types of wastes leads to poor quality of the products being recycled (Hosoda, 2014). Segregation of all types of waste at source is the first and most important step that will lead to saving of resources such as time and labor when it comes to waste recycling.

2.4.4 Waste Technology
The use of waste technology is important when it comes to sustainable waste management. Improving waste technology in Kenya would be of essence. He argues that Nairobi lacks a waste management system leading to short term and long term impacts on employees and on the company at large. Companies ought to put up proper waste management systems that would bring solutions geared towards waste reduction, recycling, and disposal as well as proper collection and transportation methods. Emphasis is also placed on costing of such waste management systems and inclusion of waste costing in the company’s budget (Muniafu & Otiato, 2010). Firms also ought to get involved in Corporate Social Responsibility (CSR) initiatives that address pollution and waste management.

2.5 Sustainable Development Goals Strategies on Waste Management in Industries
2.5.1 United Nations Conference on Environment and Development (UNCED)
During the United Nations Conference on Environment and Development (UNCED) in Rio de Janeiro in 1992, Kenya endorsed and adopted Agenda 21, which provided the world with potential practical solutions to the ever-pressing problems of the environment and development. Kenya has ratified most of the international agreements, treaties, conventions, and protocols resulting from the first Rio conference, that are considered to be in harmony with the country's plans for sustainable development (Gatheru, 2014).

The most significant outcome was that Kenya joined and ratified three international treaties, the United Nations Framework Convention on Climate Change (UNFCCC), whose aim is to cooperatively consider actions to limit average global temperature
increases and the resulting climate change, and to cope with whatever impacts which were, by then, inevitable; the United Nations Convention on Biological Diversity (UNCBD) and the UN Convention to Combat Desertification (UNCCD). As demonstration of its commitment, Kenya has actively participated in international meetings convened by these conventions and hosted the second meeting of the Parties to the Kyoto Protocol (CMP 2), in conjunction with the twelfth session of the Conference of the Parties to the UNFCCC (COP 12), in Nairobi from 6 to 17 November 2006. Endorsing the Rio and subsequent agreements meant undertaking certain activities and putting in place institutions to address climate change, biological diversity and combating desertification by each member country (Vivian, 2012).

2.5.1 Vision 2030 towards Sustainable Industrial Waste Management
Although environment does not feature in Vision 2030 as a pillar, the Kenyan Government has put in place a wide range of policy, institutional and legislative frameworks to address the major causes of environmental degradation and negative impacts on ecosystems emanating from industrial and economic development programmes (Vivian, 2012).

The Environmental Management and Coordination Act of 1999 (EMCA) was enacted to provide an appropriate legal and institutional framework for the management of the environment and for matters connected therewith and incidental thereto. Environmental considerations of development are contained within the social and economic pillars. Kenya is a member of the Convention of Biological Diversity (CBD), one of the outcomes of the United Nations Conference on Environment and Development held in Rio de Janeiro in 1992. Kenya has also been implementing other international development treaties like Agenda 21 and the MDGs that are inclined to environment protection and sustainable development (Halfani, 2014).

2.5.2 NEMA Contributions to Sustainable Waste Management in Industries
The National Environment Management Authority (NEMA), a regulatory body of the ministry of environment and mineral resources (MEMR), handles environmental coordination in Kenya. However, environment being a multi-sectoral phenomenon, there are several other government agencies that play a role as they manage their sectors. These include: Ministry of public health and sanitation-environmental health including; Public
Health, the working environment radiation control and management of hazardous wastes; Ministry of water development-through management of water resources utilization; Ministry of Local government-through management of urban environments by urban councils; Ministry of forestry and wild life-anti poaching and deforestation; and Ministry of Agriculture-Controls farming practices to prevent soil erosion in areas with sloppy land (Midamba, 2010).

Critics of Vision 2030 could point to the fact that it lacks Environment Pillar. However, environmental issues are well articulated in Environmental Management and Co-ordination Act 1999 (EMCA, 1999) where sustainable development is defined as development that meets the needs of the present without compromising the ability of future generations to meet their own needs. The new Kenyan constitution, which was promulgated in August 2010, advances this further and makes environmental protection an obligation of the government and the citizens.

Proper conservation and utilization of the environment and natural resources is encouraged through Article 69 (1 and 2), which obligates the State and every person to protect and conserve the environment to ensure ecological sustainable development and use of natural resources. The Constitution encourages equitable sharing among both men and women of the accruing benefits of the sustainable exploitation, utilization, management and conservation of the environment and natural resources (Article 69 1a). It compels the State to ensure the sustainable exploitation, utilization, management and conservation of the environment and natural resources and ensure equitable sharing of the accruing benefits. The constitution thus takes an ecological perspective to sustainable development; a perspective geared towards the protection of the environment for ecological reasons as well as for satisfaction of human needs, thus advancing Agenda 21 and the Brundtland Commission report.

2.5.3 Waste Management and the Kenya Constitution
The constitution clearly incorporates the principles of conserving options, quality and access (Article 60(1)). It also states that land shall be held in Kenya in a manner that is equitable, efficient, productive and sustainable and in accordance, inter alia, with the principles of sustainable and productive management of land resources, transparent and cost effective administration of land and sound conservation and protection of
ecologically sensitive areas. Such a provision in the constitution advances the rights of the environment by ensuring that is safeguarded and enhanced for its own sake and for the benefits of the present and future generations.

Privatization as an alternative to publicly provided waste management has been explored for developing countries. Bartone et al. (1991) conclude that the private sector can operate more efficiently than the public sector in providing municipal solid waste services, while Cointreau-Levine (1994) concludes that it is a possible opportunity, not a panacea, for improving solid waste management in developing countries. For example, in Nairobi, two formal sector companies provide private waste collection services. However, only upper-income residents and businesses are able to afford the monthly fee. Neither company ventures into the informal settlements since they are unable to collect fees from residents. The NCC has no official policy towards the privatization of waste collection, nor do they provide any assistance to private companies to enable them to operate in informal settlements (Personal communication, NCC Cleansing Section).

Successful industrial waste management is often attributed to many reasons arising from policy implementation; however the main reason why most companies have succeeded in industrial waste management is due to public waste awareness and support. In addition involving communities in waste management programs often promotes publicity with tips on waste management hence eventually minimizing waste (Young, Ni & Fan, 2010). Similarly Wilson (2010) indicates that two main underpinning group of drivers of waste management include public awareness and responsibility issues. Waste awareness is critical in ensuring that there is waste management sustainability. Its starts from people knowing which waste elements exist in a company and which methods are to be used to effective manage, reduce and properly dispose of the waste. One of the challenges facing proper waste management in Nigeria is lack of proper public waste awareness. This is also observed by the fact the public has a negative attitude towards waste management, hence the government should carry out campaigns to enlighten the public on waste and waste management (Babalola, 2010).
2.5.5 UN Habitat on Waste Management

Most countries in the world experience challenges in proper waste management. These challenges range from reducing waste generation to proper waste disposal. In a quest to attain industrial development, there is often little attention given to solid waste management in developing nations. In these areas, this issue will continue to prevail if proper initiatives are not implemented at both local and national levels. Major underlying factors contributing to poor waste management include a high rate in population growth and consumption patterns, poor management by local authorities in provision of waste management facilities, inadequate law enforcement by the government, lack of community participation due to lack of awareness, and increase in urbanization and industrialization. According to UN-Habitat, solid wastes in Nairobi are as a result of industrial and manufacturing activities which constitute 68 percent of domestic waste. The bulk of the waste constitutes 57 percent food waste, 13 percent plastic and 8 percent paper. Mismanagement of these wastes result in pollution and contamination of environmental resources.

The current total recycling capacity in Nairobi is very low comparative to total waste being generated. Middle- to high-income areas have better waste collection, largely by private institutions, due to their greater ability to pay for the services. However, low-income areas like Kibera lack the capacity and are therefore largely susceptible to waste management problems which create health, safety and environmental concerns. Sustainable development, as defined by the Brundtland Commission (2011) is “development that meets the needs of the present without compromising the ability of future generations to meet their own needs.” Domestic and industrial wastes deteriorate the state of environmental resources through contamination of air, water and soil and destruction of biodiversity. Poor waste disposal may distort the environment to the extent that future generations may not have the privilege to a clean environment. Sustainable waste management is therefore critical in ensuring both the current and future generations have access to a clean and productive environment (Mitlin, 2010).

Establishing certain Behavior patterns in transient populations such as student groups and military populations, and also in high density residential areas can be challenging. Targeted strategies which are aimed at specific areas and groups (Purcell & Magette, 2010) and which focus on providing instructions on how, what, and where efforts should
be focused can result in greater success rates (Smyth et al., 2010). Participation and perception towards different waste management plans can be impacted by a variety of factors including: the level of knowledge regarding the impacts of current and suggested actions; access to adequate facilities; adequate knowledge and expertise to carry out what is being asked; concern for the community and knowledge of the consequences or benefits of their actions (Davis, 2006).

Waste segregation is very important since it enables one to identify products that can be reused instead of mixing such materials with others that will contribute to polluting the environment. This separation also helps in reducing the time that will be taken in handling the waste (Mallak et al., 2015). Proper housekeeping is essential in ensuring waste is properly reused. Good house-keeping measures help in clearly marking items that ought to be reused which ultimately assists in reducing waste. Use of Eco labels is a key method to ensure waste is effectively segregated for reuse purposes. As much as the labels would be used for the more environmentally friendly materials, they could also be used to distinguish reusable materials that do not have to be thrown out into the environment.

According to Fernández et al. (2015) characterization of waste is very important in developing sustainable waste solution. It is absolutely imperative to establish whether employees can properly characterize waste accordingly. Characterization can either be through: Identification, origin and legal classification, Composition and information about its components, Physical and chemical properties. Stability and reactivity under certain conditions. Safety criteria potential hazardous waste or toxic effects on people or environment. Likewise, an environmental sheet is aimed to collect information regarding conditions of the place where the waste management and treatment system will be located. This will influence each of the stages of such treatment.

Motivating individuals towards waste intolerance is a plus since; the individuals will exert pressure to the companies and authorities that will ensure proper waste management support and implementation. Public education and waste awareness is also a critical method of ensuring waste management and sustainability. Examined the role that public participation plays with regards to solid waste management in Mlolongo Town. The study adopted a descriptive research design whereby a total of 196 households were randomly
sampled. The study findings revealed that, waste management was carried out by cart pushers, resource merchants, private solid waste collectors, public, and neighborhood and estate associations. It was further found out that the County Government collects and then transports waste to a specific dumping site. Waste collection, transportation, sorting, financing and finally recycling were the major tasks that the public undertook to manage wastes in the study area. Potential roles that the public played were waste separation, composting, distribution of waste containers and subsequent re-usage of collected and separated wastes. Various challenges however suffice in attempts to enhance sustainable waste management for instance; inadequate resources, averseness, poor attitudes and solid waste management knowledge gap.

The study recommends various methodologies to ensure sustainable waste management; public sensitization, the enhancement of social interactions with like-minded individuals, the prioritization of solid waste management during company’s annual budgets and subsequent plans to close the existing knowledge gaps of waste management (Mitlin, 2010).

2.6 Chapter Summary
This chapter has effectively reviewed literature based on the three research questions listed. A clear illustration of previously done work has been indicated with regards to industrial waste management and the various factors which mostly affect sustainability of industrial waste management.

The next chapter provides insights on the methodology that was used for the study.
CHAPTER THREE

3.0 RESEARCH METHODOLOGY

3.1 Introduction
This chapter discusses the research design, population and sampling design, data collection method, research procedures, data analysis methods and finally the chapter summary.

3.2 Research Design
Kothari (2004) defined research design as the arrangement of conditions for data collection and consequent analysis in a manner that strives to combine relevance to the research objectives and economy in the conduct of research procedures. Research design therefore sheds light on the methods which were used by the study to achieve the desired objectives. This study intends to adopt a descriptive research design. Quantitative methods were used to analyze collected data. According to Kothari (2004), a descriptive research design gives a clear description of the current state of affairs in the manner in which they exist. The study adopted this design owing to the inability to manipulate the collected data. The researcher intended to use quantitative and qualitative research methods in order to be able to gather quality research data. This also aided in the collection of large quantities of research data in the most economical way.

3.3 Population and Sampling Design

3.3.1 Population
Study population entails well defined people, firms, services, a set of groups of things, households, elements or events under investigation by the researcher (Ngechu, 2004). Mugenda (2003) defined population as the total of individuals, groups or elements that are studied by the researcher. The target population for this study comprised all the permanent and pensionable employees of Nairobi Bottlers Limited involved in operational, administration and production functions. The population was 934 employees which had been obtained from the human resource payroll listing.

3.3.2 Sampling Design
Sampling design is basically a road map that explains the rationale behind the selection of the survey sample hence has an effect on many important aspects of the intended study as well. Sample design is made up of two elements; sampling method that outlines the rules
and procedures of including the population into the sample and the estimator that outlines the process of calculating the sample statistics (Kothari, 2004).

3.3.2.1 Sampling Frame

Turner (2003) defined a sampling frame as the entire set of source materials whereby the research sample is selected from. The purpose of this frame is to provide an outline whereby particular members of the target population can be chosen so as to participate in the survey. An ideal sample frame ought to be accurate, complete and most of all up-to-date. The sample frame for the study was obtained from the human resource payroll listing, the sample size was proportionately drawn such that the study applied the rule of thumb and selected 20% of the target population to ensure equal representation. This was classified into several strata as shown in the Table 3.1:

<table>
<thead>
<tr>
<th>Sample Category</th>
<th>Population</th>
<th>Sample Proportion</th>
<th>Sample</th>
</tr>
</thead>
<tbody>
<tr>
<td>Executives</td>
<td>8</td>
<td>20%</td>
<td>2</td>
</tr>
<tr>
<td>Managerial</td>
<td>45</td>
<td>20%</td>
<td>9</td>
</tr>
<tr>
<td>Supervisors</td>
<td>200</td>
<td>20%</td>
<td>40</td>
</tr>
<tr>
<td>Entry Level staff</td>
<td>681</td>
<td>20%</td>
<td>136</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>934</strong></td>
<td><strong>20%</strong></td>
<td><strong>187</strong></td>
</tr>
</tbody>
</table>

Source: NBL (2015)

3.3.2.2 Sampling Technique

The target population being large, the study carried out the research using a representative sample of the target population. The sampling technique that was used was stratified probability sampling technique where the study grouped the population into four strata on the basis of the different employee categories at the firm. Consequently, the researcher used simple random sampling technique to select the desired sample size from each stratum of the population. Therefore, respondents to participate in the study were selected using simple random sampling. Target subjects from each category of the target population were sampled randomly using random numbers in order to ensure that each person in the population had an equal chance of being selected for the sample. Mugenda
and Mugenda (2003) indicates that a sample of 10% is adequate for generalization of research findings where the population is homogeneous.

3.3.2.3 Sample Size
Due to resource limitations, the researcher computed a representative sample of the population and then sampled the respondents using simple random sampling. A sample of 20% of the entire population was used since the employees in the different lines of operations were homogenous in terms of the knowledge they possessed with regards to waste management. This selected study sample size therefore was representative enough of the entire population. This sample size conformed to stipulations by Mugenda and Mugenda (2003) that a sample size which is 10% or more is adequate and representative of a population which exhibits homogenous characteristics and traits.

A sample of 20% of the entire population was used since the employees in the different lines of operations were homogenous in terms of the knowledge they possessed with regards to waste management. This selected study sample size was therefore representative enough of the entire population. This sample size conformed to stipulations by Mugenda and Mugenda (2003) that a sample size which is 10% or more is adequate and representative of a population which exhibits homogenous characteristics and traits.

3.4 Data Collection Methods
The researcher collected primary data for the purposes of this study. The data was collected for the first time hence adding to existing literature on waste management. Kothari (2004) defined primary data as that research data that is collected for the first time, thus original in nature. Structured questionnaires were designed and distributed by the researcher to target respondents. The questionnaires comprised of closed ended questions. The researcher distributed the research instruments using the drop and pick method so as to give enough time to the respondents to fill in details accurately and without details without any undue influence.

The questionnaire was divided into five sections. The first section captured the general information of the population, the second section captured the meaning and scope of industrial waste management in industries, the third section captured waste reduction contribution to sustainable waste management in industries, the fourth section captured
waste reuse strategy towards sustainable waste management in industries, and the final section captured the sustainable development goals strategies on waste management in industries. Distributed questionnaires used a five point likert scale; where 1 = No extent, 2= Little Extent, 3 = Moderate Extent, 4= Great Extent and 5 = Very Great Extent. This scale provided an interval to further explain the computed means in showing how the various factors influence the sustainability of industrial waste management.

The study captured the background information of the respondents so as to determine their suitability to participate in this research. The distributed structured questionnaires were designed in such a manner that they ensured confidentiality of responses hence did not bear the name of any respondent. In addition the researcher also collected qualitative data via the usage of interview guides. These guides aided the researcher to collect first-hand information with regards to waste management.

3.5 Research Procedures
The questionnaires was designed by the researcher based on the research questions and were pre-tested to ascertain the suitability of the tool before the actual administration. The reason for conducting pilot testing was to detect weakness in design and instrumentation and to provide proxy data for selection of a probability sample. Pre-testing was done by administering the questionnaire to 10 respondents who were not included in the actual study. This enabled the researcher to fine tune the questionnaire for objectivity and efficiency of the process. The questionnaire was estimated to take twenty minutes to complete.

Data was collected through a drop and pick method. Respondents were informed of the exercise and permission was sought from the company before the exercise commenced. To ensure a high response rate, the employees were asked to take a break from their work-shift and respond to the questionnaire. The respondents were given forty-five minutes to answer so as to ensure that they did not rust through.

3.6 Data Analysis Methods
Kothari (2008) defined data analysis as the process that starts immediately after the collection of data and ends at the point where results are interpreted and processed. Just before data analysis commences, data collected via the questionnaires will be examined
for completeness then coded and lastly entered into Statistical Package for Social Sciences (SPSS) for subsequent analysis.

Since the study collected quantitative data, quantitative analysis methods was applied thereon. The researcher then computed frequencies, percentages and means to help in the analysis of collected data. It is from these computations that meaningful deductions and conclusions were made. The researcher used SPSS version 20.0 to analyze the collected quantitative data. Computed standard deviations depicted the deviations of the means. Correlation analysis was also conducted so as to explain the results from the interview guides. These combination of research data analysis enabled the researcher obtain meaningful and quality deductions of the research objectives. Data was presented in the form of figures and tables.

3.7 Chapter Summary

In this chapter, the researcher highlighted the intended research design to be applied in the study well as the justification for its choice. The chapter also identified the preferred data collection instruments as well as the distribution criterion to the target respondents. Identified analysis techniques were also pointed out in this chapter.

The next chapter presents the results and findings of the study.
CHAPTER FOUR

4.0 RESULTS AND FINDINGS

4.1 Introduction
This chapter presents the results and findings of the collected and analyzed data. The researcher gave out 187 questionnaires and only 142 were completely filled. This gave the research a response rate of 75.9%.

4.2 General Information
4.2.1 Marital Status
The respondents were asked to indicate their marital status and the results were as follows: From the analyzed data, it was revealed that 56.3% were single and 43.7% were married, showing that single respondents were more in the study. This graph shows that majority of the respondents were single, showing that most of NBL staff were single.

Figure 4.1 Marital Status

4.2.2 Age Category
The respondents were asked to indicate their age category and the results were as follows: From the analyzed data, 40.2% of the respondents were aged between 39-48 years, 38% were aged between 18-28 years, and 21.8% were aged between 29-38 years. Most of the respondents were aged between 18 and 38 years.
4.2.3 Highest Level of Education

The respondents were asked to indicate their level of education and the results were as follows: From the analyzed data, it was revealed that 82.4% of the respondents had university degrees and 17.6% had college diplomas, showing that the respondents had a strong educational background. This shows that the respondents were well placed to understand the study questions.

4.2.4 Duration worked in the Work Station

The respondents were asked to indicate the duration they had worked at NBL and the results were as follows: From the analyzed data, it was revealed that 33.8% of the respondents had worked in their work stations for 5-9 years, 26.8% had worked for 2-4 years, 21.5% had worked for 10 and above years and 17.6% had worked for 0-1 years,
showing that the respondents had a lot of experience working in their work stations making them the best candidates for the study.

![Work Station Experience](image1)

**Figure 4.4 Work Station Experience**

### 4.2.5 Department Worked Under

The respondents were asked to indicate the department they worked in at NBL and the results were as follows: From the analyzed data, it was revealed that 54.2% of the respondents worked in production, 31.7% worked in finance and 14.1% were in sales, showing that the population had covered the major areas of operations at NBL, indicating that the study would cover all areas of NBL.

![Department Worked](image2)

**Figure 4.5 Department Worked Under**
4.3 Meaning and Scope of Industrial Waste Management in Industries

The first research question examined the meaning and scope of industrial waste management and this section presents the results of the same with a focus on NBL.

4.3.1 Meaning of Industrial Waste Management at NBL

The respondents were asked to indicate their level of agreement on the following statements regarding the meaning of waste management in industries, using the scale of NE=No Extent, LE=Little Extent, ME=Moderate Extent, GE=Great Extent, and VGE=Very Great Extent. Their results were as tabled:

Table 4.1 shows that there are several meanings and various categories of waste. The resulting mean of 3.0 shows that the respondents had a good understanding of waste definitions and the standard deviation that was less than 1.5 shows that the difference in response was insignificant. The table shows that, waste is any given kind of substance that contains a scrap material or an effluent or other strange substance coming from the application of any process and can also refer to any substance or article which ideally should be disposed of as being broken, worn out, contaminated or otherwise spoiled. The table shows that, solid waste is defined as waste from the offices, retail shops existing within a town, different warehouses and even hotels and industrial waste is waste that comes from packaging materials, food waste, waste from plastics, metals textiles and even fuel ash waste. The table shows that, street waste is waste generated from cleaning process in the streets including drain cleaning, sand, litter and even actual dead animals, construction waste is waste that includes waste from the construction process for example pipes, bricks, and masonry, and that municipal solid waste is solid waste that includes all domestic and local hazard and non-hazardous waste for example waste emanating from commercial and institutions, street and construction waste including food waste, plastic, metal and even glass.
Table 4.1 Meaning of Industrial Waste Management at NBL

<table>
<thead>
<tr>
<th>Statement</th>
<th>NE</th>
<th>LE</th>
<th>ME</th>
<th>GE</th>
<th>VGE</th>
<th>Mean</th>
<th>Std Dev</th>
</tr>
</thead>
<tbody>
<tr>
<td>Waste as any given kind of substance that contains a scrap material or an</td>
<td>0</td>
<td>4.9</td>
<td>18.3</td>
<td>12</td>
<td>62</td>
<td>4.25</td>
<td>1.094</td>
</tr>
<tr>
<td>effluent or other strange substance coming from the application of any</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>process</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Waste is any substance or article which ideally should be disposed of as</td>
<td>12.7</td>
<td>7.7</td>
<td>40.1</td>
<td>15.5</td>
<td>23.9</td>
<td>3.30</td>
<td>1.272</td>
</tr>
<tr>
<td>being broken, worn out, contaminated or otherwise spoiled</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Solid waste is defined as waste from the offices, retail shops existing</td>
<td>7.7</td>
<td>16.2</td>
<td>28.9</td>
<td>17.6</td>
<td>29.6</td>
<td>3.45</td>
<td>1.280</td>
</tr>
<tr>
<td>within a town, different warehouses and even hotels</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Industrial waste is waste that comes from packaging materials, food waste,</td>
<td>0</td>
<td>19.7</td>
<td>7.7</td>
<td>34.5</td>
<td>38</td>
<td>3.91</td>
<td>1.117</td>
</tr>
<tr>
<td>waste from plastics, metals textiles and even fuel ash waste</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Street waste is waste generated from cleaning process in the streets</td>
<td>2.8</td>
<td>5.6</td>
<td>16.2</td>
<td>50.7</td>
<td>24.6</td>
<td>3.89</td>
<td>0.939</td>
</tr>
<tr>
<td>including drain cleaning, sand, litter and even actual dead animals</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Construction waste is waste that includes waste from the construction</td>
<td>2.8</td>
<td>0</td>
<td>8.5</td>
<td>57</td>
<td>31.7</td>
<td>4.15</td>
<td>0.798</td>
</tr>
<tr>
<td>process for example pipes, bricks, and masonry</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Municipal solid waste is solid waste that includes all domestic and local</td>
<td>0</td>
<td>0</td>
<td>8.5</td>
<td>59.9</td>
<td>31.7</td>
<td>4.23</td>
<td>0.591</td>
</tr>
<tr>
<td>hazard and non-hazardous waste for example waste emanating from</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>commercial and institutions, street and construction waste including food</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>waste, plastic, metal and even glass</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

4.3.2 Relationship between Meaning and Industrial Waste Management at NBL

The correlation test was done to determine the significance of meaning of industrial waste at NBL using the P value of 0.000 to 0.05. The relationship of the factors were as tabled. Table 4.2 shows that: Waste as any given kind of substance that contains a scrap material or an effluent or other strange substance coming from the application of any process is insignificant (P=0.428). Waste being any substance or article which ideally should be disposed of as being broken, worn out, contaminated or otherwise spoiled is insignificant (P=0.190). Solid waste defined as waste from the offices, retail shops existing within a
town, different warehouses and even hotels is significant (P=0.000). Industrial waste is waste that comes from packaging materials, food waste, waste from plastics, metals textiles and even fuel ash waste is significant (P=0.000). Street waste is waste generated from cleaning process in the streets including drain cleaning, sand, litter and even actual dead animals is significant (P=0.000). Construction waste is waste that includes waste from the construction process for example pipes, bricks, and masonry is significant (P=0.001). Municipal solid waste is solid waste that includes all domestic and local hazard and non-hazardous waste for example waste emanating from commercial and institutions, street and construction waste including food waste, plastic, metal and even glass is insignificant (P=0.122).

Table 4.2 Correlations for Meaning of Industrial Waste Management at NBL

<table>
<thead>
<tr>
<th>Statement</th>
<th>Correlations</th>
</tr>
</thead>
<tbody>
<tr>
<td>Waste as any given kind of substance that contains a scrap material or an</td>
<td>0.055</td>
</tr>
<tr>
<td>effluent or other strange substance coming from the application of any</td>
<td>0.428</td>
</tr>
<tr>
<td>process</td>
<td></td>
</tr>
<tr>
<td>Waste is any substance or article which ideally should be disposed of as</td>
<td>-0.095</td>
</tr>
<tr>
<td>being broken, worn out, contaminated or otherwise spoiled</td>
<td>0.190</td>
</tr>
<tr>
<td>Solid waste is defined as waste from the offices, retail shops existing</td>
<td>0.475**</td>
</tr>
<tr>
<td>within a town, different warehouses and even hotels</td>
<td>0.000</td>
</tr>
<tr>
<td>Industrial waste is waste that comes from packaging materials, food</td>
<td>0.517**</td>
</tr>
<tr>
<td>waste, waste from plastics, metals textiles and even fuel ash waste</td>
<td>0.000</td>
</tr>
<tr>
<td>Street waste is waste generated from cleaning process in the streets</td>
<td>0.273**</td>
</tr>
<tr>
<td>including drain cleaning, sand, litter and even actual dead animals</td>
<td>0.000</td>
</tr>
<tr>
<td>Construction waste is waste that includes waste from the construction</td>
<td>0.256**</td>
</tr>
<tr>
<td>process for example pipes, bricks, and masonry</td>
<td>0.001</td>
</tr>
<tr>
<td>Municipal solid waste is solid waste that includes all domestic and local</td>
<td>0.119</td>
</tr>
<tr>
<td>hazard and non-hazardous waste for example waste emanating from</td>
<td>0.122</td>
</tr>
<tr>
<td>commercial and institutions, street and construction waste including food</td>
<td></td>
</tr>
<tr>
<td>waste, plastic, metal and even glass</td>
<td></td>
</tr>
</tbody>
</table>

** Correlation is Significant at 0.01 Level (2-tailed)

* Correlation is Significant at 0.05 Level (2-tailed)
4.3.3 Scope of Industrial Waste Management at NBL

The respondents were asked to indicate their level of agreement on the following statements regarding the scope of waste management in industries, using the scale of NE=No Extent, LE=Little Extent, ME=Moderate Extent, GE=Great Extent, and VGE=Very Great Extent. Their results were as tabled below:

Table 4.3 shows the scope of waste management at NBL. The resulting mean of 3.0 for most results shows that the respondents had a good understanding of the scope of waste management and the standard deviation that was less than 1.5 shows that the difference in response was insignificant. The table shows that the onus and costs of managing waste streams should be placed on ‘producers’ of the waste and that, municipal solid waste management system has changed from being efficient to the current status that displays a lot of inefficiencies. The table also shows that, storage, collection, transportation and final treatment/disposal of wastes has become a major problem in urban centers and that, the global trend of increased use of electrical and electronic goods has led to an increase in E-waste becoming a significant threat to our environment and human health. The table also shows that, waste management in our urban centers has been subjected to enormous commercial and legal changes over the last two decades and the country has a sustained and multi-faceted legislative and policy attack on landfill, and waste management both at the domestic and international level. From the table, it can noted that, legislative changes have imposed, and continue to impose, structural challenges on the waste management in the country and our urban areas lack space for new landfills due to the associated urban sprawl of affluent suburbs that uphold a “Not-In-My-Back-Yard” mentality. The table also shows that sanitary landfills on our urban centers are designed to “concentrate and contain” our solid waste at a specific site and minimal environmental cost and each day, layers of waste are compacted by heavy machinery and buried under a layer of earth or clean construction debris and to keep out the vermin, confine the refuse, reduce the odors, and divert leachate forming rain water from entering the landfills. The table shows that the nation reduces waste by preventing it from becoming waste in the first place through the manufacture and purchase of reusable materials but not efficiently and hazardous waste treatment flourishing in the country since large quantities of such waste are being imported for recycling and treatment is also inefficient.
Table 4.3 Scope of Industrial Waste Management at NBL

<table>
<thead>
<tr>
<th>Statement</th>
<th>NE</th>
<th>LE</th>
<th>ME</th>
<th>GE</th>
<th>VGE</th>
<th>Mean</th>
<th>Std Dev</th>
</tr>
</thead>
<tbody>
<tr>
<td>The onus and costs of managing waste streams should be placed on ‘producers’ of the waste</td>
<td>2.8</td>
<td>2.8</td>
<td>31</td>
<td>30.3</td>
<td>33.1</td>
<td>3.88</td>
<td>1.000</td>
</tr>
<tr>
<td>Municipal solid waste management system has changed from being efficient to the current status that displays a lot of inefficiencies</td>
<td>0</td>
<td>4.9</td>
<td>10.6</td>
<td>28.9</td>
<td>55.6</td>
<td>4.35</td>
<td>0.860</td>
</tr>
<tr>
<td>Storage, collection, transportation and final treatment/disposal of wastes has become a major problem in urban centers</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>28.9</td>
<td>71.1</td>
<td>4.71</td>
<td>0.455</td>
</tr>
<tr>
<td>The global trend of increased use of electrical and electronic goods has led to an increase in E-waste becoming a significant threat to our environment and human health</td>
<td>0</td>
<td>0</td>
<td>19</td>
<td>20.4</td>
<td>60.6</td>
<td>4.42</td>
<td>0.792</td>
</tr>
<tr>
<td>Waste management in our urban centers has been subjected to enormous commercial and legal changes over the last two decades</td>
<td>0</td>
<td>4.9</td>
<td>23.9</td>
<td>33.8</td>
<td>37.3</td>
<td>4.04</td>
<td>0.902</td>
</tr>
<tr>
<td>The country has a sustained and multi-faceted legislative and policy attack on landfill, and waste management both at the domestic and international level</td>
<td>0</td>
<td>36.6</td>
<td>12.7</td>
<td>33.1</td>
<td>17.6</td>
<td>3.32</td>
<td>1.145</td>
</tr>
<tr>
<td>Legislative changes have imposed, and continue to impose, structural challenges on the waste management in the country</td>
<td>2.8</td>
<td>19.7</td>
<td>27.5</td>
<td>45.1</td>
<td>4.9</td>
<td>3.30</td>
<td>0.936</td>
</tr>
<tr>
<td>Our urban areas lack space for new landfills due to the associated urban sprawl of affluent suburbs that uphold a “Not-In-My-Back-Yard” mentality</td>
<td>0</td>
<td>11.3</td>
<td>21.1</td>
<td>36.6</td>
<td>31</td>
<td>3.87</td>
<td>0.981</td>
</tr>
<tr>
<td>Sanitary landfills on our urban centers are designed to “concentrate and contain” our solid waste at a specific site and minimal environmental cost</td>
<td>12.7</td>
<td>0</td>
<td>31.7</td>
<td>34.5</td>
<td>21.1</td>
<td>3.51</td>
<td>1.201</td>
</tr>
<tr>
<td>Each day, layers of waste are compacted by heavy machinery and buried under a layer of earth or clean construction debris and to keep out the vermin, confine the refuse, reduce the odors, and divert leachate forming rain water from entering the landfills</td>
<td>0</td>
<td>45.1</td>
<td>12.7</td>
<td>13.4</td>
<td>28.9</td>
<td>3.26</td>
<td>1.297</td>
</tr>
<tr>
<td>The nation reduces waste by preventing it from becoming waste in the first place through the manufacture and purchase of reusable materials</td>
<td>30.3</td>
<td>9.9</td>
<td>18.3</td>
<td>28.9</td>
<td>12.7</td>
<td>2.84</td>
<td>1.447</td>
</tr>
<tr>
<td>Hazardous waste treatment is flourishing in the country since large quantities of such waste are being imported for recycling and treatment</td>
<td>24.6</td>
<td>9.2</td>
<td>26.8</td>
<td>7.7</td>
<td>31.7</td>
<td>3.13</td>
<td>1.557</td>
</tr>
</tbody>
</table>
4.3.4 Relationship between Scope of Waste and Industrial Waste Management

The correlation test was done to determine the significance of scope of industrial waste at NBL using the P value of 0.000 to 0.05. Table 4.4 shows that, the onus and costs of managing waste streams should be placed on ‘producers’ of the waste as significant (P=0.000). It also shows that, municipal solid waste management system has changed from being efficient to the current status that displays a lot of inefficiencies as insignificant (P=0.635). The table shows that, storage, collection, transportation and final treatment/disposal of wastes has become a major problem in urban centers as insignificant (P=0.095). The global trend of increased use of electrical and electronic goods has led to an increase in E-waste becoming a significant threat to our environment and human health is significant (P=0.007). Waste management in our urban centers has been subjected to enormous commercial and legal changes over the last two decades is significant (P=0.001). The country has a sustained and multi-faceted legislative and policy attack on landfill, and waste management both at the domestic and international level is significant (P=0.000). Legislative changes have imposed, and continue to impose, structural challenges on the waste management in the country is insignificant (P=0.874). Our urban areas lack space for new landfills due to the associated urban sprawl of affluent suburbs that uphold a “Not-In-My-Back-Yard” mentality is insignificant (P=0.208). Sanitary landfills on our urban centers are designed to “concentrate and contain” our solid waste at a specific site and minimal environmental cost is significant (P=0.000). Table 4.4 also shows that, each day, layers of waste are compacted by heavy machinery and buried under a layer of earth or clean construction debris and to keep out the vermin, confine the refuse, reduce the odors, and divert leachate forming rain water from entering the landfills is significant (P=0.032). The nation reduces waste by preventing it from becoming waste in the first place through the manufacture and purchase of reusable materials is significant (P=0.001). Hazardous waste treatment is flourishing in the country since large quantities of such waste are being imported for recycling and treatment is significant (P=0.000).
Table 4.4 Correlations for Scope of Industrial Waste Management at NBL

<table>
<thead>
<tr>
<th>Statement</th>
<th>Correlations</th>
</tr>
</thead>
<tbody>
<tr>
<td>The onus and costs of managing waste streams should be placed on ‘producers’ of the waste</td>
<td>0.579** 0.000</td>
</tr>
<tr>
<td>Municipal solid waste management system has changed from being efficient to the current status that displays a lot of inefficiencies</td>
<td>-0.035 0.635</td>
</tr>
<tr>
<td>Storage, collection, transportation and final treatment/disposal of wastes has become a major problem in urban centers</td>
<td>0.131 0.095</td>
</tr>
<tr>
<td>The global trend of increased use of electrical and electronic goods has led to an increase in E-waste becoming a significant threat to our environment and human health</td>
<td>-0.201** 0.007</td>
</tr>
<tr>
<td>Waste management in our urban centers has been subjected to enormous commercial and legal changes over the last two decades</td>
<td>-0.243** 0.001</td>
</tr>
<tr>
<td>The country has a sustained and multi-faceted legislative and policy attack on landfill, and waste management both at the domestic and international level</td>
<td>-0.550** 0.000</td>
</tr>
<tr>
<td>Legislative changes have imposed, and continue to impose, structural challenges on the waste management in the country</td>
<td>-0.011 0.874</td>
</tr>
<tr>
<td>Our urban areas lack space for new landfills due to the associated urban sprawl of affluent suburbs that uphold a “Not-In-My-Back-Yard” mentality</td>
<td>0.091 0.208</td>
</tr>
<tr>
<td>Sanitary landfills on our urban centers are designed to “concentrate and contain” our solid waste at a specific site and minimal environmental cost</td>
<td>0.366** 0.000</td>
</tr>
<tr>
<td>Each day, layers of waste are compacted by heavy machinery and buried under a layer of earth or clean construction debris and to keep out the vermin, confine the refuse, reduce the odors, and divert leachate forming rain water from entering the landfills</td>
<td>-0.156* 0.032</td>
</tr>
<tr>
<td>The nation reduces waste by preventing it from becoming waste in the first place through the manufacture and purchase of reusable materials</td>
<td>-0.235** 0.001</td>
</tr>
<tr>
<td>Hazardous waste treatment is flourishing in the country since large quantities of such waste are being imported for recycling and treatment</td>
<td>-0.393** 0.000</td>
</tr>
</tbody>
</table>

** Correlation is Significant at 0.01 Level (2-tailed)
* Correlation is Significant at 0.05 Level (2-tailed)

4.4 Waste Reduction Contribution to Sustainable Waste Management in Industries

The second research question examined the implication of waste reduction strategy on sustainable waste management in industries. This section presents the results of the same with a focus on NBL.

4.4.1 Impact of Waste Reduction Contribution to Sustainable Waste Management

The respondents were asked to indicate their level of agreement on the following statements regarding the scope of waste reduction contribution to sustainable waste management in industries using the scale NE=No Extent, LE= Little Extent, ME=
Moderate Extent, GE= Great Extent, and VGE=Very Great Extent. The resulting mean of 3.5 for most results shows that reducing waste impacts sustainability of waste management and the standard deviation of less than 1.5 shows that the difference in response was insignificant.

Table 4.5 shows that, a sustainable method of waste management involves looking for opportunities to reduce waste even during the product life cycle and implementation of simplified leaness evaluation metrics can be used to reduce waste and improve effectiveness and efficiency in organizations. The table also shows that, availability of adequate garbage disposal in urban area can improve community development and cohesion of waste management and organizations should involve communities around them in waste management programs to promote publicity on waste management. The study shows that, behavioral instruments should be applied in implementing waste management strategies through initiatives that inform and educate and waste awareness and participation can be enhanced by creating recognition programs, and door-to-door awareness. The table shows that, establishing certain behavior patterns in transient populations can be used as a strategy of sustainable waste management system and having proper waste management systems that are included in company policies and procedures facilitates sustainable waste management system. The table shows that, having a tax policy that ensures individuals are taxed based on the amount of waste they produce cannot help facilitate a sustainable waste management system and having good housekeeping (good operating practices) that focus on reducing wastes from the source cannot facilitate the creation of a sustainable waste management system.
<table>
<thead>
<tr>
<th>Statement</th>
<th>NE</th>
<th>LE</th>
<th>ME</th>
<th>GE</th>
<th>VG</th>
<th>Mean</th>
<th>Std Dev</th>
</tr>
</thead>
<tbody>
<tr>
<td>A sustainable method of waste management involves looking for opportunities to reduce waste even during the product life cycle</td>
<td>0.00</td>
<td>2.80</td>
<td>0.00</td>
<td>41.50</td>
<td>55.60</td>
<td>4.50</td>
<td>0.650</td>
</tr>
<tr>
<td>Implementation of simplified leanness evaluation metrics can be used to reduce waste and improve effectiveness and efficiency in organizations</td>
<td>0.00</td>
<td>0.00</td>
<td>13.40</td>
<td>41.50</td>
<td>45.10</td>
<td>4.32</td>
<td>0.698</td>
</tr>
<tr>
<td>Availability of adequate garbage disposal in urban area can improve community development and cohesion of waste management</td>
<td>0.00</td>
<td>4.90</td>
<td>27.50</td>
<td>20.40</td>
<td>47.20</td>
<td>4.10</td>
<td>0.970</td>
</tr>
<tr>
<td>Organizations should involve communities around them in waste management programs to promote publicity on waste management</td>
<td>2.80</td>
<td>0.00</td>
<td>30.30</td>
<td>19.70</td>
<td>47.20</td>
<td>4.08</td>
<td>1.014</td>
</tr>
<tr>
<td>Behavioral instruments should be applied in implementing waste management strategies through initiatives that inform and educate</td>
<td>0.00</td>
<td>4.90</td>
<td>18.30</td>
<td>31.70</td>
<td>45.10</td>
<td>4.17</td>
<td>0.899</td>
</tr>
<tr>
<td>Waste awareness and participation can be enhanced by creating recognition programs, and door-to-door awareness</td>
<td>0.00</td>
<td>4.90</td>
<td>5.60</td>
<td>63.40</td>
<td>26.10</td>
<td>4.11</td>
<td>0.712</td>
</tr>
<tr>
<td>Establishing certain behavior patterns in transient populations can be used as a strategy of sustainable waste management system</td>
<td>0.00</td>
<td>4.90</td>
<td>23.90</td>
<td>34.50</td>
<td>36.60</td>
<td>4.03</td>
<td>0.899</td>
</tr>
<tr>
<td>Having proper waste management systems that are included in company policies and procedures facilitates sustainable waste management system</td>
<td>4.90</td>
<td>0.00</td>
<td>16.90</td>
<td>30.30</td>
<td>47.90</td>
<td>4.16</td>
<td>1.036</td>
</tr>
<tr>
<td>Having a tax policy that ensures individuals are taxed based on the amount of waste they produce can help facilitate a sustainable waste management system</td>
<td>10.60</td>
<td>26.80</td>
<td>2.80</td>
<td>33.10</td>
<td>26.80</td>
<td>3.39</td>
<td>1.398</td>
</tr>
<tr>
<td>Having good house-keeping (good operating practices) that focus on reducing wastes from the source can facilitate the creation of a sustainable waste management system</td>
<td>0.00</td>
<td>26.10</td>
<td>7.70</td>
<td>40.10</td>
<td>26.10</td>
<td>3.66</td>
<td>1.129</td>
</tr>
</tbody>
</table>
4.4.2 Relationship between Waste Reduction and Sustainable Waste Management

The correlation test was done to determine the significance of waste reduction and contribution to sustainable waste management at NBL using the P value of 0.000 to 0.05. Table 4.6 shows that, a sustainable method of waste management involving looking for opportunities to reduce waste even during the product life cycle is significant (P=0.000). Implementation of simplified leaness evaluation metrics can be used to reduce waste and improve effectiveness and efficiency in organizations is significant (P=0.000). Availability of adequate garbage disposal in urban area can improve community development and cohesion of waste management is significant (P=0.000). Organizations should involve communities around them in waste management programs to promote publicity on waste management is significant (P=0.000). Behavioral instruments should be applied in implementing waste management strategies through initiatives that inform and educate is insignificant (P=0.065). Waste awareness and participation can be enhanced by creating recognition programs, and door-to-door awareness is significant (P=0.002). Establishing certain behavior patterns in transient populations can be used as a strategy of sustainable waste management system is significant (P=0.001). Having proper waste management systems that are included in company policies and procedures facilitates sustainable waste management system is significant (P=0.000). Having a tax policy that ensures individuals are taxed based on the amount of waste they produce can help facilitate a sustainable waste management system is significant (P=0.021). Having good house-keeping (good operating practices) that focus on reducing wastes from the source can facilitate the creation of a sustainable waste management system is insignificant (P=0.422).
### Table 4.6 Relationship between Waste Reduction and Sustainable Waste Management

<table>
<thead>
<tr>
<th>Statement</th>
<th>Correlations</th>
</tr>
</thead>
<tbody>
<tr>
<td>A sustainable method of waste management involves looking for opportunities to reduce waste even during the product life cycle</td>
<td>0.728**</td>
</tr>
<tr>
<td>Implementation of simplified leaness evaluation metrics can be used to reduce waste and improve effectiveness and efficiency in organizations</td>
<td>0.636**</td>
</tr>
<tr>
<td>Availability of adequate garbage disposal in urban area can improve community development and cohesion of waste management</td>
<td>0.496**</td>
</tr>
<tr>
<td>Organizations should involve communities around them in waste management programs to promote publicity on waste management</td>
<td>0.402**</td>
</tr>
<tr>
<td>Behavioral instruments should be applied in implementing waste management strategies through initiatives that inform and educate</td>
<td>0.144</td>
</tr>
<tr>
<td>Waste awareness and participation can be enhanced by creating recognition programs, and door-to-door awareness</td>
<td>0.243**</td>
</tr>
<tr>
<td>Establishing certain behavior patterns in transient populations can be used as a strategy of sustainable waste management system</td>
<td>-0.250**</td>
</tr>
<tr>
<td>Having proper waste management systems that are included in company policies and procedures facilitates sustainable waste management system</td>
<td>0.283**</td>
</tr>
<tr>
<td>Having a tax policy that ensures individuals are taxed based on the amount of waste they produce can help facilitate a sustainable waste management system</td>
<td>0.176*</td>
</tr>
<tr>
<td>Having good house-keeping (good operating practices) that focus on reducing wastes from the source can facilitate the creation of a sustainable waste management system</td>
<td>-0.062</td>
</tr>
</tbody>
</table>

**Correlation is Significant at 0.01 Level (2-tailed)**

*Correlation is Significant at 0.05 Level (2-tailed)**

### 4.5 Waste Reuse Strategy towards Sustainable Waste Management in Industries

The third research question examined the implication of waste reuse strategy on sustainable waste management in industries. This section presents the results of the same with a focus on NBL.
4.5.1 Impact of Waste Reuse Strategy towards Sustainable Waste Management

The respondents were asked to indicate their level of agreement on the following statements regarding the strategies that gear towards a sustainable waste management system in industries using the scale NE=No Extent, LE= Little Extent, ME= Moderate Extent, GE= Great Extent, and VGE=Very Great Extent. The resulting mean of 3.0 for most results shows that waste reuse strategy impacts sustainability of waste management and the standard deviation of less than 1.5 shows that the difference in response was insignificant.

Table 4.7 Waste Reuse Strategy Contribution to Sustainable Waste Management

<table>
<thead>
<tr>
<th>Statement</th>
<th>NE</th>
<th>LE</th>
<th>ME</th>
<th>GE</th>
<th>VGE</th>
<th>Mean</th>
<th>Std Dev</th>
</tr>
</thead>
<tbody>
<tr>
<td>In my opinion, reusing waste is the best strategy of creating a sustainable waste management by companies</td>
<td>5.6</td>
<td>0</td>
<td>25.4</td>
<td>19</td>
<td>50</td>
<td>4.08</td>
<td>1.124</td>
</tr>
<tr>
<td>An effective way to reuse solid waste is through burning materials that are combustible and melting down non-combustible materials through the company’s incinerators</td>
<td>15.5</td>
<td>24.6</td>
<td>10.6</td>
<td>28.2</td>
<td>21.1</td>
<td>3.15</td>
<td>1.409</td>
</tr>
<tr>
<td>Waste ash from incineration can be used to improve soil fertility on urban areas</td>
<td>15.5</td>
<td>12</td>
<td>5.6</td>
<td>26.8</td>
<td>40.1</td>
<td>3.64</td>
<td>1.489</td>
</tr>
<tr>
<td>Disposal of both non-degradable and degradable wastes separately can be used to safely use the generated wastes for agricultural purposes</td>
<td>12.7</td>
<td>29.6</td>
<td>12</td>
<td>30.3</td>
<td>15.5</td>
<td>3.06</td>
<td>1.317</td>
</tr>
<tr>
<td>Recycling can be carried out by companies at waste recycling plants as a strategy of creating a sustainable waste management system</td>
<td>0</td>
<td>2.8</td>
<td>15.5</td>
<td>23.9</td>
<td>57.7</td>
<td>4.37</td>
<td>0.846</td>
</tr>
<tr>
<td>Companies can think of new and better ways of producing and consuming goods and services to facilitate the creation of a sustainable waste management system</td>
<td>0</td>
<td>16.9</td>
<td>7</td>
<td>36.6</td>
<td>39.4</td>
<td>3.99</td>
<td>1.072</td>
</tr>
</tbody>
</table>

Table 4.7 shows that reusing waste is the best strategy of creating a sustainable waste management by companies and an effective way to reuse solid waste is through burning materials that are combustible and melting down non-combustible materials through the company’s incinerators. The table shows that, waste ash from incineration can be used to
improve soil fertility on urban areas and disposal of both non-degradable and degradable wastes separately can be used to safely use the generated wastes for agricultural purposes. The table also shows that, recycling can be carried out by companies at waste recycling plants as a strategy of creating a sustainable waste management system and that, companies can think of new and better ways of producing and consuming goods and services to facilitate the creation of a sustainable waste management system.

### 4.5.2 Relationship between Waste Reuse Strategies and Sustainable Waste Management

The correlation test was done to determine the significance of waste reuse strategy and contribution to sustainable waste management at NBL using the P value of 0.000 to 0.05.

#### Table 4.8 Relationship between Waste Reuse Strategies and Sustainable Waste Management

<table>
<thead>
<tr>
<th>Statement</th>
<th>Correlations</th>
</tr>
</thead>
<tbody>
<tr>
<td>In my opinion, reusing waste is the best strategy of creating a sustainable waste management by companies</td>
<td>0.431** 0.000</td>
</tr>
<tr>
<td>An effective way to reuse solid waste is through burning materials that are combustible and melting down non-combustible materials through the company’s incinerators</td>
<td>0.283** 0.000</td>
</tr>
<tr>
<td>Waste ash from incineration can be used to improve soil fertility on urban areas</td>
<td>0.199** 0.006</td>
</tr>
<tr>
<td>Disposal of both non-degradable and degradable wastes separately can be used to safely use the generated wastes for agricultural purposes</td>
<td>-0.291** 0.000</td>
</tr>
<tr>
<td>Recycling can be carried out by companies at waste recycling plants as a strategy of creating a sustainable waste management system</td>
<td>0.498** 0.000</td>
</tr>
<tr>
<td>Companies can think of new and better ways of producing and consuming goods and services to facilitate the creation of a sustainable waste management system</td>
<td>0.493** 0.000</td>
</tr>
</tbody>
</table>

** Correlation is Significant at 0.01 Level (2-tailed)

* Correlation is Significant at 0.05 Level (2-tailed)

Table 4.8 shows that, reusing waste is the best strategy of creating a sustainable waste management by companies is significant (P=0.000). An effective way to reuse solid waste...
is through burning materials that are combustible and melting down non-combustible materials through the company’s incinerators is significant (P=0.000). Waste ash from incineration can be used to improve soil fertility on urban areas is significant (P=0.006). Disposal of both non-degradable and degradable wastes separately can be used to safely use the generated wastes for agricultural purposes is significant (P=0.000). Recycling can be carried out by companies at waste recycling plants as a strategy of creating a sustainable waste management system is significant (P=0.000). Companies can think of new and better ways of producing and consuming goods and services to facilitate the creation of a sustainable waste management system is significant (P=0.000).

4.5.3 Impact of Public Involvement towards Sustainable Waste Management

The respondents were asked to indicate their level of agreement on the following statements regarding the strategies of involving the public geared towards a sustainable waste management system in industries using the scale NE=No Extent, LE= Little Extent, ME= Moderate Extent, GE= Great Extent, and VGE=Very Great Extent. The resulting mean of 3.0 shows that public involvement strategy impacts sustainability of waste management and the standard deviation of less than 1.5 shows that the difference in response was insignificant.

Table 4.9 shows that, the public which includes cart pushers, resource merchants, private solid waste collectors, public, and neighborhood and estate associations, is involved in managing solid waste and the public plays the role of waste separation, composting, distribution of solid waste containers and subsequent re-usage of collected and separated wastes. The table indicates that, inadequate resources, averseness, poor attitudes and solid waste management knowledge gap are some of the challenges facing the creation of a sustainable solid waste management and that, recycling mostly depends on the policies that a company has enforced on recycling and also the availability of buyers. Table 4.9 also shows that, the economy benefits from recycling through reduction of cost of fertilizers since organic waste can easily be transformed into fertilizers and that, the economy benefits from recycling through the employment of people to handle the urban waste. The table also shows that, the country does not have a single option of effectively and efficiently dealing with the increasing e-waste and that manufacturers of electronic equipment in urban centers are not being given incentives to recycle or buy back
electronic waste, as well as, Nairobi lacks a waste management system leading to short-term and long-term impacts on employees in companies and the county at large.

**Table 4.9 Public Involvement and Sustainable Waste Management**

<table>
<thead>
<tr>
<th>Statement</th>
<th>NE</th>
<th>LE</th>
<th>ME</th>
<th>GE</th>
<th>VGE</th>
<th>Mean</th>
<th>Std Dev</th>
</tr>
</thead>
<tbody>
<tr>
<td>The public which includes cart pushers, resource merchants, private solid waste collectors, public, and neighborhood and estate associations, is involved in managing solid waste</td>
<td>0</td>
<td>32.4</td>
<td>2.8</td>
<td>4.9</td>
<td>59.9</td>
<td>3.92</td>
<td>1.389</td>
</tr>
<tr>
<td>The public plays the role of waste separation, composting, distribution of solid waste containers and subsequent re-usage of collected and separated wastes</td>
<td>0</td>
<td>15.5</td>
<td>10.6</td>
<td>43</td>
<td>31</td>
<td>3.89</td>
<td>1.016</td>
</tr>
<tr>
<td>Inadequate resources, averseness, poor attitudes and solid waste management knowledge gap are some of the challenges facing the creation of a sustainable solid waste management</td>
<td>0</td>
<td>0</td>
<td>10.6</td>
<td>60.6</td>
<td>28.9</td>
<td>4.18</td>
<td>0.603</td>
</tr>
<tr>
<td>Recycling mostly depends on the policies that a company has enforced on recycling and also the availability of buyers</td>
<td>2.8</td>
<td>14.1</td>
<td>13.4</td>
<td>30.3</td>
<td>39.4</td>
<td>3.89</td>
<td>1.159</td>
</tr>
<tr>
<td>The economy benefits from recycling through reduction of cost of fertilizers since organic waste can easily be transformed into fertilizers</td>
<td>0</td>
<td>19.7</td>
<td>31</td>
<td>14.8</td>
<td>34.5</td>
<td>3.64</td>
<td>1.151</td>
</tr>
<tr>
<td>The economy benefits from recycling through the employment of people to handle the urban waste</td>
<td>0</td>
<td>2.8</td>
<td>34.5</td>
<td>9.9</td>
<td>52.8</td>
<td>4.13</td>
<td>0.988</td>
</tr>
<tr>
<td>The country does not have a single option of effectively and efficiently dealing with the increasing e-waste</td>
<td>2.8</td>
<td>12.7</td>
<td>34.5</td>
<td>7.7</td>
<td>42.3</td>
<td>3.74</td>
<td>1.213</td>
</tr>
<tr>
<td>Manufacturers of electronic equipment in urban centers are not being given incentives to recycle or buy back electronic waste</td>
<td>5.6</td>
<td>7.7</td>
<td>9.9</td>
<td>28.9</td>
<td>47.9</td>
<td>4.06</td>
<td>1.184</td>
</tr>
<tr>
<td>Nairobi lacks a waste management system leading to short-term and long-term impacts on employees in companies and the county at large</td>
<td>0</td>
<td>19.7</td>
<td>9.9</td>
<td>50</td>
<td>20.4</td>
<td>3.71</td>
<td>1.008</td>
</tr>
</tbody>
</table>
4.5.4 Relationship between Public Involvement and Sustainable Waste Management

The correlation test was done to determine the significance of public involvement strategy and contribution to sustainable waste management at NBL using the P value of 0.000 to 0.05.

Table 4.10 Relationship between Public Involvement and Sustainable Waste Management

<table>
<thead>
<tr>
<th>Statement</th>
<th>Correlations</th>
</tr>
</thead>
<tbody>
<tr>
<td>The public which includes cart pushers, resource merchants, private solid waste collectors, public, and neighborhood and estate associations, is involved in managing solid waste</td>
<td>0.270** 0.000</td>
</tr>
<tr>
<td>The public plays the role of waste separation, composting, distribution of solid waste containers and subsequent re-usage of collected and separated wastes</td>
<td>0.609** 0.000</td>
</tr>
<tr>
<td>Inadequate resources, averseness, poor attitudes and solid waste management knowledge gap are some of the challenges facing the creation of a sustainable solid waste management</td>
<td>0.246** 0.002</td>
</tr>
<tr>
<td>Recycling mostly depends on the policies that a company has enforced on recycling and also the availability of buyers</td>
<td>0.519** 0.000</td>
</tr>
<tr>
<td>The economy benefits from recycling through reduction of cost of fertilizers since organic waste can easily be transformed into fertilizers</td>
<td>0.487** 0.000</td>
</tr>
<tr>
<td>The economy benefits from recycling through the employment of people to handle the urban waste</td>
<td>0.599** 0.000</td>
</tr>
<tr>
<td>The country does not have a single option of effectively and efficiently dealing with the increasing e-waste</td>
<td>0.614** 0.000</td>
</tr>
<tr>
<td>Manufacturers of electronic equipment in urban centers are not being given incentives to recycle or buy back electronic waste</td>
<td>0.510** 0.000</td>
</tr>
<tr>
<td>Nairobi lacks a waste management system leading to short-term and long-term impacts on employees in companies and the county at large</td>
<td>0.732** 0.000</td>
</tr>
</tbody>
</table>

** Correlation is Significant at 0.01 Level (2-tailed)
* Correlation is Significant at 0.05 Level (2-tailed)
Table 4.10 shows that, the public which includes cart pushers, resource merchants, private solid waste collectors, public, and neighborhood and estate associations, is involved in managing solid waste is significant (P=0.000). The public plays the role of waste separation, composting, distribution of solid waste containers and subsequent re-usage of collected and separated wastes is significant (P=0.000). Inadequate resources, averseness, poor attitudes and solid waste management knowledge gap are some of the challenges facing the creation of a sustainable solid waste management is significant (P=0.002). Recycling mostly depends on the policies that a company has enforced on recycling and also the availability of buyers is significant (P=0.000). The economy benefits from recycling through reduction of cost of fertilizers since organic waste can easily be transformed into fertilizers is significant (P=0.000). The economy benefits from recycling through the employment of people to handle the urban waste is significant (P=0.000). Table 4.10 also shows that, the country does not have a single option of effectively and efficiently dealing with the increasing e-waste is significant (P=0.000). Manufacturers of electronic equipment in urban centers are not being given incentives to recycle or buy back electronic waste is significant (P=0.000). Nairobi lacks a waste management system leading to short-term and long-term impacts on employees in companies and the county at large is significant (P=0.000).

4.6 Sustainable Development Goals Strategies on Waste Management in Industries

The fourth research question examined the implication of sustainable development goals strategies on waste management in industries. This section presents the results of the same with a focus on NBL.

4.6.1 Sustainable Development Goals Strategies on Waste Management in Industries

The respondents were asked to indicate their level of agreement on the following statements regarding the sustainable development goals and strategies of waste management in industries using the scale NE=No Extent, LE=Little Extent, ME=Moderate Extent, GE=Great Extent, and VGE=Very Great Extent. The resulting mean of 3.0 shows that sustainable development goals strategies impacts sustainability of waste management and the standard deviation of less than 1.5 shows that the difference in response was insignificant.
Table 4.11 Sustainable Development Goals Strategies on Waste Management in Industries

<table>
<thead>
<tr>
<th>Statement</th>
<th>NE</th>
<th>LE</th>
<th>ME</th>
<th>GE</th>
<th>VGE</th>
<th>Mean</th>
<th>Std Dev</th>
</tr>
</thead>
<tbody>
<tr>
<td>The country has put in place institutions to address climate change, biological diversity and combating desertification</td>
<td>2.8</td>
<td>16.2</td>
<td>39.4</td>
<td>28.2</td>
<td>13.4</td>
<td>3.33</td>
<td>0.994</td>
</tr>
<tr>
<td>The Kenyan Government has put in place a wide range of policy, institutional and legislative frameworks to address the major causes of environmental degradation and negative impacts on ecosystems emanating from industrial and economic development programmes</td>
<td>4.9</td>
<td>29.6</td>
<td>27.5</td>
<td>33.1</td>
<td>4.9</td>
<td>3.04</td>
<td>1.013</td>
</tr>
<tr>
<td>The new Kenyan constitution (promulgated in August 2010) advances environmental protection as an obligation of the government and the citizens</td>
<td>16.2</td>
<td>0</td>
<td>31.7</td>
<td>33.8</td>
<td>18.3</td>
<td>3.38</td>
<td>1.259</td>
</tr>
<tr>
<td>The constitution incorporates the principles of conserving options, quality and access in terms of waste management</td>
<td>0</td>
<td>0</td>
<td>35.9</td>
<td>43</td>
<td>21.1</td>
<td>3.85</td>
<td>0.743</td>
</tr>
<tr>
<td>The constitution advances the rights of the environment by ensuring that the environment is safeguarded and enhanced for its own sake and for the benefits of the present and future generations</td>
<td>0</td>
<td>0</td>
<td>38.7</td>
<td>26.8</td>
<td>34.5</td>
<td>3.96</td>
<td>0.858</td>
</tr>
<tr>
<td>Private sector involvement can facilitate efficient municipal solid waste management services as compared to the public</td>
<td>0</td>
<td>0</td>
<td>38.7</td>
<td>18.3</td>
<td>43</td>
<td>4.04</td>
<td>0.906</td>
</tr>
<tr>
<td>Public waste awareness and support facilitates the success of companies in managing industrial waste</td>
<td>0</td>
<td>5.6</td>
<td>23.2</td>
<td>28.2</td>
<td>43</td>
<td>4.08</td>
<td>0.942</td>
</tr>
<tr>
<td>Negative attitude towards waste management by the public inhibits the creation of a sustainable waste management system</td>
<td>0</td>
<td>21.8</td>
<td>7.7</td>
<td>41.5</td>
<td>28.9</td>
<td>3.77</td>
<td>1.094</td>
</tr>
</tbody>
</table>

Table 4.11 shows that, the country has put in place institutions to address climate change, biological diversity and combating desertification and that, the Kenyan Government has
put in place a wide range of policy, institutional and legislative frameworks to address the major causes of environmental degradation and negative impacts on ecosystems emanating from industrial and economic development programmes. The table shows that, the new Kenyan constitution (promulgated in August 2010) advances environmental protection as an obligation of the government and the citizens and that, the constitution incorporates the principles of conserving options, quality and access in terms of waste management and it also advances the rights of the environment by ensuring that the environment is safeguarded and enhanced for its own sake and for the benefits of the present and future generations. The table shows that, private sector involvement can facilitate efficient municipal solid waste management services as compared to the public and that, public waste awareness and support facilitates the success of companies in managing industrial waste. The table also shows that, negative attitude towards waste management by the public inhibits the creation of a sustainable waste management system.

4.6.2 Relationship between Sustainable Development Goals Strategies and Waste Management in Industries
The correlation test was done to determine the significance of sustainable development goal strategies on waste management at NBL using the P value of 0.000 to 0.05. Table 4.12 shows that, the country has put in place institutions to address climate change, biological diversity and combating desertification is significant (P=0.000). The Kenyan Government has put in place a wide range of policy, institutional and legislative frameworks to address the major causes of environmental degradation and negative impacts on ecosystems emanating from industrial and economic development programmes is significant (P=0.000). The new Kenyan constitution (promulgated in August 2010) advances environmental protection as an obligation of the government and the citizens is significant (P=0.001). The constitution incorporates the principles of conserving options, quality and access in terms of waste management is significant (P=0.000). The constitution advances the rights of the environment by ensuring that the environment is safeguarded and enhanced for its own sake and for the benefits of the present and future generations is significant (P=0.000). Private sector involvement can facilitate efficient municipal solid waste management services as compared to the public is significant (P=0.001). Public waste awareness and support facilitates the success of companies in managing industrial waste is significant (P=0.000). Negative attitude
towards waste management by the public inhibits the creation of a sustainable waste management system is significant (P=0.002).

Table 4.12 Relationship between Sustainable Development Goals Strategies on Waste Management in Industries

<table>
<thead>
<tr>
<th>Statement</th>
<th>Correlations</th>
</tr>
</thead>
<tbody>
<tr>
<td>The country has put in place institutions to address climate change, biological diversity and combating desertification</td>
<td>0.637**</td>
</tr>
<tr>
<td>The Kenyan Government has put in place a wide range of policy, institutional and legislative frameworks to address the major causes of environmental degradation and negative impacts on ecosystems emanating from industrial and economic development programmes</td>
<td>0.321**</td>
</tr>
<tr>
<td>The new Kenyan constitution (promulgated in August 2010) advances environmental protection as an obligation of the government and the citizens</td>
<td>0.247**</td>
</tr>
<tr>
<td>The constitution incorporates the principles of conserving options, quality and access in terms of waste management</td>
<td>0.502**</td>
</tr>
<tr>
<td>The constitution advances the rights of the environment by ensuring that the environment is safeguarded and enhanced for its own sake and for the benefits of the present and future generations</td>
<td>0.706**</td>
</tr>
<tr>
<td>Private sector involvement can facilitate efficient municipal solid waste management services as compared to the public</td>
<td>0.242**</td>
</tr>
<tr>
<td>Public waste awareness and support facilitates the success of companies in managing industrial waste</td>
<td>0.476**</td>
</tr>
<tr>
<td>Negative attitude towards waste management by the public inhibits the creation of a sustainable waste management system</td>
<td>-0.224**</td>
</tr>
</tbody>
</table>

** Correlation is Significant at 0.01 Level (2-tailed)
* Correlation is Significant at 0.05 Level (2-tailed)

4.6.3 Waste Management System in the Country and Sustainable Waste Management
The respondents were asked to indicate their level of agreement on the following statements regarding the waste management system in the country using the scale NE=No
Extent, LE=Little Extent, ME=Moderate Extent, GE=Great Extent, and VGE=Very Great Extent. The resulting mean of 3.0 shows that sustainable development goals strategies impacts sustainability of waste management and the standard deviation of less than 1.5 shows that the difference in response was insignificant.

Table 4.13 Waste Management Systems in the Country

<table>
<thead>
<tr>
<th>Statement</th>
<th>NE %</th>
<th>LE %</th>
<th>ME %</th>
<th>GE %</th>
<th>VGE %</th>
<th>Mean</th>
<th>Std Dev</th>
</tr>
</thead>
<tbody>
<tr>
<td>Poor waste management has increased as a result of a high rate in population growth and consumption patterns</td>
<td>0</td>
<td>15.5</td>
<td>7.7</td>
<td>28.2</td>
<td>48.6</td>
<td>4.10</td>
<td>1.087</td>
</tr>
<tr>
<td>Poor waste management in the country is due to poor management by local authorities in providing waste management facilities</td>
<td>0</td>
<td>0</td>
<td>43.6</td>
<td>13.4</td>
<td>43</td>
<td>3.99</td>
<td>0.934</td>
</tr>
<tr>
<td>Poor waste management in the country is as a result of inadequate law enforcement by the government, lack of community participation due to lack of awareness, and increase in urbanization and industrialization</td>
<td>0</td>
<td>0</td>
<td>16.2</td>
<td>36.6</td>
<td>47.2</td>
<td>4.31</td>
<td>0.736</td>
</tr>
<tr>
<td>Poor waste management in the county is as a result of the current lack of recycling capacity compared to total waste being generated</td>
<td>0</td>
<td>9.9</td>
<td>27.5</td>
<td>28.9</td>
<td>33.8</td>
<td>3.87</td>
<td>0.998</td>
</tr>
</tbody>
</table>

Table 4.13 shows that, poor waste management has increased as a result of a high rate in population growth and consumption patterns and due to poor management by local authorities in providing waste management facilities. It also shows that, poor waste management in the country is as a result of inadequate law enforcement by the government, lack of community participation due to lack of awareness, and increase in urbanization and industrialization, as well as, a result of the current lack of recycling capacity compared to total waste being generated.
4.6.4 Relationship between Waste Management System in the Country and Sustainable Waste Management

The correlation test was done to determine the significance of sustainable development goal strategies on waste management at NBL using the P value of 0.000 to 0.05.

Table 4.14 Relationship between Waste Management Systems in the Country

<table>
<thead>
<tr>
<th>Statement</th>
<th>Correlations</th>
</tr>
</thead>
<tbody>
<tr>
<td>Poor waste management has increased as a result of a high rate in population growth and consumption patterns</td>
<td>0.546**</td>
</tr>
<tr>
<td></td>
<td>0.000</td>
</tr>
<tr>
<td>Poor waste management in the country is due to poor management by local authorities in providing waste management facilities</td>
<td>-0.080</td>
</tr>
<tr>
<td></td>
<td>0.289</td>
</tr>
<tr>
<td>Poor waste management in the country is as a result of inadequate law enforcement by the government, lack of community participation due to lack of awareness, and increase in urbanization and industrialization</td>
<td>0.312**</td>
</tr>
<tr>
<td></td>
<td>0.000</td>
</tr>
<tr>
<td>Poor waste management in the county is as a result of the current lack of recycling capacity compared to total waste being generated</td>
<td>-0.043</td>
</tr>
<tr>
<td></td>
<td>0.550</td>
</tr>
</tbody>
</table>

** Correlation is Significant at 0.01 Level (2-tailed)
* Correlation is Significant at 0.05 Level (2-tailed)

Table 4.14 shows that, poor waste management has increased as a result of a high rate in population growth and consumption patterns is significant (P=0.000). Poor waste management in the country is due to poor management by local authorities in providing waste management facilities is insignificant (P=0.289). Poor waste management in the country is as a result of inadequate law enforcement by the government, lack of community participation due to lack of awareness, and increase in urbanization and industrialization is significant (P=0.000). Poor waste management in the county is as a result of the current lack of recycling capacity compared to total waste being generated is insignificant (P=0.550).

4.7 Chapter Summary

The findings of the study have been presented in the form of tables and figures with explanations on the numerical figures presented. The chapter has used statistical figures of means, standard deviations and correlations to test the various results that were obtained. The next chapter gives the study discussions, conclusions and recommendations.
CHAPTER FIVE
5.0 DISCUSSIONS, CONCLUSIONS AND RECOMMENDATIONS
5.1 Introduction
This chapter concludes the study by giving a summary of the research questions and study findings and also elaborating on the study discussions. The chapter also offers the conclusions and gives recommendations for improvement and those for further studies.

5.2 Summary
The main purpose of this study was to determine the strategic factors that affect sustainable industrial waste management at Nairobi Bottlers. The study attempted to answer the following research questions; How does waste reduction strategy contribute to sustainable waste management? To what extent does waste reuse strategy lead to sustainable waste management? And how does recycling of waste help in sustainable waste management?

This study adopted a descriptive research design. Quantitative methods were used to analyze collected data. After data had been data collected via the questionnaires, it was examined for completeness then coded. It was then entered into Statistical Package for Social Sciences (SPSS) for subsequent analysis. The sample frame for the study was obtained from the human resource payroll listing. The sample was classified into several strata as the researcher used simple random sampling technique to select the desired sample size from each stratum of the population. A sample of 20% of the entire population was used since the employees in the different lines of operations were homogenous in terms of the knowledge they possess with regards to waste management.

The study shows that the onus and costs of managing waste streams should be placed on ‘producers’ of the waste and that, municipal solid waste management system has changed from being efficient to the current status that displays a lot of inefficiencies. It also showed that, storage, collection, transportation and final treatment/disposal of wastes has become a major problem in urban centers and that, the global trend of increased use of electrical and electronic goods has led to an increase in E-waste becoming a significant threat to our environment and human health. The study revealed that, waste management in our urban centers has been subjected to enormous commercial and legal changes over the last two decades and the country has a sustained and multi-faceted legislative and
The study revealed that a sustainable method of waste management involves looking for opportunities to reduce waste even during the product life cycle and implementation of simplified leanness evaluation metrics can be used to reduce waste and improve effectiveness and efficiency in organizations. It also showed that, availability of adequate garbage disposal in urban area can improve community development and cohesion of waste management and organizations should involve communities around them in waste management programs to promote publicity on waste management. The study showed that, behavioral instruments should be applied in implementing waste management strategies through initiatives that inform and educate and waste awareness and participation can be enhanced by creating recognition programs, and door-to-door awareness.

The study showed that reusing waste is the best strategy of creating a sustainable waste management by companies and an effective way to reuse solid waste is through burning materials that are combustible and melting down non-combustible materials through the company`s incinerators. It also showed that, waste ash from incineration can be used to improve soil fertility on urban areas and disposal of both non-degradable and degradable wastes separately can be used to safely use the generated wastes for agricultural purposes. The study revealed that, recycling can be carried out by companies at waste recycling plants as a strategy of creating a sustainable waste management system and that, companies can think of new and better ways of producing and consuming goods and services to facilitate the creation of a sustainable waste management system.

The study revealed that, the country has put in place institutions to address climate change, biological diversity and combating desertification and that, the Kenyan Government has put in place a wide range of policy, institutional and legislative frameworks to address the major causes of environmental degradation and negative impacts on ecosystems emanating from industrial and economic development programmes. The study also showed that, the new Kenyan constitution (promulgated in August 2010) advances environmental protection as an obligation of the government and the citizens and that, the constitution incorporates the principles of conserving options,
quality and access in terms of waste management and it also advances the rights of the environment by ensuring that the environment is safeguarded and enhanced for its own sake and for the benefits of the present and future generations. The study also showed that, private sector involvement can facilitate efficient municipal solid waste management services as compared to the public and that, public waste awareness and support facilitates the success of companies in managing industrial waste.

5.3 Discussions

5.3.1 Meaning and Scope of Industrial Waste Management in Industries
The study showed that, waste is any given kind of substance that contains a scrap material or an effluent or other strange substance coming from the application of any process. This view is in tandem with the COPA act that, defines waste as any given kind of substance that contains a scrap material or an effluent or other strange substance coming from the application of any process.

The study showed that, waste refers to any substance or article which ideally should be disposed of as being broken, worn out, contaminated or otherwise spoiled. This view is in tandem with the COPA act that goes ahead to indicate that waste is any substance or article which ideally should be disposed of as being broken, worn out, contaminated or otherwise spoiled.

The study showed that, solid waste is defined as waste from the offices, retail shops existing within a town, different warehouses and even hotels. Cossio et al. (2012) states that, solid waste is defined primarily from an East African perspective as waste from the offices, retail shops existing within a town, different warehouses and even hotels.

The study showed that, industrial waste is waste that comes from packaging materials, food waste, waste from plastics, metals textiles and even fuel ash waste. Cossio et al. (2012) states that, industrial waste in the same content is highlighted to be waste coming from packaging materials, food waste, waste from plastics, metals textiles and even fuel ash waste.
The study showed that, street waste is waste generated from cleaning process in the streets including drain cleaning, sand, litter and even actual dead animals. Cossio et al. (2012) goes ahead to define street waste as waste generated from cleaning process in the streets including drain cleaning, sand, litter and even actual dead animals.

The study showed that, construction waste is waste that includes waste from the construction process for example pipes, bricks, and masonry. Cossio et al. (2012) also adds that, construction waste is defined as demolition waste that includes waste from the construction process for example pipes, bricks, masonry and all waste materials obtained method of collecting, handling, treatment and final disposal of such waste.

The study showed that, municipal solid waste is solid waste that includes all domestic and local hazard and non-hazardous waste for example waste emanating from commercial and institutions, street and construction waste including food waste, plastic, metal and even glass. Magutu and Onsongo (2010) state that, from a Kenyan perspective municipal solid waste has been defined as solid waste that includes all domestic and local hazard and non-hazardous waste for example waste emanating from commercial and institutions, street and construction waste including food waste, plastic, metal and even glass.

The study showed that, the onus and costs of managing waste streams should be placed on ‘producers’ of the waste. Deutsch (2012) states that, the EU has determined critically, for a number of reasons, that the onus and costs of managing these waste streams should be placed on ‘producers’ of the product (for example: manufacturers, importers, retailers, distributors and packer/fillers) and not on the consumer or taxpayer.

The study showed that, municipal solid waste management system has changed from being efficient to the current status that displays a lot of inefficiencies. According to Okot-Okumu and Nyenje (2011), municipal solid waste management (MSWM) system in East Africa has changed from the colonial days in the 40s, 50s and early 60s when it was efficient because of the lower urban population and adequate resources, to the current status that displays inefficiencies.
The study showed that, storage, collection, transportation and final treatment/disposal of wastes has become a major problem in urban centers. According to ADB (2012) and Kaseva (2014), the storage, collection, transportation and final treatment/disposal of wastes are reported to have become a major problem in urban centers.

The study showed that, the global trend of increased use of electrical and electronic goods has led to an increase in E-waste becoming a significant threat to our environment and human health. Oberin (2011) notes that, the global trend of increased use of electrical and electronic goods is also evident in EAC where E-waste is becoming a significant threat to the environment and human health in EAC urban centers.

The study showed that, waste management in our urban centers has been subjected to enormous commercial and legal changes over the last two decades. This result is similar to that of Slocum (2014), who noted that, the waste management sector in Western Europe has been subjected to enormous commercial and legal changes over the last two decades (at least), with these changes continuing to occur.

The study showed that, the country has a sustained and multi-faceted legislative and policy attack on landfill, and waste management both at the domestic and international level. These results are similar to those of Slocum (2014), who noted that, the once dominant position of landfill as the activity of choice for waste management has been well and truly broken. This has been brought about by a sustained and multi-faceted legislative and policy attack on landfill, primarily from the EU but also at the domestic level.

The study showed that, legislative changes have imposed, and continue to impose, structural challenges on the waste management in the country. According to Berg (2013), legislative change, primarily (but not exclusively) from the EU, has imposed, and continues to impose, structural challenges on the waste management sector across the EU.

The study showed that, our urban areas lack space for new landfills due to the associated urban sprawl of affluent suburbs that uphold a “Not-In-My-Back-Yard” mentality. Sitkin (2011) asserts that, urban areas lack space for new landfills due to the associated urban sprawl of affluent suburbs that uphold a NIMBY, “Not-In-My-Back-Yard”, mentality.
The study showed that, sanitary landfills on our urban centers are designed to “concentrate and contain” our solid waste at a specific site and minimal environmental cost and that each day, layers of waste are compacted by heavy machinery and buried under a layer of earth or clean construction debris and to keep out the vermin, confine the refuse, reduce the odors, and divert leachate forming rain water from entering the landfills. According to Sitkin (2011), sanitary landfills are designed to “concentrate and contain” our solid waste at a specific site and minimal environmental cost. Each day, a layer of waste is compacted by heavy machinery and buried under a layer of earth or clean construction debris to keep out the vermin, confine the refuse, reduce the odors, and divert leachate forming rain water from entering the landfill.

The study showed that, hazardous waste treatment flourishing in the country since large quantities of such waste are being imported for recycling and treatment is also inefficient. These results are similar to Bolaane’s (2006) study that indicates, hazardous waste treatment is a flourishing industry in India and large quantities of such waste are imported for recycling and treatment.

5.3.2 Waste Reduction Contribution to Sustainable Waste Management
The study showed that, a sustainable method of waste management involves looking for opportunities to reduce waste even during the product life cycle. According to Stasiskiene, Gaiziuniene and Zidoniene (2011), one of the sustainable methods of ensuring sustainable waste management is the integrated method of waste management method which seeks to reduce waste at source before it goes on to the next level. It also involves looking for opportunities to reduce waste even during the product life cycle.

The study showed that, implementation of simplified leanness evaluation metrics can be used to reduce waste and improve effectiveness and efficiency in organizations. Zaman (2013) brings in the idea of a systematic lean implementation methodology for manufacturing organizations. The study proposes implementation of simplified leanness evaluation metrics to reduce waste and improve effectiveness and efficiency in an organization.
The study showed that, availability of adequate garbage disposal in urban area can improve community development and cohesion of waste management. According to Mwaura (1991), the lack of adequate garbage disposal in an area often results in negative attitudes that contribute to a general deterioration of community development and cohesion.

The study showed that, organizations should involve communities around them in waste management programs to promote publicity on waste management. Young, Ni and Fan (2010) state that, successful industrial waste management is often attributed to many reasons arising from policy implementation, in addition involving communities in waste management programs often promotes publicity with tips on waste management hence eventually minimizing waste.

The study showed that, behavioral instruments should be applied in implementing waste management strategies through initiatives that inform and educate. According to Bolaane (2006), behavioral instruments play a role in waste management strategies through initiatives that inform and educates, some of these initiatives include waste audits, school programs, advertising, training, and competitions.

The study showed that, waste awareness and participation can be enhanced by creating recognition programs, and door-to-door awareness. Zhu et al. (2007) state that, waste awareness can also be created through door to door awareness and motivation programs which involve establishing contact with participants and providing feedback, it also helps in reducing the time lag that would be created between information communication and when the actual waste collection begins.

The study showed that, establishing certain behavior patterns in transient populations can be used as a strategy of sustainable waste management system. Purcell and Magette (2010) states that, establishing certain behavior patterns in transient populations such as student groups and military populations, and also in high density residential areas can be challenging. Smyth et al. (2010) notes that, behavior patterns which focus on providing instructions on how, what, and where efforts should be focused can result in greater success rates.
The study showed that, having proper waste management systems that are included in company policies and procedures facilitates sustainable waste management system. According to Muniafu and Otiato (2010), one method to ensure effective waste management is having proper waste management systems which are included in the policies and procedures within a company.

The study showed that, having a tax policy that ensures individuals are taxed based on the amount of waste they produce can help facilitate a sustainable waste management system. Hariz and Bahmed (2013) note that, one of the most effective ways of minimizing or reducing waste is through introduction of a tax policy that will ensure that individuals are taxed based on the amount of waste they produce. In addition higher taxes can be imposed on raw materials that contribute most to waste to encourage manufacturers to produce goods that generate less waste.

The study showed that, having good house-keeping (good operating practices) that focus on reducing wastes from the source can facilitate the creation of a sustainable waste management system. Salah (2007) states that, good house-keeping is also referred to as good operating practices and depends on reducing wastes from the source. It implies all the measures that a company can take to minimize waste and emissions.

5.3.3 Waste Reuse Strategy Contribution to Sustainable Waste Management

The study showed that, reusing waste is the best strategy of creating a sustainable waste management by companies. Festus and Ogoegbunam (2012) states that, reusing waste is the process of using materials repeatedly. This is where a company takes a material and after it has gone through its useful life it is used again for other purposes. Bates et al. (2006) indicates that, reusing waste occurs when waste that was going to be disposed of is put back into good use. A good example is obtaining plastic soda bottles and using them to store milk or water.

The study showed that, an effective way to reuse solid waste is through burning materials that are combustible and melting down non-combustible materials through the company`s incinerators. USEPA (2002) states that, another effective way to reuse solid waste is through burning materials that are combustible. This technique is effective especially where wastes cannot be recycled and are generated in large quantities.
The study showed that, waste ash from incineration can be used to improve soil fertility on urban areas and that, disposal of both non-degradable and degradable wastes separately can be used to safely use the generated wastes for agricultural purposes. Pasquini et al. (2005) examined the efficient use of urban waste ash to improve soil fertility on Jos Plateau, Nigeria. The study advocated for the disposal of both non-degradable and degradable wastes separately so as to safety use the generated wastes for agricultural purposes.

The study showed that, recycling can be carried out by companies at waste recycling plants as a strategy of creating a sustainable waste management system. According to Festus and Ogoegbunam (2012), recycle unlike reuse is the process of using materials to make new products. Recycling is mostly carried out by companies at waste recycling plants. The old used materials are taken through a process that will yield new products.

The study showed that, companies can think of new and better ways of producing and consuming goods and services to facilitate the creation of a sustainable waste management system. According to United Nations (2003), sustainability needs companies to think of new and better ways of producing and consuming goods and services. Industries are tasked with the responsibility of providing goods and services that reduce negative environmental and social impact all through the product life cycles from design, production, consumption and ultimate disposal.

The study showed that, the public which includes cart pushers, resource merchants, private solid waste collectors, public, and neighborhood and estate associations, is involved in managing solid waste. These results are similar to those of Kaloki (2015) whose findings revealed that, solid waste management was carried out by cart pushers, resource merchants, private solid waste collectors, public, and neighborhood and estate associations.

The study showed that, the public plays the role of waste separation, composting, distribution of solid waste containers and subsequent re-usage of collected and separated wastes. Kaloki’s (2015) study also showed that, waste collection, transportation, sorting, financing and finally recycling were the major tasks that the public undertook to manage wastes in the study area. Potential roles that the public played were waste separation,
composting, distribution of solid waste containers and subsequent re-use of collected and separated wastes.

The study showed that, inadequate resources, averseness, poor attitudes and solid waste management knowledge gap are some of the challenges facing the creation of a sustainable solid waste management. These results are similar to those of Kaloki (2015) whose findings revealed that, various challenges however suffice in attempts to enhance sustainable waste management for instance; inadequate resources, averseness, poor attitudes and solid waste management knowledge gap.

The study showed that, recycling mostly depends on the policies that a company has enforced on recycling and also the availability of buyers. According to Zhu et al. (2007), material recycling mostly depends on the policies that a company has enforced on recycling and also the availability of buyers.

The study showed that, the economy benefits from recycling through reduction of cost of fertilizers since organic waste can easily be transformed into fertilizers and that, the economy benefits from recycling through the employment of people to handle the urban waste. According to Zhu et al. (2007), the economy also benefits from recycling through reduction of cost of fertilizers since organic waste can easily be transformed into fertilizers, in addition the economy benefits since more people will get employment.

The study showed that, the country does not have a single option of effectively and efficiently dealing with the increasing e-waste. These results concur with Shephard (2008) who states that, there is no single option that can be used to effectively and efficiently deal with e-waste being generated by the company.

The study showed that, manufacturers of electronic equipment in urban centers are not being given incentives to recycle or buy back electronic waste. These results concur with Shephard (2008) who states that, manufacturers of electronic equipment are not being given incentives to recycle or buy back electronic waste. To make it worse we see that electronic devices have continued being cheaper in the market hence need to replace old items and leaving an e-waste sustainability gap.
The study showed that, Nairobi lacks a waste management system leading to short-term and long-term impacts on employees in companies and the county at large. The results of this study are in tandem with Muniafu and Otia (2010) who stated that, Nairobi lacks a waste management system leading to short term and long term impacts on employees and on the company at large.

5.3.4 Sustainable Development Goals Strategies on Waste Management in Industries

The study showed that, the country has put in place institutions to address climate change, biological diversity and combating desertification. These results are similar to Vivian (2012) who states that, Kenya has actively participated in international meetings convened by these conventions and hosted the second meeting of the Parties to the Kyoto Protocol and has endorsed the Rio and subsequent agreements meant undertaking certain activities and putting in place institutions to address climate change, biological diversity and combating desertification by each member country.

The study showed that, the Kenyan Government has put in place a wide range of policy, institutional and legislative frameworks to address the major causes of environmental degradation and negative impacts on ecosystems emanating from industrial and economic development programmes. These results are similar to those of Vivian (2012) who states that, although environment does not feature in Vision 2030 as a pillar, the Kenyan Government has put in place a wide range of policy, institutional and legislative frameworks to address the major causes of environmental degradation and negative impacts on ecosystems emanating from industrial and economic development programmes.

The study showed that, the New Kenyan constitution (promulgated in August 2010) advances environmental protection as an obligation of the government and the citizens. According to EMCA (1999), the New Kenyan Constitution, which was promulgated in August 2010, advances this further and makes environmental protection an obligation of the government and the citizens.
The study showed that, the constitution incorporates the principles of conserving options, quality and access in terms of waste management. According to EMCA (1999), the constitution clearly incorporates the principles of conserving options, quality and access (Article 60[1]).

The study showed that, the constitution advances the rights of the environment by ensuring that the environment is safeguarded and enhanced for its own sake and for the benefits of the present and future generations. According to EMCA (1999), there is a provision in the constitution advances the rights of the environment by ensuring that is safeguarded and enhanced for its own sake and for the benefits of the present and future generations.

The study showed that, private sector involvement can facilitate efficient municipal solid waste management services as compared to the public. Bartone et al. (1991) conclude that the private sector can operate more efficiently than the public sector in providing municipal solid waste services, while Cointreau-Levine (1994) concludes that it is a possible opportunity, not a panacea, for improving solid waste management in developing countries.

The study showed that, public waste awareness and support facilitates the success of companies in managing industrial waste. Young, Ni and Fan (2010) state that, successful industrial waste management is often attributed to many reasons arising from policy implementation; however the main reason why most companies have succeeded in industrial waste management is due to public waste awareness and support.

The study showed that, negative attitude towards waste management by the public inhibits the creation of a sustainable waste management system. Babalola (2010) observed by the fact that, the public has a negative attitude towards waste management, hence the government should carry out campaigns to enlighten the public on waste and waste management.

The study showed that, poor waste management has increased as a result of a high rate in population growth and consumption patterns, poor management by local authorities in providing waste management facilities, inadequate law enforcement by the government,
lack of community participation due to lack of awareness, and increase in urbanization and industrialization. According to Brundtland Commission (2011), major underlying factors contributing to poor waste management include a high rate in population growth and consumption patterns, poor management by local authorities in provision of waste management facilities, inadequate law enforcement by the government, lack of community participation due to lack of awareness, and increase in urbanization and industrialization.

The study showed that, poor waste management in the county is as a result of the current lack of recycling capacity compared to total waste being generated. According to Brundtland Commission (2011), the current total recycling capacity in Nairobi is very low comparative to total waste being generated. Middle- to high-income areas have better waste collection, largely by private institutions, due to their greater ability to pay for the services.

5.4 Conclusions

5.4.1 Meaning and Scope of Industrial Waste Management in Industries
The study concludes that the onus and costs of managing waste streams should be placed on ‘producers’ of the waste and that, municipal solid waste management system has changed from being efficient to inefficient. The study has shown how storage, collection, transportation and final treatment/disposal of wastes has become a major problem in urban centers and the impact of the global trend of increased use of electrical and electronic goods that led to an increase in E-waste leading to a significant threat to the environment and human health. The study concludes that, waste management in the urban centers has been subjected to enormous commercial and legal changes over the last two decades and the country has a sustained and multi-faceted legislative and policy attack on landfill, and waste management both at the domestic and international level.

5.4.2 Waste Reduction Contribution to Sustainable Waste Management in Industries
The study concludes that, a sustainable method of waste management involves looking for opportunities to reduce waste even during the product life cycle and implementation of simplified leanness evaluation metrics can be used to reduce waste and improve effectiveness and efficiency in organizations. Availability of adequate garbage disposal in
urban area can improve community development and cohesion of waste management and therefore the study concludes that, organizations not only provide garbage disposal bins, but also involve communities around them in waste management programs to promote publicity on waste management. The study concludes that behavioral instruments could be used in implementing waste management strategies through initiatives that inform and educate and waste awareness and participation.

5.4.3 Waste Reuse Strategy towards Sustainable Waste Management in Industries
The study concludes that, the best strategy of creating a sustainable waste management by companies and an effective way to reuse solid waste is through burning materials that are combustible and melting down non-combustible materials through the company`s incinerators. The waste ash from incineration can be used to improve soil fertility on urban areas and disposal of both non-degradable and degradable wastes separately can be used to safely use the generated wastes for agricultural purposes. Recycling can also be used by companies at waste recycling plants as a strategy of creating a sustainable waste management system, as companies can think of new and better ways of producing and consuming goods and services to facilitate the creation of a sustainable waste management system.

5.4.4 Sustainable Development Goals Strategies on Waste Management in Industries
The study concludes that, there are institutions that have been out in place to address climate change, biological diversity and combating desertification and that, the government has put in place a wide range of policy, institutional and legislative frameworks to address the major causes of environmental degradation and negative impacts on ecosystems emanating from industrial and economic development programmes. The study concludes that, private sector involvement has facilitated efficient municipal solid waste management services as compared to the public and that, public waste awareness and support has facilitated the success of companies in managing industrial waste.
5.5 Recommendations

5.5.1 Recommendations for Improvement

5.5.1.1 Meaning and Scope of Industrial Waste Management in Industries

From the study, it can noted that, legislative changes have imposed, and continue to impose, structural challenges on the waste management in the country and the urban area lacks space for new landfills due to the associated urban sprawl of affluent suburbs. This study therefore recommends that the County Councils of Kenya provide landfills that would be used to manage industrial waste and employ the use of sustainable mechanisms that would be beneficial to the nation.

5.5.1.2 Waste Reduction Contribution to Sustainable Waste Management in Industries

The study recommends that the policy makers in both government and companies make use of behavioral instruments that could be used in implementing waste management strategies through initiatives that inform and educate and waste awareness and participation. They can achieve this using recognition programs, and door-to-door awareness.

5.5.1.3 Waste Reuse Strategy towards Sustainable Waste Management in Industries

The study recommends that industries should involve and train the public to help them manage their waste. The study also recommends for the government and industries to provide adequate resources, and train employees and public to change their attitudes to facilitate the implementation of proper solid waste management strategies as well as reduce the knowledge gap that exists.

5.5.1.4 Sustainable Development Goals Strategies on Waste Management in Industries

The study has revealed that the country has put in place institutions to address climate change, biological diversity and combating desertification and that, the Kenyan Government has put in place a wide range of policy, institutional and legislative frameworks to address the major causes of environmental degradation and negative impacts on ecosystems emanating from industrial and economic development programmes. This study therefore recommends that the government implement these plans to successfully create a sustainable waste management system.
5.5.2 Recommendations for Further Studies

This study focused on the strategic factors affecting sustainable industrial waste management in at Nairobi Bottlers Limited and the results were limited to the organization. This study, therefore recommends that similar studies be carried out on other manufacturing organizations.
REFERENCES


APPENDICES
APPENDIX 1 A: COVER LETTER

DATE: January 2, 2016

Cell: 0721522728
Email: Ruth Ochoro <ramoshest@gmail.com>
Nairobi.

Dear Respondent,

RE: RESEARCH QUESTIONNAIRE
I am a graduate student at the United States International University – Africa pursuing a Masters of Business Administration program. I am currently conducting a research on “Strategic Factors Affecting Sustainable Waste Management in Industries; A Case Study of Nairobi Bottlers Limited” The results of the survey will be instrumental in knowing the principle factors that are vital when in Waste Management and how the decision affects organizations.

This is an academic research and confidentiality will be strictly adhered to. Kindly spare some minutes to fill the questionnaire attached.

Yours Sincerely,

Ruth Ochoro.
APPENDIX 1 B: QUESTIONNAIRE

You are requested to provide answers to these questions with honesty. Responses to these questions will be treated with confidentiality therefore your name is not required anywhere. Please tick (✓) where appropriate or fill in the required information on the space provided.

PART A: General Information

1. What is your Marital Status?
   Married [ ] Single [ ]

2. Indicate your age category?
   18-28 [ ] 29-38 [ ] 39-48 [ ]
   49-58 [ ] Above 59 [ ]

3. Please indicate your highest level of education.
   Primary school [ ] Secondary school [ ]
   University [ ] College [ ]

4. How long have you worked in your respective work station?
   Less than 1 year [ ] 2 – 4 years [ ]
   5 – 9 years [ ] Above 10 years [ ]

5. Which department do you work under? Please tick appropriately.
   Operations [ ] Administration [ ] Production [ ]
PART B: Meaning and Scope of Industrial Waste Management in Industries

6. Indicate your level of agreement on the following statements regarding the meaning of waste management in industries. Use a scale of 1-5 where 1 = No Extent, 2 = Little Extent, 3 = Moderate Extent, 4 = great extent, 5 = Very Great Extent.

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<tr>
<th>Statement</th>
<th>No Extent</th>
<th>Little Extent</th>
<th>Moderate Extent</th>
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<tr>
<td>Waste as any given kind of substance that contains a scrap material or an effluent or other strange substance coming from the application of any process</td>
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<td>Waste is any substance or article which ideally should be disposed of as being broken, worn out, contaminated or otherwise spoiled</td>
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<td>Solid waste is defined as waste from the offices, retail shops existing within a town, different warehouses and even hotels</td>
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<td>Industrial waste is waste that comes from packaging materials, food waste, waste from plastics, metals textiles and even fuel ash waste</td>
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<td>Street waste is waste generated from cleaning process in the streets including drain cleaning, sand, litter and even actual dead animals</td>
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<td>Construction waste is waste that includes waste from the construction process for example pipes, bricks, and masonry</td>
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<td>Municipal solid waste is solid waste that includes all domestic and local hazard and non-hazardous waste for example waste emanating from commercial and institutions, street and construction waste including food waste, plastic, metal and even glass</td>
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7. Indicate your level of agreement on the following statements regarding the scope of waste management in industries. Use a scale of 1-5 where 1 = No Extent, 2 = Little Extent, 3 = Moderate Extent, 4 = great extent, 5 = Very Great Extent.

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<thead>
<tr>
<th>Statement</th>
<th>No Extent</th>
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</table>
PART C: Waste Reduction Contribution to Sustainable Waste Management in Industries

8. Indicate your level of agreement on the following statements regarding the scope of waste reduction contribution to sustainable waste management in industries. Use a scale of 1-5 where 1 = No Extent, 2 = Little Extent, 3 = Moderate Extent, 4 = great extent, 5 = Very Great Extent.

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<th>Statement</th>
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<tr>
<td>A sustainable method of waste management involves looking for opportunities to reduce waste even during the product life cycle</td>
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<td>Implementation of simplified leaness evaluation metrics can be used to reduce waste and improve effectiveness and efficiency in organizations</td>
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<td>Availability of adequate garbage disposal in urban area can improve community development and cohesion of waste management</td>
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<td>Organizations should involve communities around them in waste management programs to promote publicity on waste management</td>
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<td>Behavioral instruments should be applied in implementing waste management strategies through initiatives that inform and educate</td>
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<td>Waste awareness and participation can be enhanced by creating recognition programs, and door-to-door awareness</td>
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<td>Establishing certain behavior patterns in transient populations can be used as a strategy of sustainable waste management system</td>
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<td>Having proper waste management systems that are included in company policies and procedures facilitates sustainable waste management system</td>
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<td>Having a tax policy that ensures individuals are taxed based on the amount of waste they produce can help facilitate a sustainable waste management system</td>
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<td>Having good house-keeping (good operating practices) that focus on reducing wastes from the source can facilitate the creation of a sustainable waste management system</td>
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PART D: Waste Reuse Strategy towards Sustainable Waste Management in Industries

9. Indicate your level of agreement on the following statements regarding the strategies that gear towards a sustainable waste management system in industries. Use a scale of 1-5 where 1 = NoExtent, 2 = Little Extent, 3 = Moderate Extent, 4 = great extent, 5 = Very Great Extent.

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<tr>
<th>Statement</th>
<th>No Extent</th>
<th>Little Extent</th>
<th>Moderate Extent</th>
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<tr>
<td>In my opinion, reusing waste is the best strategy of creating a sustainable waste management by companies</td>
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<td>An effective way to reuse solid waste is through burning materials that are combustible and melting down non-combustible materials through the company’s incinerators</td>
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<td>Waste ash from incineration can be used to improve soil fertility on urban areas</td>
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<td>Disposal of both non-degradable and degradable wastes separately can be used to safely use the generated wastes for agricultural purposes</td>
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<td>Recycling can be carried out by companies at waste recycling plants as a strategy of creating a sustainable waste management system</td>
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<td>Companies can think of new and better ways of producing and consuming goods and services to facilitate the creation of a sustainable waste management system</td>
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10. Indicate your level of agreement on the following statements regarding the strategies that gear towards involving the public in creating a sustainable waste management system in the county. Use a scale of 1-5 where 1 = No Extent, 2 = Little Extent, 3 = Moderate Extent, 4 = great extent, 5 = Very Great Extent.

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<th>Statement</th>
<th>No Extent</th>
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<tr>
<td>The public which includes cart pushers, resource merchants, private solid waste collectors, public, and neighborhood and estate associations, is involved in managing solid waste</td>
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<td>The public plays the role of waste separation, composting, distribution of solid waste containers and subsequent re-usage of collected and separated wastes</td>
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<td>Inadequate resources, averseness, poor attitudes and solid waste management knowledge gap are some of the challenges facing the creation of a sustainable solid waste management</td>
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<td>Recycling mostly depends on the policies that a company has enforced on recycling and also the availability of buyers</td>
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<td>The economy benefits from recycling through reduction of cost of fertilizers since organic waste can easily be transformed into fertilizers</td>
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<td>The economy benefits from recycling through the employment of people to handle the urban waste</td>
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<td>The country does not have a single option of effectively and efficiently dealing with the increasing e-waste</td>
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<td>Manufacturers of electronic equipment in urban centers are not being given incentives to recycle or buy back electronic waste</td>
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<td>Nairobi lacks a waste management system leading to short-term and long-term impacts on employees in companies and the county at large</td>
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PART E: Sustainable Development Goals Strategies on Waste Management in Industries

11. Indicate your level of agreement on the following statements regarding the sustainable development goals and strategies of waste management in industries. Use a scale of 1-5 where 1 = No Extent, 2 = Little Extent, 3 = Moderate Extent, 4 = great extent, 5 = Very Great Extent.

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<tr>
<td>The country has put in place institutions to address climate change,</td>
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<td>biological diversity and combating desertification</td>
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<td>The Kenyan Government has put in place a wide range of policy, institutional and legislative frameworks to address the major causes of environmental degradation and negative impacts on ecosystems emanating from industrial and economic development programmes</td>
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<td>The new Kenyan constitution (promulgated in August 2010) advances</td>
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<td>environmental protection as an obligation of the government and the citizens</td>
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<td>The constitution incorporates the principles of conserving options, quality and access in terms of waste management</td>
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<td>The constitution advances the rights of the environment by ensuring that the environment is safeguarded and enhanced for its own sake and for the benefits of the present and future generations</td>
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<td>Private sector involvement can facilitate efficient municipal solid waste management services as compared to the public</td>
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<td>Public waste awareness and support facilitates the success of companies in managing industrial waste</td>
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<td>Negative attitude towards waste management by the public inhibits the creation of a sustainable waste management system</td>
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</tbody>
</table>
12. Indicate your level of agreement on the following statements regarding the waste management system in the country. Use a scale of 1-5 where 1 = No Extent, 2 = Little Extent, 3 = Moderate Extent, 4 = great extent, 5 = Very Great Extent.

<table>
<thead>
<tr>
<th>Statement</th>
<th>No Extent</th>
<th>Little Extent</th>
<th>Moderate Extent</th>
<th>Great Extent</th>
<th>Very Great Extent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Poor waste management has increased as a result of a high rate in population growth and consumption patterns</td>
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<tr>
<td>Poor waste management in the country is due to poor management by local authorities in providing waste management facilities</td>
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<tr>
<td>Poor waste management in the country is as a result of inadequate law enforcement by the government, lack of community participation due to lack of awareness, and increase in urbanization and industrialization</td>
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<td>Poor waste management in the county is as a result of the current lack of recycling capacity compared to total waste being generated</td>
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</tbody>
</table>

THANK YOU