AN ASSESSMENT OF ATTITUDE AND BEHAVIOUR TOWARDS LITTERING AMONG THE CITIZENS OF NAIROBI CITY

BY

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DECLARATION

I declare that this proposal is my original work and has never been presented to any university for any award

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This research project has been submitted for examination with our approval as the University supervisors

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DEDICATION

This project is dedicated to the people who have been affected by the adverse impacts of littering and to every volunteer of Mazingira Safi Initiative.

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I am first and foremost grateful to God for giving me the strength to do this work. I also appreciate all those who have given me support towards the production of this work. I am most grateful to my supervisors, Dr. Samuel Owuor and Ms. Jacqueline Walubwa, for their guidance, patience, expertise and great understanding while undertaking this project. Furthermore, I wish to sincerely Dr. Owuor for giving me a new meaning on what it is to be an Urban Geographer. I also want to appreciate the respondents for giving me their consent to use their "attitude and behaviour" as a subject of this study.

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ABSTRACT

Littering is considered an important environmental problem. This problem is growing steadily and is attracting great concerns amongst the public, scholars and government institutions. Studies done have continually shown that littering is a result of an attitudinal and behavioural problems in human beings and as such, it is seen as a human impact on the environment and on the society; a personal choice with public consequences. With Kenya grappling with poor waste management, litter as an important aspect of waste management, has been largely ignored. The solution by the Government of Kenya has been to increase manpower, trucks and street cleaning equipment. However, these solutions have not been effective as they lack community participation. Furthermore, they do not focus nor seek to understand citizens' attitude and behaviour towards littering. The purpose of this project, which focuses on Nairobi City, was guided by three main objectives: (1) to describe the nature and extent of littering in Nairobi City; (2) to determine Nairobi City residents' attitude and behaviour towards littering; and (3) to assess the impact of littering in Nairobi City. The study findings are largely based on a survey households sampled from Karen and Mukuru in Nairobi. The hypothesis was tested using the independent sample t-test. The research findings revealed that people and keeping trash by the roadside are the major sources of litter in Nairobi. The study also revealed that the residents had a positive attitude and a negative behaviour towards littering hence they litter rampantly. The study recommends provision of more litter bins and creation of awareness through civic education which should target all citizens of all ages, gender, education level or socio-economic status.

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CHAPTER ONE
INTRODUCTION

1.1 Background to the study problem

Littering is an intrinsic constituent of today's way of life, existing in numerous countries in the world, and it is a problem that is increasingly growing with sustained negative effects on the health of communities, environmental quality and economic growth of the urban and rural areas (Ojedokun & Balogun, 2011). Whereas there are many definitions of littering, Ojedokun (2011) defines littering as an individuals' intentional or unintentional act of throwing away waste on the ground as a daily routine. In Nairobi, littering is a persistent challenge which costs the government huge amounts of money annually to cleanup.

Litter is a visible problem with many sources. According to Keep America Beautiful, one of the most successful anti-litter organizations, the sources of litter can be classified into two major groups: stationary and moving sources where stationary sources are houses, offices, loading docks, and construction and demolition sites while moving sources are uncovered trucks, vehicles and pedestrians (KAB, 2009). Littering is a result of human behaviour (Schultz *et al.*, 2011). This behaviour affects people's lives, gives visitors bad view of the locality and leads to environmental degradation (Butcher, 2005). Whether intentional or accidental, littering begins with the individual, and the habit has now become so common that it has become an interesting area of research (KAB, 2009).

Given the social, aesthetic and environmental problems that result from litter, several strategies have been devised to deal with the littering problem. They have included increased provision and recruitment of equipment, trucks and labour to collect and dispose the litter collected. These strategies however have not been successful as they don't follow the right criteria during implementation (Bell & Russell, 2002). The failures of the strategies implies that it is an attitude or behaviour problem. Furthermore, majority of these programs are not based on sound principles of human behaviour (KAB, 2009). The failure also suggests that the strategies require a psychological intervention with the public being consulted to make them successful (Okeoma & Nkwocha, 2009).

An attitude can be defined as the positive or negative evaluation of performing a certain behaviour, in this case littering (Ojedokun, 2011). Various beliefs determine this attitude,

which can either positive or negative. People acquire beliefs automatically by relating them to certain items, characteristics and/or occasions. People analyze benefits and costs of doing particular behaviours and they therefore tend to form good attitudes towards behaviour that seem to have a consequence that they desire and bad attitudes towards those that don't have a consequence they desire (Ajzen, 1991; Leijdekkers *et al.*, 2015).

As such, attitude towards littering is defined as a person's inclination to react positively or negatively towards throwing away of wastes (Ojedokun, 2011). It is perceptive, emotional and normative. An individual can have a negative attitude and positive behaviour or a positive and a negative behaviour towards littering. A negative attitude towards littering is important for environmentally sensitive actions and a positive attitude is environmentally destructive. (Kaiser *et al.*, 1999). This negative attitude, if turned into a behaviour, could lead to reduced money and time spent on litter cleanups and environmental campaigns. A negative response could also be an outward display of values on cleanliness. Therefore, questions arise as to why some people lack this negative attitude. Ojedokun & Balogun (2013) argue that the people with these attitude have some characteristics which control their thoughts, feeling and in turn their littering actions.

Africa is urbanizing rapidly (Freire, 2014). Population growth and rapid urbanization rate aggravate waste generation in cities, hence the increasing concern about the implications of environmental pollution problems such as littering on health, social, economic and aesthetic related issues of urban environments. Whereas developed nations have governments, agencies, international organizations, entities and special interest groups that fund and provide expertise on littering research, this efforts lack in developing countries (Asante & Stephenson, 2006) leading to little knowledge on the matter.

1.2 Statement of the research problem

Littering is one of the most ignored and visible forms of environmental degradation (Finnie, 1973). According to Keep America Beautiful (2009) and Schultz *et al.* (2011), about 85% of littering is caused by individuals. Whether littering is intentional or unintentional, littering has negative impacts on the economy, environment and society in general (Torgler *et al.*, 2008).

Despite the negative impacts associated with littering, people still litter. This is because dropping litter is a habit; an instinctive and repetitive behaviour (Ojedokun & Adenkule, 2013). The behaviour is so rampant that it is now considered an important environmental issue worldwide with many research studies being done on it (see e.g., Keep Britain Tidy 2009 & 2013). This problem has been growing steadily in developing countries, also prompting studies on the phenomenon (see Chezmuna 2014; Furusa 2015; Itai, 2015).

In Nairobi, a lot of research has been geared towards solid waste management (SWM). However, though litter is an aspect of SWM, it has received relatively low attention yet the problem of littering in Nairobi is a visible and persistent problem. Many strategies have been put forward which have included provision of more bins but they have not been successful. This leaves us with a supposition that perhaps it is the citizens of Nairobi with the problem. Therefore, the main objective of this study is to assess the attitude and behaviour of Nairobi City residents towards littering. The study hypothesizes that Nairobi City residents have a poor attitude and behaviour towards littering and as such, they litter rampantly even where amenities have been provided, leading to a decline in urban cleanliness. A clean environment is a catalyst for any growing economy and the realization of a clean Nairobi complete with environmental conscious citizens will be one-step ahead to a wealthy one.

1.3 Research questions
The research was guided by the following questions:
1. What is the nature and extent of littering in Nairobi City?
2. What are the Nairobi City residents' attitude and behaviour towards littering?
3. What is the impact of littering in Nairobi City?
4. What are some of the solutions to curb the littering problem?

1.4 Objectives of the study
The research was guided by the following specific objectives:
1. To describe the nature and extent of littering in Nairobi City.
2. To determine Nairobi City residents' attitude and behaviour towards littering.
3. To assess the impact of littering in Nairobi City.
4. To recommend solutions to curb the littering problem.

1.5 Hypothesis

The study sought to test the following hypothesis:

H_{01}:   There is no statistically significant relationship found between littering and attitudes and behaviours towards littering.

H_{02}:   Alternative

1.6 Justification of the study

Any attitude towards littering can affect the amount of littering in an area (Zurbruegg, 2002). Research on littering proliferated after the cost of cleaning up litter became high and a solution was needed (Cooley, 2005). This gave birth to organizations such as Keep America Beautiful in 1970 and subsequent affiliates and other organizations. These have been successful in combating littering with most of their research focused around attitude and behaviour (see Reiter *et al.*, 1980; Grasmick *et al.*, 1991; Lehman *et al.,* 2004; Beck, 2007; Keep Britain Tidy 2009 & 2013). In developing countries like Kenya, although there has been research done on environmental issues (see Kabogo, 2005; Njeru, 2006; Ongoro, 2012) there has been little research done on littering. Evidence on these environmental issues has shown that people are ignorant of their environment and have accepted living with dirt (Ongoro, 2012). With littering becoming an issue of environmental concern, this study is important as understanding people's attitude and behaviour towards littering will lay a solid foundation to finding effective and long-lasting solutions against the problem.

1.7 The Scope of the study

The study was a project, focused on littering: its extent and nature, attitudes and behaviours and its impacts on Nairobi County. Whereas littering has impacts on all spheres of society, this paper focused on environmental and economic impacts of littering only. This is because measuring aesthetics is a difficult task because no universal measurement standard is in place to help accurately convey the magnitude of the littering problems. It will also use the resulting analysis from the study to make recommendation on the littering issue.

1.8: The Study area

The study areas Karen and Mukuru Kayaba are located within Nairobi County. Nairobi is located at the south-eastern end of Kenya's agricultural heartland, at approximately 1° 09'S, 36°39E and 1° 27'S 37°06'E and occupies 696 square kilometres. The city is divided into

four administrative districts: Nairobi North, Nairobi West, Nairobi East and Westlands. Karen is in Nairobi West while Mukuru Kayaba is in Nairobi East.
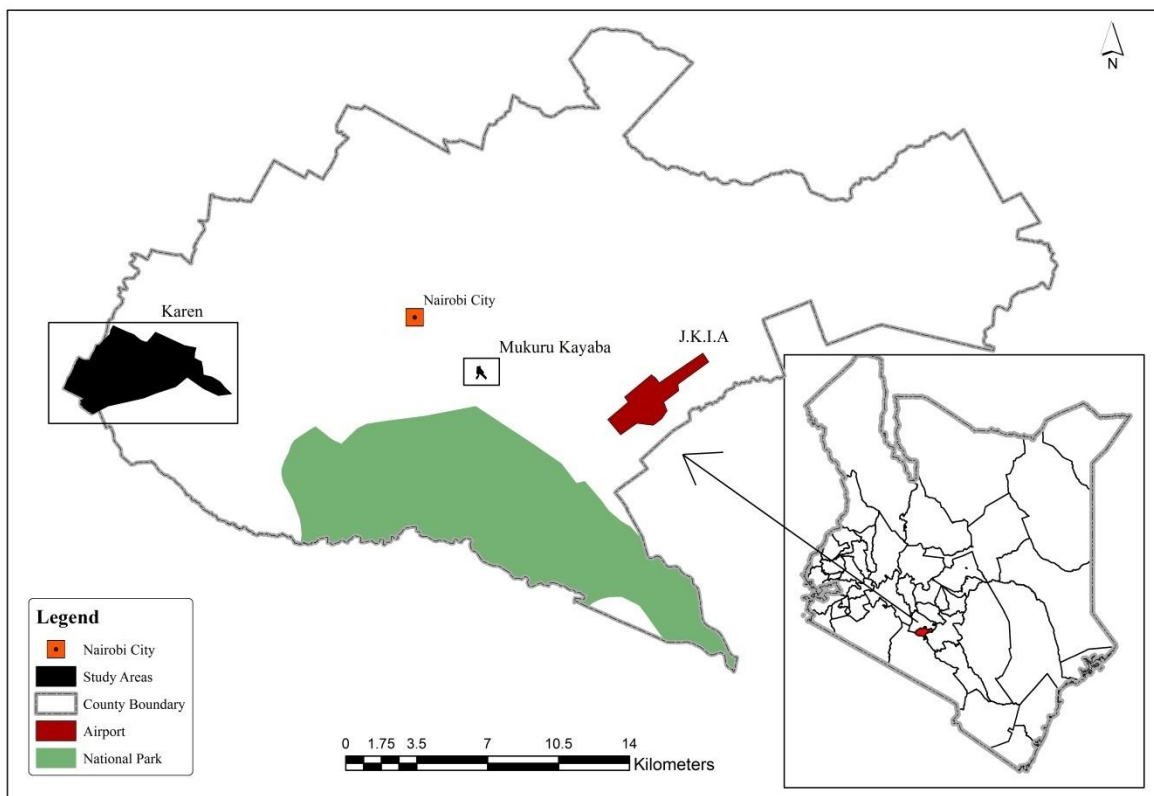
Figure 1.1 The map of Nairobi

Source: Author (2015)

The city developed as result of the Kenyan-Ugandan Railway when it reached Nairobi in 1899. By 1900, Nairobi had become a flourishing town comprising of three main settlements: the west of the railway trucks on the well-drained high ground was the high income area for Europeans and on the east of the railway trucks with black cotton soil was divided between the Asians and Africans. Nairobi became the capital of Kenya in 1907 and in 1950 it became a city (Rakodi, 1997; Mitullah, 2003; Ongoro, 2012).

Obudho & Aduwo (1988) classified Nairobi into four residential areas given their population density and income levels:
1) Low density and high income areas of Woodley, Kileleshwa, Lavington and Muthaiga; Karen and Lang'ata.
2) Middle density and middle income areas of Parklands, Eastleigh and Nairobi South.
3) High density and low income areas of Eastlands.

4) The informal settlements (highest density and low income) of Mathare and Kibera.

In 1979, the Nairobi Zoning policy was established. Its main role was to assist in the integration of compatible land use within Nairobi. This zoning policy has 20 zones where Karen is classified under Zone 12, is classified as a low density, high income residential estate while Mukuru is under zone 10, classified as a high density and low income area (see figure 1.1).

1.8.1: Karen

Karen administrative ward is in Nairobi West District. It lies South-West of the city centre under Nairobi County. Karen occupies an area of 23km^2 with a population density of 382 persons per square kilometers. It has a population of 8796 with 2861 households. The Nairobi Zoning Policy classifies it as a low density residential estate recommending one family dwelling house per 0.2-0.4 hectares (NCC, n.d). The suburb is named after Karen Blixen, a famous author who lived in Nairobi during the colonial period, who farm occupied the land where Karen currently occupies. It is also in close proximity with the Ngong' Road Forest. The Karen Lang'ata Association (KARENGATA) manages Karen and Lang'ata. It was founded in 1940 and by 2010, it had begun to manage the area's infrastructure. Karen is home to international schools, religious congregation headquarters, charity associations, and a country club with golf facilities.

1.8.2: Mukuru Kayaba

Mukuru is located 10 kilometres outside the city centre (Figure 3.4)**.** Mukuru Kayaba is one of the villages that make up the larger Mukuru which has eight villages. Mukuru Kayaba is a low income found in Nairobi County, Nairobi East District of Code 101. It has an area of 1.6 km^2 and density of 20,802 with a population of 32418 with 10912 households. It is in Starehe Sub-County, Nairobi South Division, Land-mawe location, Land-mawe sub-location. Mukuru Kayaba was first settled in the early 1960's and the area was named Mukuru Kayaba because the area was covered with Kay apples (Wangari & Makau, 2009). Mukuru, is a Swahili word for "dumping site," (COHRE, 2008). Mukuru covers at least 20 acres. It borders Ngong' River, Industrial area and is also build on land owned by Kenya Railways (Wangari & Makau, 2009). The entrance of Mukuru is via Enterprise Road (Watcher, 2013). Mukuru Kayaba has two units and 5 villages. The Crescent Unit which holds the Crescent, Kambi Moto and Barclays villages and the Mandazi Unit which has the Mandazi Road and Sigei

Road villages. Mukuru is classified under zone 10 as a high density, low income area according to the Nairobi Zoning Policy (NCC, n.d.).

Figure 1.2 Map of Mukuru

Source: Google maps

1.8.3: Climate

The climate in Nairobi is generally a temperate tropical climate. There are long rainy periods between April and June, while the short rains come in November and early December. Average daily temperatures range from 29º C in the dry season to 24º C during the rest of the year. The warmest month of the year is March, with an average temperature of 20.7 °C. July has the lowest average temperature of the year at 16.7 °C according to the Koppen Climate Classification. Being in Nairobi, Karen and Mukuru Kayaba have the same climatic conditions, with Karen having a bit more rain due to the nature of vegetation which comprises of many trees.

1.8.4: Relief and drainage

Nairobi lies at an altitude of 1670 metres, Karen lies at an altitude of between 1831 and 1879 metres above sea level while Mukuru lies at 1788 metres above sea level (Falling Rain Genomics, 2016). Nairobi is on the division of Athi plains and foothills of Aberdare Mountains. The Athi plain has successive layers of 'Kapiti' and 'Nairobi' phonolite soils. Nairobi is drained by the deep valley cut by the Nairobi, Mathari, Msongawa and Ngong streams as well as the artificial drainage systems. Karen has red, well drained soils since it's

on higher ground while Mukuru Kayaba has black cotton soils which are poorly drained due to the low topography in the area.

1.8.5: Land use

The use of land in Nairobi is very disperse ranging from residential areas, industrial, commercial trade, road networks and recreational areas. For example, the Jomo Kenyatta International Airport, Dandora dumpsite, amongst others. Karen boasts of use of land for residential, recreational and commercial areas. Land use in Mukuru is mostly for residential areas with the residents having quasi legal or no legal rights to occupy the areas.

1.8.6: Socio-economic characteristics and settlements

There are high inequalities by class and other social economic variables exhibited in Nairobi. The larger proportion of Nairobi city population remain very poor. Currently, almost two-thirds of the residents of Nairobi live in informal settlements (Weru, 2012). While lower income neighbourhoods have densities of up to 800 persons per hectare, high income neighbourhoods like Karen have densities of four persons per hectare, (Huchzermeyer, 2011). Karen residents have access to water, electricity, and security and use privatized services. Most of the residents in Karen own the houses (maisonettes or bungalows) and the land they live in.

In Mukuru Kayaba, most of the population are tenants paying 800-2000 shillings monthly. Some of the structures that make up houses are made up of iron sheets while others are made up of wood. Floors are made of cement. Each structure has 2 to 12 rooms, measuring 8 by 8 feet or 10 by 10 feet (Wangari & Makau, 2009). Just like other slums, Mukuru experiences a dire lack of basic services. The toilets are few and charges Kshs. 5 per use. The waste is drained into the nearby river. As they are not distributed everywhere, flying toilets are used by majority of the population (Dyfed, 2009). Due to this, basis services are funded by international organizations or women's and youth groups (UNHCR, 2003) or controlled by cartels.

Drainage is non-existent and so is electricity with individuals sub-letting power to residents at a cost of 500-1500 shillings. Most of the children in the slum go to Mukuru Primary, a city council school while some go to private schools which charge Kshs. 300 to 500 per month as school fees. Mukuru has several private clinics and chemists which offer consultation

services. Crescent Medical Aid Merali Clinic, which is the most common one among the residents, charges a consultation fee of Kshs. 200. Most of the residents are casual labourers, working in nearby industries or as *juakali* artisans. The women are mostly grocery vendors. They earn as little as 50 to 300 shillings. NEMA and other organizations conduct clean-ups in the area (Wangari & Makau, 2009; Dyfed, 2009).

1.8.7: Population of Nairobi City

Nairobi city has a population of 3,138,369 inhabitants with 985,016 households and the growth rate is 4.7% (KNBS, 2009). The city has a young population where 49% of the total population is made up of people between the ages of 15-34 years. 50% of the city residents have a secondary level of education or above; 38% have a primary level of education only, while 11% have no formal education. Despite the decreasing unemployment opportunities after the 1980s economic crisis, Nairobi remains attractive for many people, most of who live in slums (Beguy *et al*., 2010).

Table 1.1: Population of Nairobi (1906-2029)

Year	Population
1906	11,512
1944	108,900
1969	509,286
1979	827,775
1989	1,324,570
1999	2,143,254
2009	3,138,369
2019	4,895,856
2029	7,637,535

Source (KNBS, 2009 & Researcher's Projections at a growth rate of 4.6%)

Owing to the rapid population growth (Table 1.1), Nairobi city has had its share of environmental problems. According to Obudho (1987), poor congestion and sanitation dwellings are said to have caused plagues in 1906 and 1912. In 1970's, there were cholera outbreaks due to poor sanitation. Population growth is a major determinant of changes in the environment and hence it affects other factors like generation of litter (NCEO, n.d.).

1.8.8: Solid Waste Management

Litter is an aspect of solid waste and the management of solid waste presents a major challenge in many developing countries (Zurbruegg, 2002; Abarca-Guerrero *et al*., 2012). In Kenya, there are laws and regulations concerning waste management but the local authorities lack the capacity to implement those (Henry *et al*., 2006). Total waste generation in Nairobi County is currently at 3121 tons/day with only 40% of this waste is collected and disposed of by Nairobi County Council (Kasozi *et al.*, 2010). The rest is uncollected leading to the proliferation of garbage heaps in the CBD, residential areas and along the roads which poses environmental and economic threats on the population and nearby property (Kabogo, 2005). In Karen, the residents use privatized waste management services while in Mukuru residents throw their waste on the roads and into the river (Wangari & Makau, 2009).

1.9 Definition of Terms

Litter can be defined as "any piece of glass, plastic, paper, metal, cloth, rubber, food, or food by-product which is thrown away in public places outside waste collection containers".

Littering is an individuals' intentional or unintentional act of throwing away waste on the ground as a daily routine.

An attitude can be defined as the positive or negative evaluation of performing a certain behaviour.

Attitude towards littering as a person's inclination to react positively or negatively towards throwing away of wastes.

Binfrastructure- a term coined by Community Change in Melbourne (2002) to describe the characteristics of public place infrastructure applying to litter, recycling and cigarette butts bins.

1.10 Acronyms

AfDB- African Development Bank

CA- Communications Authority of Kenya

CBD- Central Business District

ENCAMS- Environmental Campaigns

FCSHWM- Florida Centre for Hazardous Waste Management

ISF- Ian Somerhalder Foundation

GOK- Government of Kenya

KAB- Keep America Beautiful

KARENGATA- Karen and Lang'ata Residential Association

KNBS- Kenya National Bereau of Statistics

NEMA- National Environment Management Authority

NCC- Nairobi County Council

NCEO- City of Nairobi Environment Outlook

NCHRP- National Cooperative Highway Research Program

n.d- No Date

NSW- New South Wales

NYS- National Youth Service

SID- Society for International Development

SWM- Solid Waste Management

OECD- Organization for Economic Co-operation and Development

UNEP- United Nation Environmental Programme

UNHCR- United Nations Human Rights Commission

CHAPTER TWO
LITERATURE REVIEW

Littering is not a new environmental pollution problem. However, it differs from other types of pollution because it results from the collective action of numerous individuals not from a small number of corporations (Feld, 1978). Litter is the end result of littering. The first efforts of behaviour experts to solve environmental issues began with the problem of littering (Cone & Hayes, 1985) because littering was seen as a behavioural problem that could cause significant impact on the economy, environment and society (Torgler *et al.*, 2008; Bennett, n.d.).

2.1 Nature and extent of littering

Litter is a visible sign that society does not take pride in the spaces where it lives, works and plays (Florida Centre for Hazardous Waste Management (FCSHWM), 1999). While littering problem is currently receiving global attention, the phenomenon has always been in existence. Melosi (1981) ascribed the problem of littering to refuse and garbage tossed in the street. He noted that the litter problem was a result of industrialization as well as the development of the European cities. Mumford (1961; as cited by Beck, 2007), said that industrialization produced the most degraded urban environment the world had yet seen.

A wide range of definitions of 'litter' and 'littering' has been used in literature. Litter can be defined as "any piece of glass, plastic, paper, metal, cloth, food, or food by-product which is thrown away in public places outside waste collection containers" (H.A. Arafat *et al.*, 2007). Waste outside any container is not referred to as litter (H.A. Arafat *et al.*, 2007). Geller *et al.* (1982), Stokols *et al.* (1987), Keenan (1996) and Hines *et al.* (1986-87) define littering as the thoughtless, inappropriate discarding of small quantities of wastes (Ojedokun & Balogun, 2013). Littering is also leaving behind unwanted and unnatural elements in the environment (Green, 2001). Powls (2005) defines littering the act of disposing rubbish improperly especially along roadsides, highways and streets. Littering can be intentional, unintentional or gross. Intentional littering is when someone deliberately throws trash while unintentional is when litter accidentally falls off a moving vehicle. Gross littering is when someone deposits a large amount of waste into a ditch or has an illegal dumpsite.

Littering can be categorized into active and passive. The researchers argue that littering is as a two-stage process of (a) placing litter in any location in the environment and then (b) failing to remove that litter when leaving that location. This failure to remove litter is termed as passive littering. Active littering is whereby an individual takes a shorter amount of time to litter an object, for example, just before leaving or while passing through an area (Sibley & Liu, 2003). Passive littering compared to active littering is more resistant to change because of forgetfulness and the decreasing feeling of responsibility of picking up the litter (Msezane, 2014).

In littering research conducted in the 1970s, the first of its kind, Keep America Beautiful (KAB) found that litter originates from seven sources: household rubbish by the curb, bins used by businesses, demolition and construction sites, loading docks, uncovered garbage trucks, pedestrians and motorists (KAB, 2009). However, many studies have shown that littering is mostly human descendent as high levels of litter are usually synonymous with high levels of human traffic (KAB, 2009; Schultz *et al.*, 2011). In 2009, Keep Britain Tidy conducted a survey, looking in more detail at roadside litter which arises mainly from litter thrown from vehicles. They found that 20% of the general public admitted to littering from a car in the six months prior to the survey. Williams *et al.* (1997) found that litter is not simply dropped or left behind, but it is deliberately placed in certain locations. A high proportion of littering occurs in locations where litter can be hidden, or in places resembling litter bins, for example, in bushes or pot planters.

Littering is also linked to economics (Okeoma & Nkwocha, 2009) as there is usually a significant intensity of activities practiced along the areas that are normally littered. These areas can be categorised into four: a) special event venues such as concerts, carnivals and other special events that attract a large number of people who will generate waste; b) roads and highways as well as highway on/off ramps; c) high traffic and everyday locations such as fast food businesses, convenience stores, picnic grounds, park benches and other high pedestrian traffic areas; and d) transition points which are places where someone stops for eating, drinking or smoking before they proceed (Novotny *et al.*, 1999). In South Africa, more bins were needed to be put near taxis and street vendors as these areas were littered (Poswa, 1997).

There are many causes of littering but the main causes offered in the literature include laziness (the bin is too far away), a perception that littering is not an important environmental concern especially compared to 'the bigger' environmental issues e.g., the ozone layer, a feeling that someone else is paid to clean up and in a location context, a lack of litter collection (general area cleanliness), and binfrastructure (bins) (The NSW Office of Environment and Heritage, 2013).

As a result of the impacts of littering in the world, many groups existed with the aim of raising littering awareness and running anti-littering campaigns including clean up events. This led to the introduction of the "*International Tidyman icon*", an icon found on packaged products to encourage proper binning of the packaging after use. The origins of the Tidyman logo are unclear but one suggestion is that the Tidyman was first used by the American beer company, Budweiser, in the 1950s to encourage people not to litter and the other although similar idea is that the Tidyman logo was originally developed by the Keep America Beautiful campaign in conjunction with the American Brewers Association in the 1960s (The Tidyman History, 2015).

Despite being the least urbanized region in the world, Africa is urbanizing rapidly. Its urbanization rate soured from 14% in 1950 to 40% in 2016 and is expected to grow to 50% in 2030 (ADB, OECD & UNDP, 2016). Urban populations are projected to grow trifold in 50 years (Freire *et al*., 2014). Population growth and rapid urbanization rate aggravate waste generation in cities, hence the increasing concern about the implications of environmental pollution problems such as littering on health, social, economic and aesthetic related issues on urban environments. This concern is promoting research on factors related to littering as urban growth will lead an increase in litter generation causing a strain on the natural resources of a country (Ojedokun & Balogun, 2013; Asante & Stephenson, 2006).

As the urban population and economic status increase, there will be more consumption hence more tendencies to litter. In Nigeria, littering is a problem particularly in urban areas (Chezmuna, 2011). Ojedokun & Bologun (2013) in their study note that there is a high and increasing prevalence of urban environmental pollution through littering in most urban centres and cities, highlighting the capital city of Oyo State, Ibadan, despite the Nigeria's government efforts to tackle the problem. Another study in Nigeria (Okeoma & Nkwocha, 2009) revealed that littering problem is intense in the areas that were surveyed, largely

determined by the education levels, age and socio-economic of citizens. However, a study in Ghana revealed that littering occurs regardless of age or socio-economic status (Ian Somerhalder Foundation (ISF), 2014).

The White Paper on Integrated Pollution Management for South Africa of 2000 described littering as an example of environmentally and socially unacceptable practice (Furusa, 2015). Its management was hindered by poor quality of data collected on forms and amounts of litter generated from the diverse types of land use in South Africa (Marais *et al*., 2004). 15 years later, littering has become a major issue which requires immediate attention (Furusa, 2015). Littering is also one of the most environmental problems especially but not limited to urban areas of Zimbambwe. The Environmental Management Agency identified the country's CBD primary sources of litter as pedestrians, motorists, overloaded trucks and overloaded trash containers and illegal dumping sites (Itai, 2015).

2.2 Attitude and behaviour towards littering

Attitude towards littering is a person's inclination to react positively or negatively towards throwing away of wastes (Ojedokun, 2011). All litter seen in the environment is the result of a person's negligence or careless attitude and behaviour (Waghorn-Lees *et al.*, 2013). People who litter are referred to as litterbugs. According to Merriam-Webster Dictionary, a litterbug is one who throws or leaves trash/waste in a public place. However, littering behaviour is not a single, easily defined behaviour, but a concept that includes a broad range of sub-behaviours. It does not matter if the behaviour is desirable or not; if it is occurring then there must be a reinforcing consequence for the performer of the behaviour.

Different socio-economic factors or variables affect people's attitude and behaviour towards littering, their littering frequency and willingness to take litter preventive approaches (H.A. Arafat *et al.*, 2007). They can be personal (individual), social, physical and habituations and it is important to note that all these factors interact and modify each other's effect (Lyndhurst, n.d.). This study will highlight all the four factors but will focus on personal and physical factors.

Surveys by Keep America Beautiful report that to some extent everyone litters (KAB, 2007). There are personal factors that influence littering behaviours. Personal variables are i) demographic variables e.g., age, sex, education, income and area of residence and ii)

cognitive variables e.g., level of litter awareness, concern about littering and the willingness to act on it. (Stuart, 1975).

Age is a demographic variable that is a statistically significant predictor of littering behaviour, even though the effect is small (Schultz *et al*., 2011). However, while certain groups are expected to litter more than others, there has been no substantiation that there is a littering demographic-a group of people generate most litter. According to Tillet (2007); Okeoma (2009); Ojedokun (2011) and Shukor *et al*., (2012), younger people litter more because they are not in the habit of urban cleanliness as it has not be well grounded in them during their upbringing. Furthermore, the young tend to consume goods and foods on the streets that litter the environment (Okeoma, 2009). However, as age increases, their attitudes become negative (Ojedokun, 2011) and as age increased, the tendency to take littering prevention actions also increased (Ojedokun & Akungba-Akoko, 2013).

In addition to age, there are other demographic variables that influence littering attitudes and behaviours. They include sex, education and living conditions, amongst others. People living in large households of 5+ members are more likely to litter compared to those from smaller households of 1-2 members (Geller, 1968; cited by Beck, 2007). On the other hand, people with higher levels of education were found to have lower than average littering rates (William *et al*.., 1997; Okeoma, 2009). Cognitive variables are levels of litter awareness, concern about littering, willingness to act, childhood experiences, sense of control, values, social class, felt responsibility and place attachment (Gifford *et al*., (2014), n.d.; Al-Khatib *et al*., 2009 & Inglehart, 1995). For example, a study carried out the Population Studies Centre (2015) found that African households were less likely to be aware of environmental interventions and initiatives than non-African households and therefore more likely to litter. In a survey done in South Africa on Exploring Environmental Consciousness in South Africa, littering was seen as a community problem by more than 20% of all households (Population Centre Research Report, 2010).

The behaviour is also affected by the physical context (situational/environmental variables) which include the characteristics of the location, cleanliness of the area, availability of bins and the distance between the bins and the litterer and the presence of law enforcement and/or fines. People are likely to litter less in a cleaner environment but will litter more at a dirty environment (Alice Ferguson Foundation, 2011). They are also likely to litter in a public

location as they assume someone else will clean it up. They are also likely to litter if there are no bins or if the distance between the bins is too far. This is because of the human need to get rid of the litter item as soon as possible. According to Okeoma (2009) the lack of bins is a major contributor to littering on Nigerian streets. Enforcement is seen a major deterrent against littering due to the embarrassment a litterer would face and the cost of the fine. However, studies in Scotland found that it was considerable hard to enforce laws and fines (Keep Britain Tidy, 2011). A preliminary study done in South Africa revealed that there was an inadequate supply of bins leading to people littering more. In addition to this, where there were bins, a lack of regular litter removal caused litter to accumulate in the street encouraging littering (Poswa, 1997).

The attitude and behaviour of littering is also affected by social variables (context). Social norms are agreed means of conduct oneself and these can drive littering or proper disposal (Lyndhurst, n.d.). For example, when individuals are with a respectable member of the family or community around them, they will most likely litter less. Lack of education on littering also influences littering behaviour as it one of the reasons people litter (ENCAMS, 2001).

The role of habit and the subconscious is noted across the literature as a factor which acts as a driver of littering behaviour for some. As with many repeat behaviours, littering may be an individual's 'default' disposal behaviour, so it is done with no thought given to the littering action. It therefore becomes an ingrained behavioural patterns, which can be difficult to change (Lyndhurst, n.d.). In Ghana, attitude towards littering was found to be exceedingly poor as almost all respondents acknowledged that they were in the habit of littering (Van *et al.*, 2016)

2.3 Impact of littering

There is no doubt that littering is a problematic issue. According to Keep Britain Tidy (2013:3) "littering is one of the first signs of social decay. If we don't care about litter on our street or in our parks, we are unlikely to care about other environmental issues that negatively impact our lives, community and society". H.A. Arafat *et al.* (2007) categorizes impacts of litter into three, noting that neither is easy to quantify: aesthetic blight; medical impact as a result of injuries caused by litter and financial impact which is associated with the cost of collection of litter and the losses caused by the occurrence of litter. Nilsen (2010) categorised the impacts of litter into biodiversity loss, aesthetic loss and human catastrophe.

While the developing nations lack the infrastructure and capacity hinder their ability to deal with the removal of this litter, developed nations in the West generate large amounts of litter per person as they consume more disposable goods negatively impacting the environment. (Armiage, 1999; Msezane, 2014).

Littering costs money. This high cost is what led to an increase in the research of littering behaviour and effective solutions to the littering problem (Cooley, 2005). In the United States, the direct cost of litter cleanup is almost 11 billion dollars annually (MSW Consultants, 2009 cited by Schultz *et al.*, 2011). In Florida, 180 businesses were surveyed and the total amount spent on litter annually was $2,434.73. This figure was calculated from data collected during the survey for wages per hour, number of hours spent on litter cleanup and employees involved in the cleanup activity (FCSHWM, 1999). In South Africa, beach cleansing to remove litter was approximately R3.5 million in 1994-95 (Balance *et al.*, 2000). England spends one billion pounds annually on litter cleanups. This is money that could be used to pay the running costs of 4400 libraries (Keep Britain Tidy, 2013).

Littering also impacts the economy through losses in the tourism and fisheries sectors. As litter is not stagnant, it will find its way into the marine environment. Marine litter impacts the economy as it leads to the loss of tourism, amenities e.g., facilities and recreation potential. It is also a threat to livelihoods. A small decrease in fish yield could cause devastating impacts as people who rely on tourism as their sole source of income may have it depleted severely resulting in a lack of basic necessities such as food (Tudor & William, 2000).

Fishing is one of the most important economic activity in Angola, South Africa and Namibia and it is a major contributor to their economies. Litter and pollution from industries are causing degradation of their coastal habitats therefore eroding their potential to attract tourists (BCLME, 2006).

Balance *et al.* (2000) conducted a study on the worth of a clean beach in Cape Peninsula, South Africa. The researchers found that the annual recreation value of the beaches in that region was eight million rand. However, if the beaches had more than two pieces of debris per metre, 85% of the tourists would not visit the beaches and the value of the beaches would

reduce from eight million rand to one million rand. Given the importance of tourism to the national economy of South Africa, the potential loss in number of tourists due to a drop in standards of beach cleanliness is significant. Cleanliness in a beach is one the most important traits tourists look at (Keep Britain Tidy, 2013). Littering also impacts the economy indirectly as occurrence of litter decreases property values by 7% and citing litter statistics from 1970-1975 by Scott Geller, KAB reported there are 500-1000 vehicle accidents related to litter and 12 houses damaged or destroyed by fire starting with litter (KAB, 2009).

Littering also has environmental impacts. Torgler *et al.*, (2008) found that items littered such as cigarettes, glass and plastic bottles, plastic bags, napkins, tissues, take-away food packages and snack wrappers seriously damage the environment as some are not degradable. The littered items cause the death of plants and animals (domestic and wildlife). For example, the Royal Society for the Prevention of Cruelty to Animals (RSPCA) in the UK receives more than 7,000 calls per year regarding animals that have been injured by litter (RSPCA, 2015). It was also seen to lead to surface and ground water pollution, threat on biodiversity and aesthetic impact in Brazil (Raffoul, 2006).

In Zimbabwe, litter was found to affect human beings as it causes health hazards; it is a breeding ground for bacteria leading to disease-The cholera and typhoid outbreak in Harare (2011- 2012) was as a result of uncontrolled littering. Littering also harms both wildlife and aqualtic life and causes land and water pollution (Itai, 2015).

Njeru (2006) studied the plastic bag problem in Kenya, which is the most littered item, and found that plastic bags are linked to many environmental problems. They cause serious storm water problems as they block gutters and drains (see also Toxic Link, 2014). Njeru reports that in Bangladesh, plastic bags were banned in 2002 following a flooding caused by blocked drains. Ingestion of the bags by livestock leads to their death; because they are not degradable, their presence in soil decreases soil productivity; they spread malaria as they provide breeding grounds for mosquitoes and finally, they release toxic gases when burnt. Wangari Maathai performed experiments that linked plastic bag litter with malaria (UNEP, 2005).

Plastic bag litter is also a common problem in South Africa with South Africans said to consume 8 million plastic bags a year (Dikgang *et al.,* 2010). Due to the negative impacts of

the bags, the plastic bag levy was put in place by the government to curb the devastating effects of plastic bag litter on the environment. Research has found that 90% of the litter found on South African beaches contained plastic. Ghana is also from plastic bag pollution which causes blockage of drainage and is a hazard to livestock (Yire, 2012). This has prompted the country to ban their usage. Kenya, Botswana, Eritrea, Uganda, Somalia, Ethiopia, Tanzania among others, already have in place a plastic bag ban (McAllister, 2015).

Clean Up Australia (n.d) focused on cigarette butt litter and its impact on the environment. According to their report, 4.5 trillion cigarette butts are littered every year and this reduces the aesthetic quality of the environment as areas with cigarette litter look untidy and unkempt and attract littering of other items. Cigarette smoke has 4000 chemicals and if dropped when alight, they can stay so for 3 hours hence releasing these toxins and can cause fires with up to 12 fires started by littered cigarette butts.

Littering also impacts the marine environment. When one tosses litter on the ground, they might be in reality throwing it into the ocean. Keep Britain Tidy (2013) found that 80% of the litter found in seas and oceans originates from inland areas. Clean Up Australia (n.d.) and UNEP (2009) report that there are 46,000 pieces of plastic in every square mile of the sea. These plastic and cigarette litter in the marine environment leads to death of aquatic life as the litter is ingested by the aquatic animals. The litter is also a source of toxic substances which pollute the water e.g., cigarettes have the chemical lead which can leach into the water threatening the wellbeing of the marine life. While beach clean-ups are advocated for, cleaning up the debris disturbs the existing natural nests for animals such as turtles and so the ultimate solution if to prevent the litter in the first place by avoiding littering (UNEP, 2009).

2.4 Measures to combat littering

Given that littering is rooted in human behaviour, Torgler *et al.* (2008) suggests two methods of changing these attitudes and behaviours. The first method is the use of antecedent strategies such as environmental design, prompts, clean ups, education and environmental participation. These have been used to control littering (see e.g., Shukor *et al.*, 2012). The second method is finding solutions that punish or applaud littering behaviour through tax impositions or giving rewards respectively.

According to Lyndhurst (n.d), careful designing of solutions contributes to effective anti-littering interventions. Furthermore, strong partnerships and working with the community can help deliver effective interventions (Bennett, 2014). On the other hand, Warghon-Lees (2013) suggests that setting achievable goals and making changes based on feedback from community members is vital to the success of any anti-littering community project. However, according to the National Cooperative Highway Research Program (NHCRP, 2009), the effectiveness of individual litter prevention strategies is largely undetermined. The primary tenet in litter prevention is that litter begets litter and keeping an area litter-free will greatly reduce the incidence of new litter. In addition, advertising and education materials should reflect a social norm that littering is not commonplace. That is such adverts should show a clean environment as opposed to a littered environment. Nilsen (2010) suggested having a moral motivation model which included taxation and public awareness to curb the littering problem in Norway.

Okeoma & Nkowacha (2009) suggested strategic and tactical measures for Nigeria for example strategic measure can be environmental education and creation of awareness on the dangers of littering and its impacts on the society, implementation and enforcement of environmental laws while tactical measures can be punishing environmental crimes by law.

Itai (2015) recommended tracking refuse vehicles, use of attractive anti-littering messages and highlighting financial gain from recycling as solutions to curb littering in Zimbabwe's CBD. In addition to this, he suggested that public places be kept clean and bins provided for a cleaner environment.

Van (2016) said that intensive education and the provision of litter collection services would reduce marine litter in the Ghananian beaches. He added that education should not only aim at increasing awareness but also at changing attitudes and recommended the use of tools such as TV and radio, fliers and brochures to be targeted at and given to users of the marine environment.

2.5 Theoretical framework

Most littering is as a result of human behaviour. The major factors in determining behaviours, according to behaviour change theories, are environmental, individual and behavioural characteristics. One such theory is the Theory of Planned Behaviour (TPB). Behaviours

inform attitudes, which are determined by a set of beliefs and the TPB is a theory that links beliefs and behaviours. The Theory of Planned Behaviour (TPB) (Ajzen, 1991) outlines that somebody's attitude towards behaviour, his or her subjective norms, and his or her perceived behavioural control, together form an individual's behavioural intention and the actual behaviour (see Figure 2.1). Intention is influenced by the attitude of an individual towards performing the behaviour, the subjective norm that surrounds the behaviour and also by the control an individual thinks he has over performing that behaviour. Intention captures the variables that stimulate the behaviour. They are the indicators of the willingness of individuals to try and how determined they are and how much energy they are willing to put to perform the said behaviour (Kong *et al.,* 2014).

Attitude towards the behaviour is the assumed consequences of the behaviour and evaluation of these consequences, perceived behavioural controls are perceptions of how simple or hard it is to do a particular behavior and social norms are the social pressures towards or against the behaviour as experienced by the individual. Therefore, the stronger the intention to engage in a certain behaviour, the more likely the performance of the behaviour. However, although there may be an intention to have good littering behaviour, this may be hindered by physical constraints such as lack of binfrastructure, poor environmental conditions, lack of incentives, etc., causing the behavior not to occur (Stern, 2005; Koger *et al.*, 2010).
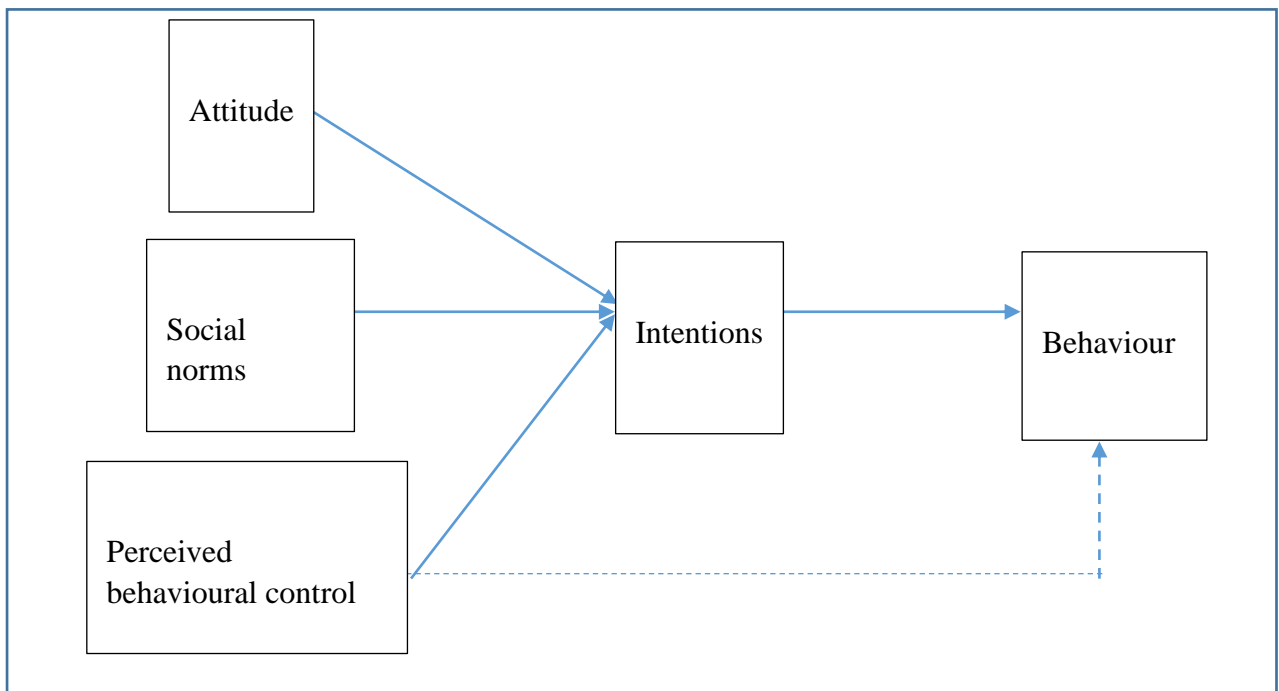
Figure 2.2 The illustration of the Theory of Planned Behaviour
Source: Ajzen (1991)

2.6 Conceptual framework

The conceptual framework (Figure 2.2) points out the relationships between the personal and physical variables that influence attitude and behaviour towards littering. Littering begins with and is as a result of the interaction of the personal and physical variables. These variables influence littering behaviour and attitude positively or negatively leading to a desirable or undesirable outcome. A desirable outcome is when an individual has a negative attitude and positive behaviour. An individual with a negative attitude and positive behaviour towards littering performs environmentally friendly actions. This means that the individual will, for example, walk to put his or her litter in a bin or hold on to the litter until he or she sees a bin, regardless of the effort or energy it costs to do so. This results to an increase in urban cleanliness and a reduction in economic and environmental impacts. The undesired outcome will be when an individual has a negative behaviour and a positive attitude towards littering. Such a person performs environmentally destructive actions. Therefore, the individual will throw the trash carelessly as the benefits for littering are higher as it will cost less effort and energy for the litterer. This positive attitude and negative behaviour towards littering will lead to litter generation which has an economic and environmental impact on society. Introducing change to these influencing factors at this point, for example through education, increasing the number of bins, laws and fines will then lead to a change in behaviour and attitude for the better if done well. If not, the cycle continues leading into the undesirable outcome. However, the desire to perform environmentally friendly actions may be hindered by physical (environmental/situational) variables and as such, applying this theory in such circumstances enables explain inconsistencies between the expected attitude and the unexpected behaviour.
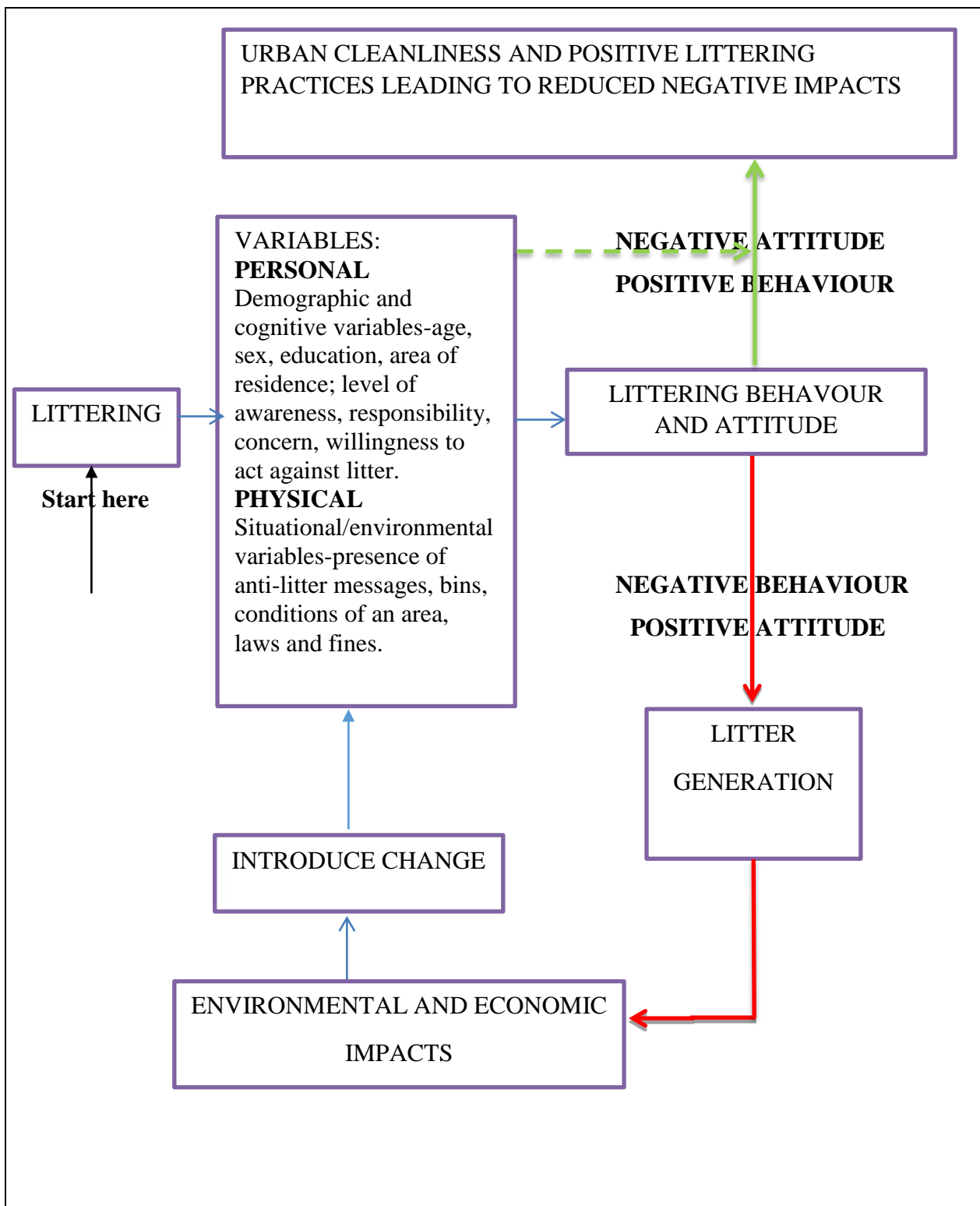
Figure 2.2 The conceptual framework   Source: Author 2015

Key:

→ Desired path

→ Undesired path

→ Direction

2.7 Research Gaps

The review of literature highlighted the following key gaps that this study aims to fill:

1. The influence of other personal factors in addition to the areas of residence, age, sex and education on littering attitudes and behaviours and littering preventive actions.

2. Many studies have been done on solid waste management yet littering is an aspect of it and has not be adequately documented. This study aims to somewhat put structure into information because understanding littering may enable solve the waste management crisis.

3. The review also showed that many littering studies have been done in developed countries and in West Africa, Nigeria specifically and though few have been done in Nairobi, they have not been specifically on littering. This study aims to change this narrative by contributing literature on littering attitude and behaviours in East Africa and Nairobi.

CHAPTER THREE
METHODOLOGY

3.1 Introduction

This chapter outlines the research methods of the study. It describes the research designs and methods employed in the study, looking at the data sources, sampling design and procedure and the data collection, processing and analysis methods used.

3.2 Research Design and organization of the study

The researcher used both quantitative research design. The designs for most quantitative studies are highly structured and it was preferred as it would facilitate prompt data collection from the respondents. The study was conducted in two parts. Data in part one was collected using the quantitative approach. Questionnaires with both open and closed ended questions were given to the sampled residents of Karen and Mukuru areas. They were asked to be as clear as possible while answering the open ended questions. As some of the residents could not understand the language used, which was English, the questions were translated for them and done carefully, so as not to lose the understanding or meaning of the question. In part two, qualitative research was used in the Director of the Environment at Nairobi County Council offices to interview the key informants. The researcher used guiding questions prepared in advance.

3.3 Data types

The study used primary and secondary data sources. It also used quantitative and qualitative data. Primary data on attitude and behaviour towards littering was collected through a pre-coded questionnaire. Secondary data was collected from review of literature done on the topic under study. In addition, the researcher relied on informal interviews with key informants.

3.4 Exploration Survey

Before the actual preparation and study was done, a pre-survey was done. This was done in Karen and Mukuru Kayaba so as to enable the researcher understand both environments and also know the best tools to use, best times to go especially in Karen and whom to approach to gain access to the households to be surveyed. In Karen, the researcher went to the chief of the area, informing him of the study and was given a guide to show her the areas she had sampled. In Mukuru Kayaba, the researcher spoke to the chief and the Head Community Social Worker and was also given a guide.

3.5 Study Population and Sample size

3.5.1: Study Population

The study population comprised residents of Karen and Mukuru Kayaba in Nairobi City which have 2,861 and 9,814 households respectively (KNBS, 2009). The two areas were chosen as they represented the high and low-income households, respectively. According to KNBS (2011), a high income household is one that spends above Sh. 200,000 a month while a middle income household is one that spends between Sh23, 670 and Sh199,999 monthly. The low income households are those who spend less than Sh23,670 per month. The two areas were also chosen because they lie in different areas of Nairobi that were segmented during the colonial period, representing high and low income dwelling areas. The unit of analysis in the study was the household.

3.5.2: Sample size

A sample size of 63 was calculated through Nassiuma Coefficient of Variation formula (Nassiuma, 2000).

$$S = N(Cv^2)/ Cv^2 + (N-1)e^2$$

Where S=sample size, N=the population size (12675; that is 2861+9814), CV=the coefficient of variation (40%) e=standard error (5%).

$$S = 12675(0.4^2)/0.4^2 + (12675-1)\ 0.05^2$$

$$= 63$$

3.6: Sampling for the households

3.6.1: Karen

In Karen, 30 households were chosen for the study and random sampling was used. The researcher randomly picked 10 estates from the list of 20 that was availed to her from the office of the chief. These ten estates were Nandi, Ndege, Mwitu, Karen Plains, Miotoni, Windridge, Treelane, Mtero, Rhino Close and Karen Lane (see figure 3.1-bolded lines). To select the specific household to be given the questionnaire, the researcher physically counted and numbered the houses in the estate. Karen being a low density area, this was not difficult. The largest estate had 14 houses while the smallest had 8 (see table 3.1). The researcher picked 3 houses per estate so as to make up 30 households. Once the number of houses in the estate was known, the researcher divided the number of houses by 3 to know how many houses would be skipped before administering a questionnaire the researcher gave the

selected household number the questionnaire to fill. To determine this, the following approach was used:

K^{th} interval= N/n.

Where:

N= total number for households i.e., for example 14 in Nandi Estate

N= sample size for Nandi estate i.e., 3

k^{th} interval= 14/3

=4.6

Therefore, every questionnaire in Nandi estate was administered at an interval of four houses. The same was applied to all the estate sampled. The questionnaire was also given to any member of the household, living in that household, regardless of age, sex or education level.

Table 3.1: Number of households sampled per neighbourhood in Karen

NEIGHBOURHOOD	NO OF HOUSES	SAMPLE SIZE
Nandi	14	3
Ndege	13	3
Mwitu	11	3
Karen Plains	12	3
Miotoni	10	3
Windridge	12	3
Treelane	9	3
Mtero	10	3
Rhino Close	8	3
Karen Lane	8	3
Total	**107**	**30**

Source: Fieldwork, 2015
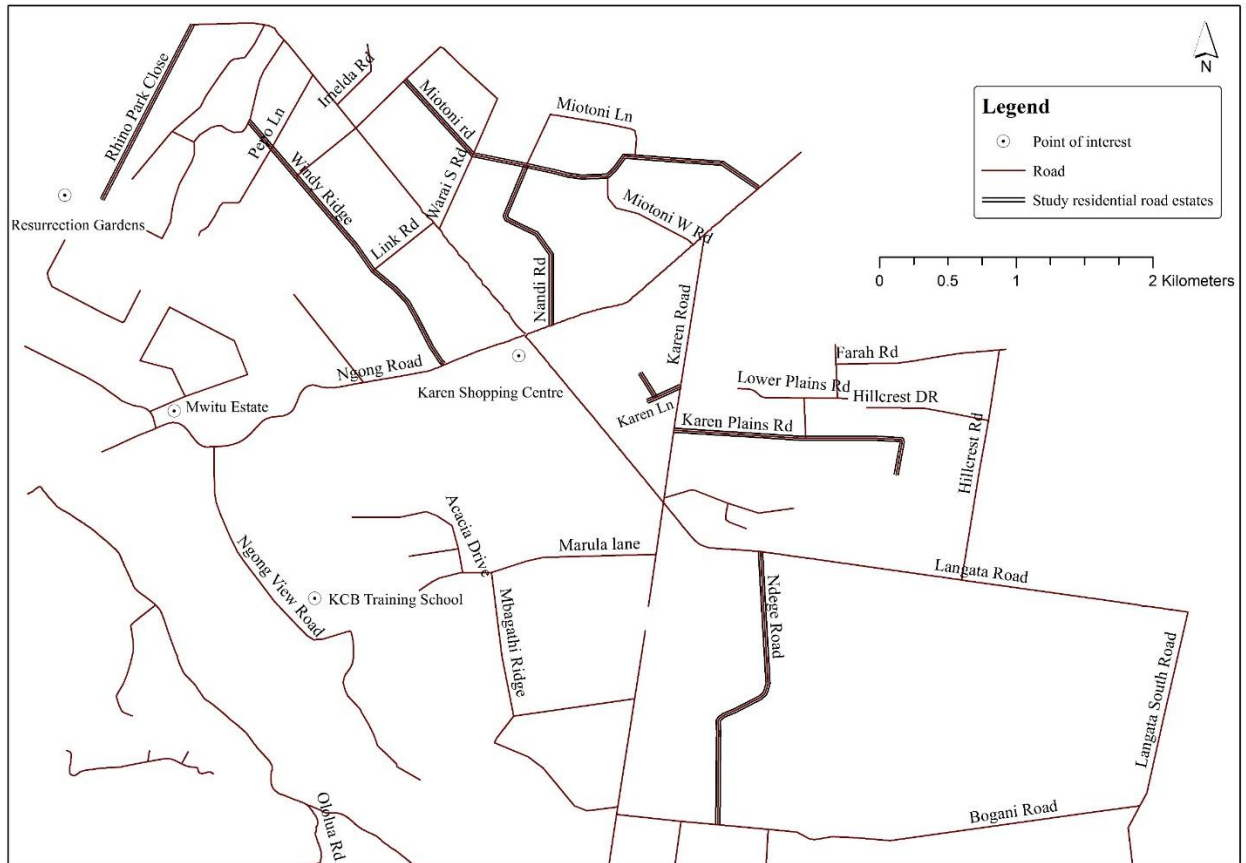
Figure 3.1: Karen map showing some of the sampled estates (in bold)

Source: Fieldwork, 2015

3.6.2: Mukuru

In Mukuru, a sample size of 33 households was chosen as well. Mukuru Kayaba is divided into 5 villages. From the five villages, three villages were randomly selected which were Barclays, Mandazi Road and Kambi Moto villages (Figure 3.2). Unlike in Karen where the houses were not always numbered, in Mukuru, they were numbered in the following format:

-Unit/village/house number/year.

To determine the number of houses to be skipped before a questionnaire was given, the same formulae for Karen was applied:

K^{th} interval= N/n.

Where:

N= total number for households i.e., for example 2350 in Kambi Moto

N= sample size for Nandi estate i.e., 15

k^{th} interval= 2350/15

30

=156.6

Therefore, after every 157th house, a questionnaire was given.

VILLAGE		SAMPLE SIZE
Kambi Moto	2350	15
Mandazi Road	2300	12
Barclays	230	6
Total	**4880**	33

Table 3.2: Number of households sampled per neighbourhood in Mukuru

Source: Fieldwork, 2015
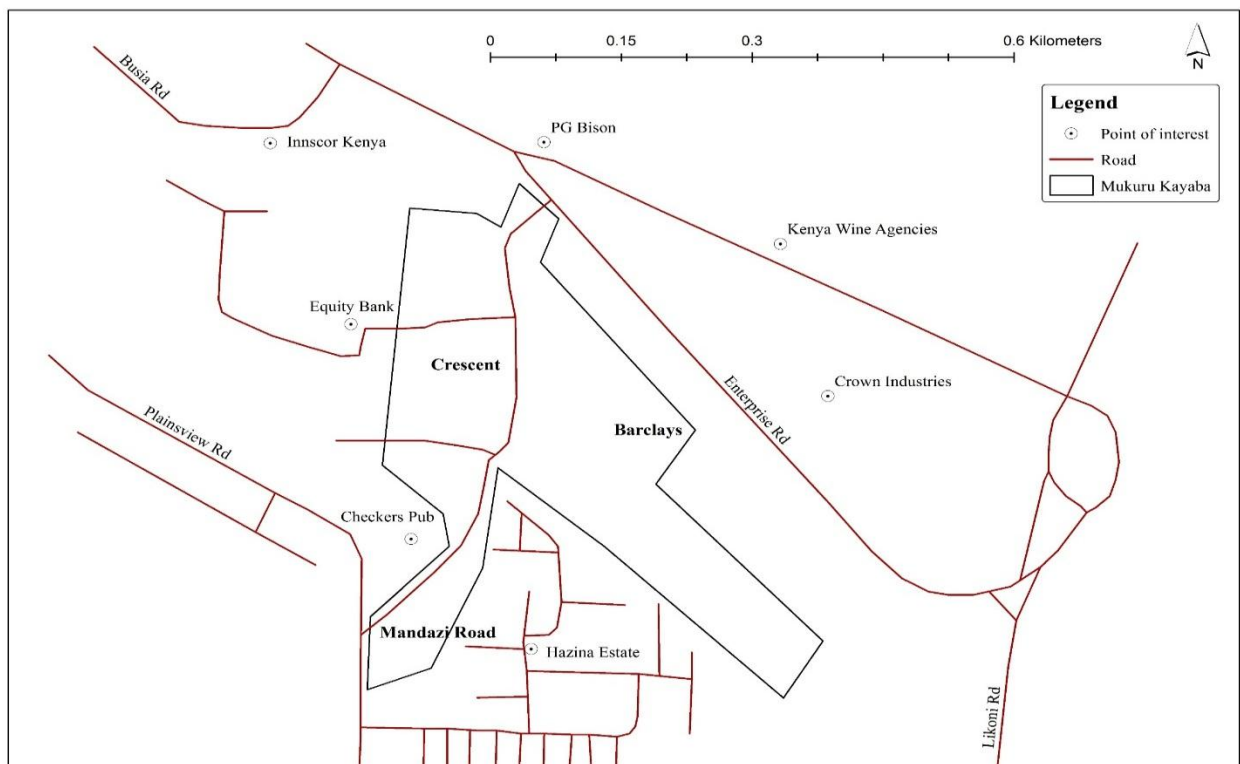
Figure 3.2: Mukuru map showing the sampled villages (in bold)

Source: Fieldwork, 2015

3.7: Household questionnaires and interviews.

A structured questionnaire was developed by the researcher. Clear instructions were given to the respondents and this was done in English or in Kiswahili. The questionnaire was designed in a way that the data could be easily coded and entered into the computer. It was also divided into different sections and was numbered. Contents of the questionnaire were

demographic information, questions on nature and extent of littering in Nairobi, attitudes and practices and finally, questions on the respondents' knowledge of littering impact. In order to measure validity and reliability of the questionnaire, it was tested on 15 different people prior to the survey. The researcher also interviewed the key informants who were the Director of the Environment and two Environmental Administrators.

3.8: Analysis of the data and presentation

In this research, the data collected was in qualitative and quantitative form. Only 60 questionnaire were analyzed as information on the questionnaires from two respondents were not understandable while one respondent refused to complete the questionnaire. The data collected was edited to guarantee accuracy. It was then classified into three groups: respondents from Karen and those from Mukuru and from the interviews. Each of the 60 questionnaires was read and re-read to enable the researcher to become familiar with the data. The closed ended questions were coded in numbers for easy analysis. As for the open-ended research questions, descriptive coding was applied so that the researcher could have a summary of what the transcript was about and then applied analytical coding where the researcher categorized the data based on phrases and keywords. The key phrases and words that came out from the open ended questions were first written down in different colour pens to be later on contextualized. The interview was also read, analytical coding was applied as well. Key points were written down then typed on an excel worksheet. The data was analyzed by Statistical Package for Social Sciences (SPSS) software and presented in tables by frequency and percentages. For the hypothesis testing, the researcher used the independent sample t-test, using the Levene's test to test the variances.

3.9: Challenges of the study

Some of the participants could not understand the English language. To overcome this, translation to Kiswahili was done making every effort to not lose the meaning of the questions.

Weather- It was raining during the time of the study but the researcher was prepared for the weather and also had access to a car for transportation. The people of Karen were also difficult to find because they were busy. This challenge was overcome by going to the field on Saturday and Sunday. The researcher also enlisted the help of the chief of the area and also a guide to help with directions and increase confidence in the respondents about the survey.

CHAPTER FOUR
RESULTS AND DISCUSSION

4.1 Nature and extent of littering

The respondents in this study were both males (26; 43.3%) and females (34; 56.7%), with more than half of them (60%) aged between 26 and 50 years old. Half of the respondents (41.7%) had attained a tertiary level of education and 31.7% secondary education (Table 4.1.1)

Table 4.1.1: Summary of respondents' demographic characteristics

	SEX		AGE GROUP					EDUCATION LEVEL		
	Male	*Female*	*<18*	*18-25*	*26-35*	*36-50*	*>50*	*Primary*	*Secondary*	*Tertiary*
(%)	43.3	56.7	5	26.7	30	30	8.3	26.7	31.7	41.7
Total	**100**		**100**					**100**		

Source: Fieldwork

A majority of the respondents were of the opinion that Nairobi is generally littered (98.3%) with 53.3% saying that the city was heavily littered (Table 4.1.2)

Table 4.1.2: Nairobi and litter

Nairobi is				
Generally littered		**Heavily littered**	**Moderately littered**	**Slightly littered**
Yes	No			
98.3%	1.7%	53.3%	38.3%	8.3%

Source: Fieldwork

According to 88.3% of the respondents, litter was a problem in Nairobi (Table 4.1.3).

Table 4.1.3: Description of the litter problem in Nairobi

Problematic	Not a problem at all
88.3%	11.7%

Source: Fieldwork

The respondents identified the major sources of litter as pedestrians and household trash by the roadside (Table 4.1.4). Household trash by the roadside was also a major source of litter as it may not be tied or kept properly leading to contents of the bag being blown away by the wind. Other common sources of litter were dumpsters by businesses, motorists, loading docks in demolitions sites and uncovered garbage trucks.

Table 4.1.4: Sources of litter

	Percentage (%)
Household trash by the roadside	71.7
Bins used by business	65.0
Loading docks at commercial sites	31.7
Construction and demolition sites	50.0
Uncovered garbage trucks	46.7
Motorists	53.3
Pedestrians	71.7

Source: Fieldwork

People as a major source of litter is proven by the fact that 60% of the respondents said that that they had littered prior to the survey and 88% of them had seen other people litter (see Table 4.1.5). This findings concur with numerous studies that people are the greatest source of litter.

Table 4.1.5: Littering among the residents before the survey

% of those who had littered			% of those who had seen others litter		
Yes	No	Total	Yes	No	Total
60%	40%	100%	88%	12%	100%

Source: Fieldwork

Most of the littering was observed on roadside gutters/water ways and at bus stops, bus stations and open air markets (Table 4.1.6) where commercial activities (retailing and vending of all sorts of products) are intensive and there's a high population of human traffic. Other places considered to be normally littered were outside commercial areas, on the floor of buses and *matatus,* and on the streets and residential areas.

Table 4.1.6: Areas littered in Nairobi

	Percentage (%)
Roadsides gutters/water alleys	83.3
Outside commercial areas (e.g. schools, offices)	60.0
Recreation areas/open spaces (e.g. parks)	48.3
On the floor of buses and/or *matatus*	51.7
Bus stops/ bus stations/Open air market.	70.0
On the streets and residential areas	58.3

Source: Fieldwork

Even though majority of the respondents said that litter in Nairobi was a problem (in Table 4.1.3), 41.7% of them observed that the amount of litter had decreased over time (Table 4.1.7). The decrease in litter was attributed to the efforts by Nairobi City County (NCC) and the National Youth Service (NYS) to clean up the city, with the NYS especially working to clean up the informal settlements.

Table 4.1.7: Amount of litter in Nairobi

	Frequency	%
Improved	25	41.7
Stayed the same	11	18.3
Gotten worse	24	40.0
Total	60	100

Source: Fieldwork

95% of the residents were of the opinion that infrequent picking up of litter results to dumping (Table 4.1.8).

Table 4.1.8: Litter resulting to dumping

Does infrequent picking up of litter lead to dumping? (%)	
Yes	95
No	5
Total	100

Source: Fieldwork

4.2 Attitude and behaviour towards littering

When the responded were asked if they had ever littered, 60% of them said that they had littered prior to taking the survey and when asked if they had ever seen others litter prior to the survey, 88% of the respondents said they had seen other people litter. This results show that littering behaviour might be a daily practice. Various factors/variables drive such attitudes and behaviours namely personal, social, material/physical and habituations. However, this study focused only on personal and physical variables.

According to table 4.2.1, a lack of litter bins, which is a material factor, was the most cited reason for the respondents littering behaviours.

Table 4.2.1: Reasons for littering

	Frequency (n)	%
No bins (material/physical)	23	63.9
Convenient/closer (personal)	4	11.1
Subconsciously done (habituations)	3	8.3
There was a dumpsite (material/physical)	2	5.6
Negligence (personal)	1	2.8
City council will collect it (material/physical)	1	2.8
Ignorance (personal)	1	2.8
Everyone is doing it (social)	1	2.8
Total	**36**	**100**

Source: Fieldwork

Those who had never littered also gave various reasons for their anti-littering behaviour (Table 4.2.2) which included the need for a clean environment; an aversion or dislike for littering; they had been educated and cultured not to litter; had awareness of the implications of littering; and being responsible citizens. Whereas material or physical factors highly influenced littering in the respondents who had littered, personal factors influenced the behaviour of the respondents who had not littered. This findings show that a change in attitude and behaviour in every individual can lead to a major decrease in littering because littering is a result of an individual's behaviour.

Table 4.2.2 Reasons for not littering

	Frequency	%
To keep the environment clean (personal)	5	20.8
Environment should be cared for (personal)	4	16.7
Do not like to litter (personal)	4	16.7
Raised/educated not to litter (social)	3	12.5
It is not right to litter (personal)	3	12.5
Aware of the impact of littering (personal)	3	12.5
It is irresponsible to litter (personal)	1	4.2
I am a respectable person (personal)	1	4.2
Total	**24**	**100**

Source: Fieldwork

When the respondents were asked to give their opinion on "who litters", it is clear from table 4.2.3, that all categories of persons litter. Over three quarters of the respondents mentioned both male (88.3%) and females (86.7%); young (81.7%) and old (81.7%); rich (78.3%) and poor (86.7%); educated (83.3%) and uneducated (91.7%) and smokers (91.7%). This findings agree with studies done showing that there is no clear 'littering group' as anyone can litter.

Table 4.2.3: Residents opinion on who litters.

Who	Percentage (%) (yes)
Male	88.3
Female	86.7
Young	81.7
Old	78.3
Rich	79.2
Poor	86.7
Educated	83.3
Uneducated	91.7
Smokers	90.8

Source: Fieldwork

However, a cross-tabulation of the results by sex reveals that whereas in some studies males seem to litter more than females, in Nairobi, females littered more than men (Table 4.2.4).

Table 4.2.4: Cross tabulation of littering by gender

Have you ever littered?				
	Yes Frequency	**%**	**No Frequency**	**%**
Gender Male	15	42	10	42
Female	21	58	14	58
Total	**36**	**100**	**24**	**100**

Source: Fieldwork

In addition to sex, age and education levels were also seen to influence littering. 31% of those who littered were between the ages of 26-35 years old (Table 4.2.5). Respondents between the ages of 18-35 were twice and thrice the number of those who had littered and were between the ages of 36-50 and above 50 respectively.

Table 4.2.5: Cross tabulation of littering by age

Have you ever littered?				
Age category in years	**Yes Frequency**	**%**	**No Frequency**	**%**
<18	3	8	0	0
18-25	9	25	4	17
26-35	11	31	7	29
36-50	8	22	10	41
>50	5	14	3	13
Total	**36**	**100**	**24**	**100**

Source: Fieldwork

Those whose highest level of education was primary littered most (42%) (See Table 4.2.6).

Table 4.2.6: Cross tabulation of littering behaviour by education

	Yes Frequency	%	No Frequency	%
Have you ever littered before?				
Education level				
Primary	15	42	5	21
Secondary	10	27	5	21
Tertiary	11	31	14	58
Total	**36**	**100**	**24**	**100**

Source: Fieldwork

Social class also influenced littering behaviour in that most people who had littered were from Mukuru (58%) (Table 4.2.7).

Table 4.2.7: Cross tabulation of littering behaviour and social class

	Yes **Frequency**	%	No **Frequency**	%
Have you littered before?				
Karen	15	42	14	58
Mukuru	21	58	10	42
Total	**36**	**100**	**24**	**100**

Source: Fieldwork

As noted before, material or physical factors influence one's attitude and behaviour towards littering. All the respondents, whether they had littered or not, were asked "why they thought people littered" (see Table 4.2.8). Material/physical factors-number of bins, presence of existing litter, enforcement of laws, and the confusion of what exactly constituted litter-`were chosen as the reasons why others littered according to the residents.

Table 4.2.8: Residents' opinion on why others litter

	(%) Yes
They do not care about the environment (personal)	81.7
There are no anti-littering laws and enforcement officers (material/physical)	70.0
The environment is already littered (material/physical)	66.7
Item does not constitute litter because, for example, it is organic (social)	65.0
Everybody else is littering (social)	76.7
They do not care about the environment because it is not their property (personal)	81.7
They do not know the impact of littering on the environment (social)	80.0
Not enough public trash receptacles provided (material/physical)	80.0
There is little or no awareness at all in regards to littering (social)	78.3
They think someone else/NCC will clean up (material/physical)	80.0

Source: Fieldwork

In addition to sex, age, education and area of residence, other personal factors were also seen to influence littering attitudes and behaviours. They were level of concern, felt responsibility and place attachment.

The level of concern usually influences littering behaviour as it makes people to be more environmentally conscious. In our findings, however, even though 58% of the respondents showed they were 'very concerned' about littering (Table 4.2.9), the level of concern did not have a bearing on littering behaviour. This is seen by the fact that 31% of those who had littered before the survey were 'very concerned' about littering in Nairobi (Table 4.2.1.1). Therefore, to come up with effective ways of dealing with litter, the mental attitude and behaviour must be examined so that their thoughts match their actions.

Table 4.2.9: Residents' level of concern about littering

Level of concern	% of respondents
Very concerned	51
Slightly concerned	19
Concerned	20
Not concerned	10

Source: Fieldwork

Table 4.2.1.1: Cross tabulation of residents' 'very concerned' response and their littering behaviour

Level of concern	Have you ever littered before	
	Yes	**No**
Very concerned (51%) 35 respondents	(31%) 11 respondents	24 respondents'

Source: Fieldwork

Place attachment was found to be an influencer of littering behaviour. 80% said they would attend an antilittering campaign voluntarily in their neighbourhood to prevent littering with 83% of the residents saying that they would not participate if antilittering event or campaign was not in their neighbourhood mostly because their responsibility is within their neighbourhood and not in other peoples' neighbourhoods (Table 4.2.1.2). This not only speaks to place attachment's influence on littering but also the influence of felt responsibility.

Table 4.2.1.2: Willingness to attend an antilittering campaign or event voluntarily in…

	The residents' neighbourhood		Other neighbourhoods	
	Frequency	%	Frequency	%
Yes	48	80	10	17
No	12	20	50	83
Total	60	100	60	100

Source: Fieldwork

47% of the residents were of the opinion that both government and the public were responsible for keeping the city clean (Table 4.2.1.3). Feeling responsible makes people less likely to litter.

Table 4.2.1.3.: Responsibility of keeping Nairobi clean

Response Item	Frequency	%
Public	27	45
Government	5	8
Both	28	47
Total	60	100

Source: Fieldwork

Studies have shown that reminders for example anti-littering messages in an area influences littering behaviour as it serves to 'remind' a person of the preferred behaviour. Table 4.2.1.4 shows that more than half (63.3%) of the respondents said they had heard the messages with road signs/billboards being the highest source of these messages (Table 4.2.1.5). The findings also show that the internet was the least provider of information on littering and its prevention. With the digital age catching up with Nairobi, and with over 37.8 million (88.1%) Kenyans having access to mobile phones with internet (CA, 2015), it is imperative to say that the internet should be used as a tool to promote and disseminate information on littering.

Table 4.2.1.4: Have you seen or heard any littering prevention message(s) in Nairobi

	Number	%
Yes	38	63.3
No	22	36.7
Total	60	100

Source: Fieldwork

Table 4.2.1.5: Sources of prevention messages

	Percentage (%)
Billboards/ road signs	41.7
Broadcast media(radio/TV)	20.0
Print media (newspapers/magazines/ pamphlets)	25.0
Internet /web	13.3
Total	100

Source: Fieldwork

48% residents also noted that the messages were somewhat effective (Table 4.2.1.6) compared to 19% who said they were 'very effective'.

Table 4.2.1.6: Effectiveness of litter prevention messages.

	Frequency	%
Very effective	8	19
Somewhat effective	20	48
Ineffective	14	33

Source: Fieldwork

Littering behaviours can be positive or negative and litter preventive actions are an example of positive behaviours towards littering, which can also be influenced by various variables. This study looked at two littering preventive actions-cautioning a litterer and attending anti-litter events or campaigns When asked if the residents would caution someone if they saw them littering, 55% of the residents said that they would 'very likely' to caution a litterer (Table 4.2.1.7).

Table 4.2.1.7: Likelihood of cautioning a litterer

	Frequency	Percent %
Very likely	33	55.0
Somewhat likely	15	25.0
Not at all likely	10	16.7
Don't know	2	3.3
Total	60	100.0

Source: Fieldwork

According to reviewed literature, as age increased, the tendency to take litter and littering prevention actions also increased such as cautioning a litterer or willingness to participate in anti-littering campaigns and events. The same was found to be true in our findings as the tendency to take prevention actions-cautioning a litterer and willingness to participate in cleanup events and campaigns to reduce littering- increased with age but changed when it came to people over 50 years old (Table 4.2.1.8 and 4.2.1.9).

Table 4.2.1.8: Age versus cautioning responses

		If you saw someone litter, would you be likely (very likely, somewhat likely) or not at all likely to caution them against it?			
		Likely (very likely + somewhat likely)	Not at all likely	Don't know	Total
Age	Below 18 years	2	1	0	3
	18-25 years	12	1	0	13
	25-35 years	13	4	1	18
	35-50 years	15	2	1	18
	Above 50	6	2	0	8
Total		48	10	2	60

Source: Fieldwork

Table 4.2.1.9: Age versus willingness to voluntary participate in an anti-littering event/campaign

Age	Would you participate in an anti-littering campaign or event VOLUNTARILY?		
	Yes	No	Total
Below 18 years	3	0	3
18-25 years	11	2	13
25-35 years	13	5	18
35-50 years	15	3	18
Above 50	6	2	8
Total	48	12	60

Source: Fieldwork

H. A. Arafat *et al*. (2007) found that participating voluntarily in an anti-littering campaign or event as a preventive action was a highly acceptable idea for people with different levels of education. However in our findings, we found that the higher the level of education, the more the willingness to participate voluntarily (Table 4.2.1.2.1). The likelihood to caution a litterer also increased with the level of education (Table 4.2.1.2.2).

Table 4.2.1.2.1: Level of education versus willingness to voluntary participate in their neighbourhood

Would you participate in an anti-littering event VOLUNTARILY?			
Level of education	Yes	No	Total
Primary	12	3	15
Secondary	17	3	20
Tertiary	19	6	25
Total	48	12	60

Source: Fieldwork

Table 4.2.1.2.2: Level of education versus cautioning response

		If you saw someone litter, would you be very likely, somewhat likely or not at all likely to caution them against it?			
		Likely (very likely + somewhat likely)	Not at all likely	Don't know	Total
Level of education	Primary	14	0	1	15
	Secondary	15	5	0	20
	Tertiary	19	5	1	25
Total		48	10	2	60

Source: Fieldwork

The areas of residence also seemed to influence littering preventive actions as most people from Karen would caution a litterer and attend anti-littering events voluntarily (Table 4.2.1.2.3 and 4.2.1.2.4).

Table 4.2.1.2.3: Area of residence versus cautioning response

		If you saw someone litter, would you be very likely, somewhat likely or not at all likely to caution them against it?			Total
		Likely (Very likely +Somewhat likely)	Not at all likely	Don't know	
Residence	KAREN	29	1	1	31
	MUKURU	19	9	1	29
Total		48	10	2	60

Source: Fieldwork

Table 4.2.1.2.4: Area of residence versus willingness to attend an anti-litter event/campaign

		Would you participate in an anti-litter campaign/event VOLUNTARY?		
		Yes	No	Total
Gender	Karen	27	3	30
	Mukuru	21	9	29
Total		48	12	60

Source: Fieldwork

Gender was also seen to influence littering preventive actions. More females than males were also likely to caution a litterer (Table 4.2.1.2.5) and attend an anti-litter campaign (Table 4.2.1.2.6).

Table 4.2.1.2.5: Gender versus cautioning response

	If you saw someone litter, would you be very likely, somewhat likely or not at all likely to caution them against it?			Total
	Likely (Very likely+ Somewhat likely)	Not at all likely	Don't know	
Gender Male	23	1	2	26
Female	25	9	0	34
Total	48	10	2	60

Source: Fieldwork

Table 4.2.1.2.6: Gender versus willingness to voluntarily participate in an antilittering event/campaign.

	Would you participate in an anti-litter campaign/event VOLUNTARY?		Total
	Yes	No	
Gender Male	22	4	26
Female	26	8	34
Total	48	12	60

Source: Fieldwork

Age, gender, education levels and areas of residence also seem to influence the level of concern which causes people to be willing to caution and even participate voluntarily in anti-littering events or campaigns. More females than males were concerned about the environment hence more likely to take preventive actions. This can be explained by the fact that they are generally more concerned about hygiene within and without their home environment especially those with small children and so were the more educated and the older ones. The older one got and with more education, people become more aware of the dangers of littering and are therefore more likely to take preventive actions. People from

Karen also seemed more concerned about littering and had even put effort to do something about it and that is one of the responsibilities of KARENGATA. Table 4.2.1.2a-d.

Table 4.2.1.2a: The level of concern versus level of education

Level of education	Concern (Very concerned + Slightly concerned +Concerned)	Not concerned	Total
Primary	10	5	15
Secondary	20	0	20
Tertiary	24	1	25
Total	54	6	60

Source: Fieldwork

Table 4.2.1.2b: The level of concern versus age

Age	Concern about littering		Total
	Concern (Very concerned + Slightly concerned +Concerned)	Not concerned	Total
Below 18 years	0	3	3
18-25 years	13	1	14
25-35 years	15	1	16
35-50 years	19	0	19
Above 50	7	1	8
Total	54	6	60

Source: Fieldwork

Table 4.2.1.2c: The level of concern versus gender

Gender	Concern about littering		Total
	Concern (Very concerned + Slightly concerned +Concerned)	Not concerned	
Male	21	5	26
Female	33	1	34
Total	54	1	60

Source: Fieldwork.

Table 4.2.1.2d: The level of concern versus areas of residence

Area of Residence	Concern about littering		Total
	Concern (Very concerned + Slightly concerned +Concerned)	Not concerned	
Karen	29	1	30
Mukuru	25	5	30
Total	54	6	60

Source: Fieldwork

4.3 Impact of littering

Littering has been seen to have impacts on multiple sectors of society: the economy, environment, social and health. Most of the residents agreed that littering affects their economy (Table 4.3.1) with over 85% agreeing that it has economic impacts of litter through loss of tourists, reduced property values and economic development.

Even though a few of respondents agreed that the cost of litter as an impact on the economy, the NCC director for the environment disagreed stating that it had a huge impact. He said that they pay Kshs. 150 per person per day for 150 people for street cleaning in all the 18 sub-counties of Nairobi. This translates to Kshs. 12.5 Million per month and Kshs. 145.8 Million per financial year. With a budget of Kshs. 600 million, almost 25% of it is spent on salaries of sweepers. According to him, this money could be diverted to constituency development instead. It was also expensive in terms of time. According to him, it is cheaper to empty a bin than to sweep a street.

Table 4.3.1: Economic impacts of littering

	% Agree	% Disagree
Litter can hinder the economic development, as business may not set up new ventures in a place that is littered.	90.0	10.0
Littering affects the tourism industry as litter on the beaches may keep tourists away	95.0	5.0
Litter clean-up causes the taxpayer a lot of money as it is expensive	70.0	30.0
Litter causes damages hence economic losses as a result of floods caused by blocked drainage	86.7	13.3
Liter reduces the value of houses/ property in the given area as people would pay more if the general area was cleaner	100.0	0.00

Source: Fieldwork

On the environmental impacts (Table 4.3.2), 90% of the respondents agreed that littering does have an impact on the environment.

Table 4.3.2: Environmental impact

	% Agree	% Disagree
Littering on the ground degrades natural vegetation	93.3	6.7
It can lead to the death of vegetation thus reducing diversity of species	98.3	1.7
Litter in the oceans can lead to death of fish and gradual depletion of marine life	95.0	5.0
Littering reduces air quality due to the smell	93.7	6.7
Litter in waterways can lead to serious water contamination	98.3	1.7
Littering is one of the signs of social decay	98.3	1.7

Source: Fieldwork

Literature reviews have given many sources to the problem of littering to reduce its impact on the society. In Nairobi, as table 4.3.3 indicates, 95% of the respondents said that providing more bins and educating the public on littering would be a good solution to littering in

Nairobi. These are material factors that could influence proper disposal. Other solutions would be awarding clean neighbourhoods and cleaning up prior litter to reduce littering rates.

Table 4.3.3: Solutions to littering

Solution	Number	Percentage (%)
Provide more bins	57	95
Create awareness and educate the public	57	95
Community involvement in litter management	56	93.3
Introduce exorbitant taxes and fines	40	66.7
Set up tough laws and legislation	48	80.0
Cleaning up prior litter to reduce the litter begets litter effect	52	86.7
Prompts from broadcast, print and social media	48	80.0
Motivation/ awards for keeping their residential places clean	54	90.0

Source: Fieldwork

Only 40% selected introduction of fines and exorbitant taxes. This was because of corruption in the county. The influence of corruption was also mentioned by the Nairobi County Council Director for environment during the interview. He said that it 'would dissuade the use of littering fines'. Applying them would thus be ineffective. He further added that the key to the reduction of littering is creation of awareness and strategic environmental education of the public.

4.4 Comparison between Karen and Mukuru Kayaba

Personal factors such as age, sex, education, gender and area of residence influence both positive and negative littering behaviours in both areas. People were seen as the major source of litter. The residents of both areas knew that littering has both environmental and economic impacts and they also agreed that creating awareness and provision of binfrastructure would reduce littering levels.

Most of the people who had littered came from Mukuru (58%). Karen was also visibly cleaner than Mukuru as a walk around the area showed little to no litter at all on the roadside and water alleys but as one approached any area with high human traffic for example, the bus stops and the kiosks, litter levels would get considerably high.

While littering was a major problem in Nairobi according to residents in both areas, in Karen, it was considered a minor problem compared to Mukuru where it was stated by most residents as a major problem. This result enhances the view that poverty is related to environmental cleanliness. This is due to the fact that people of a higher economic status have less environmental problems in their communities than those of a low economic status because they can afford the initial and subsequent costs that come with keeping the environment clean (Gifford *et al*., 2014). For example, in Karen, the residents can afford hiring gardeners and sweepers of their gardeners and pay service providers for their litter and waste management, something the people of Mukuru cannot do due to their economic status.

The level of environmental concern was different between the residents of Karen and Mukuru. The residents of Karen were more concerned about littering and also the general cleanliness of the area. However, they were not only concerned. They also saw and had the need to do something about it and this is usually done through KARENGATA. KARENGATA controls most of the services-infrastructure, security, waste management among others- in Karen as they don't receive these services from the Nairobi County Council (NCC). Therefore, the influence of residential associations like KARENGATA cannot be understated. This influence lacks in Mukuru and furthermore, the residents, though concerned about the littering rates and impacts, they were not willing to do something about the litter to attain a clean environment. They rely on the government to conduct clean-ups for their area as it is the 'work of the State'. This promotes a culture of irresponsibility. As a result, they are not likely to take initiative in maintaining cleanliness.

Another explanation for this could be the change in values that come with an increase in wealth and welfare of individuals. When people don't have to spend so much time looking to meet material things like basic needs- food, water, clothing and shelter- their values change from material to post material things like environmental aesthetics (Inglehart, 1997). The residents in Karen already have their basic needs like food, water and education catered for and therefore have enough resources and time to channel into activities like environmental cleanliness unlike the people in Mukuru.

In the matter of fines as a way to reduce littering, the people of Mukuru were against it because they couldn't afford the fine but those in Karen had no problem. The ability to afford

the fines could therefore mean that the people of Karen would have the tendency to litter more.

Littering is therefore a problem that needs to be dealt with and the responsibility lies in both the public and the government domain, with the government setting up structures and facilities to enhance litter collection and disposal and the public taking up personal responsibility of the environment, because the environment belongs to all of us.

4.5 Hypothesis testing

The study sought to identify the attitude and behaviour of the residents of Nairobi towards littering. One hypotheses was formulated and has been analyzed in this section. From the analysis of the responses the following results were obtained.

The hypothesis was formulated to find out the influence of personal variables on littering attitudes and behaviours. The hypothesis was formulated as follows.

H_{01}:   There is no statistically significant relationship found between littering and attitudes and behaviours towards littering.

H_{11}:   Alternative

An independent t-test was performed to test the hypothesis. A Levene's test was first done to find out if the two areas of residences have about the same or different amounts of variability between scores. From the Levene's test for equality of variances section, it indicates a value of 0.328>0.05 in the Sig. column. 0.328 is greater than 0.05. This means that the variability between the two areas of residence is not significantly different as the scores from Karen and Mukuru do not vary much. From the independent t-test results, there was not a significant difference in the scores for Karen (M=1.28, SD=0.24) and Mukuru (M=1.34, SD=0.27); t (58) = -.871, p = 0.037 (See table 4.5.1 and 4.5.2). 0.037, which is less than 0.05, means that there is a statistically significant relationship found between littering and their attitudes and behaviours towards littering. This means that we can reject the null hypothesis and conclude that littering in Nairobi occurs because the citizens have a positive attitude and negative behaviour towards littering and that is why they litter as a general daily practice. Therefore interventions should be made to ensure that negative attitudes and positive behaviours are

adopted among the residents' behaviours for a cleaner, greener and more beautiful environment and more environmentally conscious citizens.

Table 4.5.1: Group Statistics

	Area of Residence	N	Mean	Std. Deviation	Std. Error Mean
Positive attitude and negative behaviour towards littering	Karen	30	1.2833	.24330	.04442
	Mukuru	30	1.3417	.27452	.05012

Table 4.5.2: Independent Samples Test for Hypothesis 1

		Levene's Test for Equality of Variances		t-test for Equality of Means		
		F	Sig.	t	df	Sig. (2-tailed)
Positive attitude and negative behaviour towards littering	Equal variances assumed	.973	.328	-.871	58	.037
	Equal variances not assumed			-.871	57.175	.041

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CHAPTER FIVE
SUMMARY OF FINDINGS, CONCLUSION AND RECOMMENDATION

5.1 Summary of findings

The study set out to investigate the behaviour and attitude towards littering of the citizens of Nairobi. It also wanted to find out the impacts of littering in the County. This study has shown that:

a) Littering is a major problem in Nairobi. Individuals and putting the household trash by the roadside are the highest sources of litter.

b) Personal and material variables are the most common drivers of littering attitudes and behaviours in Nairobi and its preventive actions.

c) Residents of Nairobi have a positive attitude and a negative behaviour towards littering.

d) Littering has an enormous impact on the environment and the economy. Having 25% of the revenue allocation go to the payment of street cleaners in Nairobi only is a taxpayer's misfortune.

e) To reduce littering, there has to be increased civic awareness and provision of more bins.

f) Corruption can undermine the anti-littering efforts. It does so by undermining the effect of littering fines and taxes and usurping of money for creating awareness in print and broadcast media which would be the most effective way of promoting awareness.

5.2 Conclusion

Litter is a social construct. Whereas litter is simply waste in the 'wrong' place, littering behaviour is the process by which that wastes ends up in the wrong place. Littering behaviour, in turn, comes about as the result of interactions between items that are considered as litter, the individuals, and the factors that influence their actions. Thus understanding this behaviour is the key to finding meaningful tactics to deal with the problem. Littering should therefore be seen as a by-product of incidences. Once we study these incidences, we find our solution.

5.3 Recommendations to:

Government and environmental agencies

Based on this study, the most effective approach to tackling littering may be strategic and tactical.

1. Strategic

- Public education and awareness (changing antecedent conditions) - An overarching awareness-raising strand to improve and dissuade littering behaviours that are and are not acceptable. Explaining why littering is not appropriate through highlighting its negative effect may make the messages more acceptable. Media campaigns should be used as evidence in the past has shown that they have been as they reach many people at a time.

- Enforcement of the already existing laws in Nairobi on littering and illegal dumping.

- Have policies to reduce urban poverty as economic pressure puts under pressure urban cleanliness.

- A strong will from the government.

2. Tactical measures

- Increase bins in areas around Nairobi in workplaces and public locations. This MUST be coupled with an efficient collection system. The bins must have action messages for example 'bin your trash'.

- Give civic education to the young and old in Nairobi on littering and general environmental education.

- Reward and recognize citizens' efforts in urban cleanliness. This will inspire positive littering behaviour and instil a sense of pride and responsibility.

Individuals

- Simply stop littering your trash as you walk or drive. BIN YOUR TRASH. Littering begins with you and so does maintenance of a clean environment.

- Caution others when you see them litter in a gentle way reminding them that littering has consequences which include flooding due to blocked roads.

- As a parent, teach your children good binning habits because they will grow into life-long practices.

Areas for further research

The following areas would benefit from additional research:

1. This study covered only personal and material factors' influence on littering attitude and behaviour. Research on habituations and social factors can be looked on further in regards to Nairobi citizens.

2. While interventions have been given on how to reduce littering, research can be done on how effective they are and how best to implement them.

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ANNEXE 1
QUESTIONAIRE

This questionnaire is anonymous. Please be honest and assured that your information will be treated confidentially.

1. Where do you reside? _____

2. What is your age?
   - ☐ Below 18
   - ☐ 18-25
   - ☐ 25-35
   - ☐ 35-50
   - ☐ Above 50

3. What is your highest level of education (Pick one)
   - ☐ Primary
   - ☐ Secondary
   - ☐ Tertiary

4. Gender: Male_____   Female_____

1. Do you think Nairobi generally is littered? Yes /No

2. If no, why? (Tick all that apply)
   - ☐ The Nairobi County Council street cleaners sweep the county keeping it clean.
   - ☐ There are enough bins to facilitate anti-littering behaviour.
   - ☐ People are aware of the importance of not littering and therefore do not litter
   - ☐ The laws and enforcements in place deter people from littering

3. If yes, how littered? (Tick one)

Slightly littered   Moderately littered   Heavily littered

4. Which areas of Nairobi are normally littered? (Tick all that apply)
   - ☐ Roadside gutters/water alleys
   - ☐ Outside commercial areas (schools, canteens, churches, banks, offices and kiosks)
   - ☐ Recreation areas/open spaces e.g., parks, etc.
   - ☐ On the floor of buses and/or matatus
   - ☐ Bus stops/bus stations/open air markets

☐ On the streets of highways, roads, residential estates, apartments, etc

5. What do you think are the sources of litter in Nairobi? (Tick all that apply)

☐ Household trash by the roadside

☐ Dumpsters used by businesses, shops, supermarkets or illegal dumping

☐ Loading docks at commercial sites e.g., outside supermarkets, food joints, etc

☐ Construction and demolition sites

☐ Uncovered garbage trucks

☐ Motorists

☐ Pedestrians

6. Have you seen people litter?   Yes   No

7. Have you ever littered?   Yes   No

8. If yes, why do you litter?

_____

_____

_____

9. If no, why do you not litter?

_____

_____

_____

10. Is littering… (Tick one)

    ☐ Mostly done by people?

    ☐ Mostly accidental? (from open garbage trucks, construction or demolition sites)

b) If mostly done by people,

        ☐ Is it intentional (everyone else is doing it, the area is already dirty, etc.)?

        ☐ Is it due to other factors e.g., lack of enough bins, poor laws and attitudes?

        ☐ Other_____

11. Who do you think litters most?

Male	Young	Rich	Educated	smokers
Female	Old	Poor	Uneducated	All the above

12. How would you describe the litter problem in this estate? Tick one

Major problem   Minor problem   Not a problem at all

QUESTIONS ON K.A.P

13. In general, how would you describe the litter problem in Nairobi?

Major problem   Minor problem   Not a problem at all   Don't know

14. Would you say the level of litter in Nairobi has improved, stayed the same, or gotten worse over the years? Tick one

Improved   Stayed the same   Gotten worse   Don't know

15. How concerned are you about littering in Nairobi? Tick one

Very concerned   Slightly concerned   Concerned   Not concerned

16. In your opinion, why do people litter? Tick yes or no on each

	Yes	No
They do not care about the environment		
They are no anti-littering laws and enforcement officers		
It does not make any difference as the environment is already littered?		
They think the item does not constitute litter because, for example, it is organic		
Everybody else is littering		
They do not care about the environment because it is not their personal property		
They do not know the impact of their actions on the environment.		
Not enough public trash receptacles provided		
There is little or no awareness at all in regards to littering		
They think someone else/NCC will clean it up		

17. Have you seen or heard any littering prevention message (s) in Nairobi?

Yes   No

18. Where have you seen or heard the littering prevention message(s)? (Check all that apply.)

☐   Billboards/road signs

☐   Broadcast media (radio, TV)

☐ Print media (newspapers/ magazines/pamphlets, posters)

☐ Internet/web

19. If yes, what was the message?

_____

_____

_____

☐ **Don't remember**

20. How effective do you think littering prevention messages are in Nairobi? Tick one.

Very effective   somewhat effective   Not at all effective

21. Making Nairobi citizens involved in picking up litter through anti-litter events, campaigns, clean-ups will stop them from dropping litter themselves.

Agree   Disagree

22. Would you participate in an anti-litter campaign, clean up event VOLUNTARILY in your neighbourhood? Yes   No

23. Infrequent picking up of litter results to dumping

Agree   Disagree

24. What do you think should be done to reduce littering in Nairobi?

	YES	NO
Provide more bins		
Create awareness and educate the public		
Community involvement in litter management		
Introduce exorbitant taxes and fines		
Set up tough laws and legislation		
Cleaning up prior litter to reduce the litter begets litter effect		
Prompts from broadcast, print and social media		
Motivations/awards for keeping their residential places clean		

25. Who do you think should be responsible for keeping Nairobi clean?

☐ The public

☐ The government

26. If you saw someone litter, would you be very likely, somewhat likely, or not at all likely to caution them against it?

- ☐ Very likely
- ☐ Somewhat likely
- ☐ Not at all likely
- ☐ Don't know

27. Did you know that littering has negative effects? Yes   No

28. Littering has economic, and environmental impacts. Please agree or disagree with the following statements under each impact.

Economic	Agree	Disagree
Litter can hinder the economic development as businesses may not set up new ventures in a place that is littered.		
Littering affects the tourism industry as litter on the beaches may keep tourists away		
Litter clean-up causes the taxpayer a lot of money as it is expensive		
Litter reduces the value of houses/property in the given area as people would pay more of the general area was cleaner		
Litter causes damages hence economic losses as a result of floods caused by blocked drainage		
Environmental impacts		
Litter on the ground degrades natural areas		
It can lead to the death of vegetation thus reducing diversity of species		
Litter in the oceans can lead to death of fish and gradual depletion of marine life		
Littering reduces air quality due to the smell		
Debris may be carried into waterways with potential for serious water contamination		
Littering is one of the signs of social decay because it shows people don't care about the environment		

THANK YOU FOR YOUR TIME!!!

ANNEXE 2: IMAGES

An image showing how putting trash by the roadside is a source of litter. By not tying it properly, trash is blown away by the wind and litter results

ANNEXE 2.1

An image showing a littered street in Nairobi, Kenya

Volunteers of a local CBO and community members participating in a cleanup near Mukuru Kayaba.

ANNEXE 3

The population of Nairobi was 3, 138,369 people in the year 2009. The growth rate is 4.7% (KNBS, 2009). Formulae used:

$P_1 = P_0 (1+R/100)/n$

Where

$P_{1=}$Projected Population

$P_{0=}$ Current Population

R= Growth Rate

N= Duration of years

Table: Population Growth Rate for Nairobi City between 1979-2009

YEAR	1979-1989	1989-1999	1999-2009
GROWTH RATE PER ANNUM (%)	8.13	1.7	3.89

Average Population growth per annum= (8.13+1.7+3.89)/3= 4.56% rounded off to 4.6% which was used to do the predictions for the populations.