THE ATTITUDES AND PRACTICES OF CONSUMERS TOWARD RECYCLING OF HOUSEHOLD WASTE IN NELSON MANDELA BAY

By

GRANT DAWSON

and

JOSHUA HANCOCKS

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DECLARATION

We, Grant Dawson and Joshua Hancocks, declare that THE ATTITUDES AND PRACTICES OF CONSUMERS TOWARD RECYCLING OF HOUSEHOLD WASTE is our own work, that all sources used or quoted have been identified and acknowledged by means of complete referencing, and that this study was not previously submitted by us for a degree at another university.

Grant Dawson Joshua Hancocks

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ABSTRACT

South Africa currently faces a growing population and a rapidly increasing rate of urbanisation which has resulted in increased waste generation, therefore, further contributing to problems of pollution, health hazards and resource conservation. Public attitudes about and willingness to participate in recycling have been identified as the main driving forces behind improved waste management. There is a thus a need for research on the attitudes and practices of consumers towards the recycling of household waste. The results of this study could be beneficial to assist both the local government and consumers on improving household recycling participation.

The primary objective of this study is to investigate the attitudes and practices of NMB households towards the recycling of household waste. A quantitative research paradigm was followed. A survey was conducted and self-administered questionnaires were distributed to a convenient sample of 120 (one hundred and twenty) selected respondents in NMB. The questionnaire consists of four sections. The statements relating to consumers' attitudes regarding household waste management were grouped into three factors, namely general beliefs regarding effective waste management and recycling, knowledge and awareness of recycling and factors which could influence recycling participation. The statements relating to household waste management practices were grouped into practices undertaken to reduce household waste, reusing household products and the act of the household recycling.

After performing the data analysis, which involved the use of descriptive statistics, such as measures of mean, mode, median and standard deviations, as well as frequency distributions, results were drawn and analysed. The main findings of the study were that NMB residents engage in practices relating to reduce and reuse waste, however, majority do not participate in recycling practices, the attitudes of NMB consumers towards household waste management were found to be 'neutral' and strongly dependent on knowledge and awareness about recycling as well as socio-economic factors, the barriers to effective waste management included socio-economic factors and the lack of efficient infrastructure and facilities and the municipality can intervene through public awareness campaigns, investment in infrastructure and facilities, and by implementing an effective recycling scheme.

The results further indicated that the main influencing factors for better attitudes and increased recycling participation is that household waste management should be convenient, cost-

effective and not time consuming, waste disposal and recycling sites should be easily accessible and incentives would encourage individuals to recycle. The recommendations provide, both consumers and the municipality, with specific guidelines to consider when attempting to implement an effective household waste management strategy.

The main contribution of the study is that it provides valuable results regarding household waste management in NMB as limited research has been done in this area. It clearly reflects the attitudes of households toward waste management and the reducing, reusing and recycling practices of households towards waste management. The results of this study could thus assist both households and the local municipality in developing appropriate strategies for managing household waste.

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CHAPTER ONE
INTRIDUCTION AND BACKGROUND TO THE STUDY

1.1 INTRODUCTION AND BACKGROUD TO THE STUDY

"Water and air, the two essential fluids on which all life depends, have become global garbage cans" – Jacques Yves Cousteau

There has been an increasing concern about the environment in which man lives (Adeleye, Adewunmi, Ologundudu & Ololade 2012:22). Waste can be defined as a manifestation of the inefficient use of resources or the root cause of pollution and associated environmental degradation (Tyagi, Garg & Paudel 2014:1491-1492). Whichever way it is perceived, increased waste generation needs to be managed to ensure the environment is protected and resources are conserved.

One of the issues of greatest concern is the impact of environmental pollution caused by solid waste (Kumar 2016:1). In order to meet daily needs, human activities contribute to various types of pollution related to land, air and water (Kumar 2016:2). In an attempt to dispose of these materials, man has carelessly polluted the environment (Adeleye *et el.* 2012:22).

Globally, waste generation rates are rising. In 2012, the cities around the world produced 1.3 billion tonnes of solid waste every year, thus being approximately 1.2 kilograms per person per day. Due to urbanisation and rapid population growth, municipal waste generation is expected to increase to 2.2 billion tonnes by 2025 (The World Bank 2017).

Kumar (2016:29) states that in most developing countries around the world, the largest source of municipal solid waste (MSW) generation is from households. Waste produced by households are substantial and expected to grow, making the recycling of household wastes a key part of efforts developed to meet this environmental challenge (Arsova, van Heeren, Goldstein, Kaufman & Themelis 2008:22). Household recycling requires that at least one household member collect, sort, store, and in some cases, transport waste materials to recycling centres (Berglund, Hage & Soderholm 2009:155). The waste industry in South Africa consists primarily of waste collection and landfilling with a limited amount, approximately 10%, of recycling (Department of Environmental Affairs 2012:2).

South Africa's commitment to sustainable development is aimed at balancing social and economic challenges of a developing and unequal society, with a focal point on protecting environmental resources. In order to achieve this, the waste sector in South Africa aims to ensure that care is given to product design, waste prevention, raw material use, resource efficiency and minimization where avoidance cannot be achieved (Department of Environmental Affairs 2012:3).

However, according to Kumar (2016:1) in developing countries, such as South Africa, solid waste management possess major challenges for numerous reasons. The two main reasons are rapid urbanisation, as it puts pressure on urban local authorities to manage the existing infrastructure and meet the needs of the growing population, and lack of awareness about and interest in waste management due to factors such as poverty, illiteracy and irresponsible waste management which creates a significant task to tackle the vast amounts of waste generation (Kumar 2016:34-39).

MSW generation has become an inevitable consequence of lifestyles and daily living. However, the quantity and quality of the waste varies and is extremely dependent upon the manner in which waste production is managed (Kumar 2016:39-40). Naidoo (2009) states that the increasing practices of littering, dumping and burning of solid waste by households in South Africa has led to the conclusion that MSW is being irresponsibly managed. In this regard, it becomes necessary to investigate the attitudes and practices of consumers toward solid waste practices, which further incorporate mitigating measures such as reducing, reusing and recycling for the generation of solid waste.

Waste management is a global issue and requires maximum attention (Reddy 2011:3). Although it is impossible to live without generating waste, recycling, reusing or reducing methods enables one to minimise the amount of MSW generated. Reddy (2011:38) states recycling involves the processing of waste into usable raw materials or products, thus enabling materials to have an extended life in addition to reducing resource consumption and avoiding disposal costs, ultimately providing environmental and economic benefits (Reddy 2011:38).

The aim of this study is thus to investigate the attitudes and practices of consumers toward recycling of household waste in NMB.

1.2 PROBLEM STATEMENT

Household waste forms part of municipal solid waste (MSW) which is challenging to control due to its diversity and heterogeneity. South Africa currently faces a growing population and a rapidly increasing rate of urbanisation which has resulted in increased waste generation, therefore, further contributing to problems of pollution, health hazards and resource conservation (Makau 2006:2). Furthermore, Oelofse (2013) states that household waste continues to put pressure on South Africa's ever filling landfill sites, but by improving the recovery of recyclables at household level the pressure on these sites would be significantly reduced.

According to Crouth (2016), research done by the Council for Scientific and Industrial Research indicates that on a national scale, South Africans tend to have negative attitudes towards recycling, citing a lack of space, time, knowledge of what to recycle, the perceived uncleanliness associated with waste and inconvenient recycling facilities. A 2010 survey of theirs indicated that 73% of South Africans living in urban areas reported no recycling at all, and only 3.3% of the respondents indicated that they sort recyclables from their household waste and recycle it on a regular basis (Crouth 2016). This is a major cause for concern as the participation of consumers is vital to the success of any domestic recycling programme (Bendak & Attili 2017).

Currently, no research has been done on the attitudes and practices of consumers towards the recycling of household waste in NMB specifically. Without a clear reference point, it cannot be assumed that local consumers have either positive or negative attitudes, or have useful practices in place. This creates a hurdle for the success of recycling initiatives in NMB as public attitudes about and willingness to participate in recycling are the main driving forces behind improved waste management (Makau 2006:4). Therefore, it is crucial that research is conducted in NMB in order to gauge the awareness and attitudes of its residents towards such issues.

Further, according to Treevolution (2018), South Africa currently lacks the infrastructure for collecting recyclable material. With no kerbside collection for recyclables, households who may want to recycle their waste have to separate it themselves and take the recyclables to a buy-back or municipal drop-off centre, which requires a substantial amount of knowledge, time and effort and, consequently, people are discouraged. Therefore, it is important that this research not only determines what recycling practices, if any, NMB consumers are

participating in, but also that it evaluates whether consumers are aware of the recycling practices available to them.

The main research question to be addressed in this study is to investigate the attitudes and practices of consumers toward recycling of household waste in NMB.

1.3 RESEARCH OBJECTIVES

1.3.1 PRIMARY RESEARCH OBJECTIVE

The primary objective of this study is to investigate the attitudes and practices of NMB households towards the recycling of household waste.

1.3.2 SECONDARY RESEARCH OBJECTIVES

In order to achieve the primary objective, the following secondary objectives need to be addressed:

- To conduct a literature study regarding household waste management
- To develop a measuring instrument to assess household perceptions and attitudes toward recycling of waste
- To empirically assess levels of awareness and practices of individuals toward recycling household waste in NMB
- To provide households and local municipality with effective guidelines regarding waste management

1.3.3 METHODOLOGICAL OBJECTIVES

In order to achieve the above mentioned primary and secondary objectives, the following methodological objectives have been identified:

- To undertake a theoretical investigation of the attitudes and practices of NMB households towards the recycling of household waste
- To determine the appropriate research methodology to address the identified research problem and research objectives
- To develop an appropriate measuring instrument that will be used to empirically test the influence of the independent variables on the dependent variables
- To source primary data from a sample of NMB households and to statistically analyse the data

- To provide conclusions and recommendations based on the findings of this research, which could assist NMB residents in improving their household waste recycling attitudes and practices

1.3.4 RESEARCH QUESTIONS

- What practices regarding waste management are used by NMB residents?
- What are people's attitudes towards waste in NMB?
- What are the barriers to having an effective waste management system?
- How can the municipality intervene to facilitate household participation in proper domestic waste management?

1.4 LITRATURE OVERVIEW

1.4.1 EFFECT OF AN INDIVIDUALS' ATTITUDES' TOWARDS RECYCLING HOUSEHOLD WASTE

According to Yusof (2004:54), a persons' attitudes toward and knowledge about recycling play a major role in determining whether they recycle or not, therefore, a positive attitude towards and efficient knowledge about recycling is essential in order to implement an effective solid waste management system.

One of the key findings of research done by Thomas, Slater and Yoxon (2003:1) on people's attitudes and behaviour towards recycling is the need for and importance of information about recycling, stating that it is one of the main influences on people's attitudes and behaviour towards recycling and a key factor to increasing the rates of recycling. Furthermore their research finds that lack of awareness about and a regular consideration for recycling issues, rather than a lack of concern for the environment, has a greater impact on people's attitudes and behaviours towards recycling their waste. Similarly, research by Kumar (2016:35) found that in developing countries, lack of awareness and interest in waste management also negatively impacted recycling attitudes and behaviours, however additional socio-economic factors such as illiteracy, poverty, and irresponsible waste management also played a role. Strydom (2012:2) recognises three main areas affecting people's attitudes and behaviours towards recycling namely knowledge, convenience and barriers to recycling. Individuals need knowledge of how a recycling scheme works, how to sort their recyclables and where to recycle their waste. Additionally, Bolaane (2006:731-740) confirms that the success of recycling

initiatives is dependent on individuals experience and knowledge about recycling coupled with a change in attitude towards such issues.

With South Africa being a developing country and having an extremely diverse society, it is vital to consider socio-economic factors when implementing any forms of management (Poswa 2004:1). Effective management of solid waste involves evaluating and recognising how socio-economic factors may influence public cooperation and participation in management projects that are implemented. Previous research shows that there is often a correlation between an individuals' socio-economic status and their attitudes towards recycling (Yusof 2004:25).

Ultimately, Strydom (2012:2) states that a recycling and solid waste collection system must be designed to accommodate the needs of all the individuals in the community for whom it is intended. The reason for this is that a convenient way of recycling household waste for some people may not be equally as convenient for others whom may face different circumstances. Therefore, the acceptance level of a specific recycling initiative may differ between different households and different communities (Miafodzyeva, Brandt and Olsson 2010:340-346). In order to solve this issue, local authorities must ensure an efficient service is provided to the communities they serve, therefore, taking several factors into consideration when selecting the appropriate waste management approach for a particular community. Such factors include: affordability, grants or subsidies available, accessibility due to location, level of education, on-site storage facilities, potential benefits, available facilities and infrastructure, and pollution potential (Guidelines for Human Settlement Planning and Design 2000:11).

1.4.2 HOUSEHOLD WASTE IN NELSON MANDELA BAY

According to Nelson Mandela Metropolitan Municipality (2005:30), household waste in NMN comprises of approximately 25% of the total waste produced. Nelson Mandela Metropolitan Municipality (2005:30) states that there is much scope for the separation, composting, recycling, and transformation of approximately 90% of this household waste stream which could ultimately lead to an amount of approximately 10% of waste being landfilled. According to Treevolution (2018) the current recovery rates for various types of household waste in South Africa are:

- Cans: 69 percent
- Paper: 59 percent
- Glass: About 25 percent

- Plastic: About 17 percent

Furthermore, the Nelson Mandela Metropolitan Municipality (2005:30) states that it is ideal for recyclable waste to be separated at the source, i.e. in the household, as sorting through different types of mixed waste is difficult and time consuming. According to Treevolution (2018) most of this sorting is currently performed by informal recyclers who recover most of this recyclable material from landfill sites and dustbins. This is not ideal, as it is potentially harmful to the recyclers' health and safety and also this waste is too often contaminated with other waste making it non-recyclable. Waste which is separated at the source is usually "uncontaminated" and therefore ideal for collection and recycling. Separate storage and collection systems would be required for separating waste at the source, and although this would make the collection and storage of the waste very costly, the downstream costs of domestic waste handling and disposal would be significantly reduced. Additionally, the Nelson Mandela Metropolitan Municipality (2005:30) states that very little waste separation currently occurs in NMB, as most households have very little awareness about recycling and the environment. Currently, most waste is disposed of in a single bag or bin. In 2005, the Nelson Mandela Metropolitan Municipality (2005:30) estimated that only 1% of the total waste stream was being recycled, however, did note that there are incidences of separation and recycling that occur from waste on garden sites, the kerbside, and waste disposal sites, which goes unaccounted for.

In 2016 the first drop-off site for recyclables next to the Kragga Kamma Road opened to the public. Its main purpose is to provide a drop-off facility to the surrounding residents for the disposal of certain household waste categories such as cardboard, cans, plastic, paper and glass. The waste will not be removed by the normal kerb side collection service and will instead be diverted away from disposal at the current landfill sites for recycling. It is hoped this will encourage waste separation at source and to provide accessible facilities for the drop-off of recyclable household waste material (News24 2016).

1.4.3 THE IMPORTANCE OF RECYCLING HOUSEHOLD WASTE

Increasing population growth, and rapid urbanisation and industrialisation has resulted in dramatic increases in the volumes of waste generated. Increase in electricity and food consumption by humans, and changing lifestyles generate a massive volume of domestic waste which creates a critical problem in developed and developing countries (Kamara 2006:3).

Many developing countries face serious problems managing their wastes. Two of the major problems are the insufficient collection and inappropriate final disposal of wastes. Most wastes are disposed of in open dumps, deposited on vacant land, or burned. Insufficient collection and inadequate disposal generate significant pollution problems and risks to human health and the environment (Medina 2010).

According to Kamara (2006:3) increased production of human wastes, due to changing lifestyles, create a critical problem, especially in developing countries, such as South Africa, which often have more urgent issues to attend to, such as food insecurity and threats from epidemic and pandemic diseases etc. In most cases, especially in the absence of a strong government commitment, stringent rules and regulations, individuals tend to dispose of their household wastes as quickly and conveniently as possible. This situation has now led most countries to include waste management in their Country Position Papers (CPPs) on the environment, clearly highlighting the relevance of domestic waste management and disposal, and the importance of recycling (Miller 2002: 523-524).

Recycling saves raw materials as it reduces the need for raw materials which reduces humans' impact on the environment. Extracting virgin materials is a key cause of global habitat loss. Virgin materials need to be refined and processed to create products, requiring vast amounts of energy and the use of polluting chemicals further causing the destruction of habitats. On top of materials needed, the creation of waste slag and the large areas of land required for industrial smelting cause considerable environmental problems (The European Environment 2012:18).

Although recycling uses energy, overall it reduces climate emissions, as recycling a material generally uses far less energy than manufacturing from virgin materials, therefore, reducing our impact on climate change (Science Daily 2007).

The costs of different waste management techniques are subject to many variables making it difficult to distinguish between them in purely economic terms. However, when comparing landfill, incineration and recycling, recycling has considerable economic merit. Recycling instead of sending waste to landfill avoids the payment of landfill tax and potential Landfill Allowance Trading Scheme (LATS) fines (Vegter 2015).

After collection, recyclables are separated and baled at materials recycling facilities and sent to re-processors where the waste is processed for use in new products. Although it costs local authorities money to collect recycling, the materials generate income when recycled and sold. This money can be fed back into the waste collection budget (PETCO 2018).

The process of recycling and composting, from kerbside collection to the sorting and reprocessing of recyclables, creates more jobs than incineration and landfill. There is still a huge potential for growth in the reprocessing sector, particularly in areas with strong manufacturing industry. Studies have estimated that for every tonne recycled 5.9 jobs are created. It has also been suggested that recycling newspapers creates three times as many jobs as incinerating them 9 and 9 new jobs could be created per 1000 tonnes recycled in kerbside collection and sorting schemes (Friends of earth 2008:3-4).

Recycling helps us toward sustainable living. For householders, recycling is one of the easiest ways they can reduce their impact on the environment and it is often the first such action they take. It introduces a "green" consciousness to daily life. Making people think about the impact of their consumption and production of waste can help to encourage us to make lifestyle decisions to reduce the waste we create and our impact on the environment. Recycling also creates a cyclic way of living rather than the current linear model, and this change is essential for reducing our impact on the environment as a whole, and will help us develop sustainably (The Economist 2007).

1.4.4 RECYCLING AND WASTE MANAGEMENT LAWS IN SOUTH AFRICA

On 1 July 2009, the National Environmental Management: Waste Act (Act No. 59 of 2008) (Republic of South Africa 2008) came into effect. Section 23(2) of the Waste Act specifies the provision of "receptacles for the collection of recyclable waste that are accessible to the public" (Republic of South Africa 2008) and according to Section 22(2) recyclable waste does not have to be placed in the receptacles for general waste. Therefore, changes in municipal collection services as well as the introduction of waste separation at a household level are implied for the implementation of this Waste Act. Thus, individuals recycling behaviour and attitudes at a household level are vital to the successful implementation of this Waste Act (Strydom 2012:1). According to Palm (2012:9) separation of waste at the household level is crucial and strongly depends on the public's participation. Further stating that municipalities must embark on continuous public awareness campaigns to in order to boost public participation. Waste separation at the source activities by the City of Cape Town had an 80% participation rate in the Pinelands suburb resulting in an approximately 12-15% recovery rate, unfortunately though this rate of participation could not be replicated in other communities (Palm 2012:9).

Despite several million Rands having been spent on sophisticated recycling plants, the history of recycling on a large scale in South Africa has not been particularly successful. There has

been reasonable success in certain regions, with organisations such as Collect-a-Can, Nampac, Sappi, Mondi and Consol Glass concentrating mainly on beverage cans, paper, plastics and glass. Voluntary recycling and small buy-back centres have met with some success, which is generally dependent on the user-friendliness of the scheme (Guidelines for Human Settlement Planning and Design 2000:11).

Environmental legislation and, in particular pollution and waste legislation, is fairly young in South Africa, with the majority of environmental legislation having only been passed since 1998 (Oelofse & Strydom 2010:2). Oelofse and Strydom (2010:2) identified at least three on-going phases in the public administration of pollution and waste in South Africa. The first targets for waste management in South Africa were set in 2001 in the Polokwane Declaration (Department of Environmental Affairs and Tourism 2001). These targets, which set a long-term goal of zero waste to landfill, were not legislated and have become a contentious issue within the South African waste sector.

It has been established that even low cost government housing schemes and informal settlements in South Africa and especially in the KwaZulu-Natal region, do not receive refuse removal services on a regular basis (Naidoo 2009). The plight of the urban poor goes beyond just poverty and unemployment. It can be seen as an infringement of human rights and as a health hazard to all citizens when municipalities withhold basic service provisions such as regular refuse removal to these areas. It is advisable that the governments of developing countries take heed of the rapid rate of global urbanization by being proactive in their policy planning as discussed earlier, where it is predicted that most urban newcomers will be poor (Naidoo 2009).

1.4.5 PRACTICES AVAILABLE

- The concept behind the first R, reduce, is that you should limit the number of purchases you make, by buying only what you need in the correct amounts, in order to simply create 'less' waste. Individuals can reduce waste at household level through various methods, such as buying items in bulk or as refills in order to reduce packaging waste, donating unwanted items to charities, engaging in opportunities to operate their home more efficiently, using rechargeable batteries, buying local products to reduce the negative environmental impacts from transportation etc. (Waste management 2017).
- Reuse means purchasing non-disposable items, or passing an item along to another person for continued use. People are conditioned to think of things that are old, empty,

worn, broken or marred, as useless, so they throw them away without much thought about the consequences, therefore, the process of reusing starts with the assumption that our used materials can be a resource rather than refuse. Individuals can reuse materials at household level through various methods, such as reusing shopping bags, donating old items to charities etc. ultimately, reusing saves money, conserves resources, and satisfies the human urge to be creative (Abdul-Rahman 2014:2)

- Recycling is a solid waste management strategy that entails the conversion of discarded consumer products, i.e. waste, into useful or environmentally friendly products (Williams 2005:63). Recycling involves the collecting, processing and manufacturing of materials in order for consumers to purchase new products made from recycled materials. Various items can be recycled at household level, such as metals, glass, textiles, paper, organics, plastic etc. (Williams 2005:63).

The ultimate aim of recycling is for the protection of the environment and public health by reducing the ever increasing volumes of waste being generated, as well as reducing the amount of natural resources necessary for the manufacture of products (Guidelines for Human Settlement Planning and Design 2000:11). Recycling also reduces the amount of waste that needs to be collected, transported, and disposed of, and extends the life of disposal facilities, which saves money for the municipalities (Medina 2010:8).

1.5 RESEARCH DESIGN AND METHODOLOGY

The proposed research design and methodology comprises of the research design paradigm, research approach, population, sample, data collection, questionnaire design, pilot study, data analysis and reliability and validity of the research methodology. Each of the above mentioned elements of the research design and methodology will be briefly discussed and outlined, while more detailed exposition of the research methodology will be provided in Chapter Three.

1.5.1 RESEARCH DESIGN

Lamb, Hair, McDaniel, Boshoff and Terblanche (2018:151) indicate that the research design specifies which research questions must be answered, how and when the data will be collected and how the data will be analysed.

1.5.2 RESEARCH PARADIGM

There are two main research methodologies, namely a positivistic methodology (quantitative research) and a phenomenological methodology (qualitative research).

According to various researchers (Cooper & Schindler 2014:146; Struwig & Stead 2013:3) quantitative research involves the analysis of numerical data, even though the key role of quantitative research is to test specific hypotheses and examine specific relationships between the dependent and independent variables.

Qualitative research is data that are not characterised by numbers and instead are textual, visual or oral. The focus is on stories, visual portrayals, meaningful characteristics, interpretations and other expressive descriptions (Zikmund, Babin, Carr & Griffon 2010:146).

Quantitative research will be conducted as the research methodology approach. The quantitative research approach consists of the attitudes and practices of consumers toward household recycling in NMB.

1.5.3 RESEARCH APPROACH

Exploratory research is conducted to clarify ambiguous situations or discover ideas that may be potential business opportunities (Zikmund *et al.* 2010:652).

Descriptive research describes characteristics of objects, people, groups, organisations or environments and tries to illustrate a given situation (Zikmund *et al.* 2010:651).

A descriptive research method will be used in this study in order to obtain the relevant data needed that will assist the researchers to determine the attitudes and practices of consumers toward household recycling in NMB.

1.5.4 POPULATION

A population or universe is any complete group of people, companies, hospitals, stores, university students, or the like, that share some set of characteristics. A population and universe can be distinguished in the way that a group is either finite (a population) or infinite (a universe) (Zikmund 2003:368). For the purpose of this study, the research population consists of all consumers in NMB. However, due to the inability of researchers to test all consumers in NMB, a sample will be selected.

1.5.5 SAMPLING

According to Crossman (2015) a sample is defined as a subset of the population. After having identified the appropriate population for the study, either probability or non-probability sampling will be used. In probability sampling, the sample is selected using deliberate, unbiased process, so that each sample unit in a group has an equal chance of being selected. In

non-probability sampling, the decision of sample group is left to the researcher and hence element of bias always appears in such examinations. Researchers are able to choose from various non-probability sampling techniques, including convenience, judgemental, quota and snowball sampling (Bryman & Bell 2011:181; Collis & Hussey 2014:132; Struwig & Stead 2013:116-117). A convenience sample is chosen purely on the basis of availability, while judgement sampling is when a sample is chosen on the basis of expert judgement, where specialists in the subject of the survey choose what they believe to be the best sample for that specific study (Struwig & Stead 2013:116).

For the purpose of this study, non-probability sampling will be used, adopting convenience and judgemental sampling as the techniques. The sample size for this research will consist of 120 NMB consumers. A computerized random sampling procedure in STATISTICA selected a sample of households.

1.5.6 DATA COLLECTION

In order to successfully address the research objectives of this study, the research is divided into two categories, namely secondary and primary research.

a.) Secondary data

Secondary data is data that is not directly gathered, but is already available. In other words, secondary data are data that has already been gathered and recorded by someone else, other than the user, for an alternative reason than the current research (Boone & Kurtz 2015:316; Collis & Hussey 2014:59; Struwig & Stead 2013:82). Sources of secondary data include annual reports, journal articles, newspaper articles, government publications and business reports (Struwig & Stead 2013:82; Wilson 2010:170).

In order to achieve the primary objective of this study, the secondary research of this study will consist of an extensive literature review in order to identify and describe the attitudes and practices of consumers towards household recycling in NMB. The secondary research of this study will be conducted by consulting a variety of relevant textbooks and well known journal articles such as Kumar (2016), Reddy (2011) and Sharholy, Ahmad, Mahmood and Triveda (2008).

In addition, the library facilities available at the Nelson Mandela University (NMU) will be used to access National and International databases, such as Emerald, EBSCOhost and Sabinet,

which will be consulted to identify preceding research on the attitudes and practices of household recycling.

b.) Primary data

Due to the study being quantitative in nature, a large sample will be required, resulting in the researchers using of a survey research method, whereby a structured questionnaire will be used to collect the data, which will in turn be statistically analysed and interpreted. For the purpose of this study, convenience sampling will be used as a sampling technique to conduct the research due to the ease of access to consumers in NMB, as well as the fact that there are currently no databases of all consumers in NMB. Consumers in NMB will be approached by field-workers from NMU, where a self-administered questionnaire will be handed out to willing participants and upon completion, the field-workers will collect the completed questionnaire.

1.5.7 QUESTIONNAIRE DESIGN

The items of the measuring instrument will be sourced from existing measuring instruments used in similar research, and which have been deemed both, valid and reliable. The respondents will be required to complete a structured self-administered questionnaire which will be used as the basis for the data collection. Respondents will be required to evaluate their responses using a nominal and ordinary scale, namely the five point Likert scale.

The questionnaire will be accompanied by a cover letter and will consist of four sections. The cover letter that will accompany the questionnaire highlights the research topic, the objective of the research, as well as the promise of confidentiality. Furthermore, instructions for the completion of the questionnaire will be included, as well as details applicable to NMU and the division responsible for the research.

The questionnaire will be developed according to the requirements of the study and consist of three sections as follows:

- Section A of the questionnaire will focus on the general perceptions regarding environmental sustainability.
- Section B of the questionnaire will investigate consumers' attitudes toward recycling of household waste using five-point Likert-type ordinal scale.
- Section C will investigate practices regarding household waste by means of five-point Likert-type ordinal scale.

- Section D of the questionnaire will focus on the biographical information of respondents using a nominal scale.

1.5.8 PILOT STUDY

Zikmund, Babin, Carr and Griffon (2010:65) indicate that a pilot study is a small-scale research project that collects data from respondents similar to those to be used in the full study. The researchers will conduct a pilot study through distributing ten self-administered questionnaires among potential respondents in order to determine whether the questionnaire is understandable and efficient to use among various respondents.

1.5.9 DATA ANALYSIS

Cooper and Schindler (2014:86) indicate that data analysis involves reducing accumulated data to a manageable size, developing summaries, looking for patterns, and applying statistical techniques. Furthermore, it is during this phase that raw data is converted into useful information, whereby patterns can be identified, and statistical techniques applied (Cooper & Schindler 2014:86). For the purpose of this study, the primary data collected from the research questionnaire will be captured in Microsoft Excel 2013. Once the data is cleaned, the statistical programme, known as STATISTICA, will be utilised to analyse the captured data.

Descriptive statistics will be utilised to analyse the data collected by the quantitative study. These statistics includes measures of mean, mode, median and standard deviations as well frequency distributions. These results will be analysed and conclusions and recommendations will then be formulated.

1.5.10 VALIDITY AND RELIABILITY OF THE MEASURING INSTRUMENT

Validity is defined as the accurateness of inferences made, based on test or performance data. It also addressed whether a measure accurately and completely represents what was intended to be measured (Landy & Conte 2007:73). Face validity is when a scale's content logically appears to reflect what was intended to be measured, while content validity is the degree that a measure covers the breath of the domain of interest (Zikmund *et al.* 2010:307). A pilot study, along with expert opinion will be utilised, in order to prove the validity of this study.

1.6 DEMARCATION OF STUDY

As discussed in the introduction, it is a well-known fact that the recycling of household waste contributes to the preserving of resources and the protecting of the environment.

Therefore, given the importance of consumers' attitudes and practices influencing the recycling of household waste, this study intends to focus primarily on the attitudes and practices of consumers towards recycling household waste in NMB. The empirical research will be targeted at consumers from various suburbs in PE/Uitenhage and Despatch as well as at shopping centres in these suburbs owing to the ease of access of this sample. Furthermore, the demographic information pertaining to participants is limited to gender, age, ethnicity, education, occupation, living situation, and living area.

NMB's consumers' attitudes and practices towards the recycling of household waste play a vital role as to whether or the individual/household participates in recycling activities, therefore, this will be the focal point of this study. However, despite the importance of recycling, individuals/households are faced with various challenges that limit their knowledge of recycling and their ability to recycle, therefore, hindering the degree of their recycling.

1.7 CLARIFICATION OF KEY CONCEPTS

With the study focusing on the attitudes and practices of consumers toward recycling of household waste, clear definitions of related terms are presented below.

1.7.1 WASTE

According to the South African Waste Information Centre (2016), Waste Amendment Act, 2014 (Act No 26 of 2014) and the Organisation of Economic Cooperation and Development (OECD 2003), waste is characterized as any material, object or substance, that is undesirable, abandoned, rejected, disposed of or discarded, by the holder of the material, object or substance regardless of whether such substance, material or object can be recycled, reused or recovered. For the purpose of this study, waste is defined as any material for which the generator has no further use in terms of his/her own purpose of production, transformation or consumption, therefore, leading him/her to dispose of the material, regardless of whether such material can be reused or reused.

1.7.2 MUNICIPAL SOLID WASTE (MSW)

Ajitha (2014:59) and Kumar (2016:29) define municipal solid waste (MSW) as waste that consists of everyday items useful for public use that have been discarded. Additionally, Ajitha (2014:59) states that MSW refers to solid waste from houses, roads, public places, shops, workplaces, and hospitals.

1.7.3 HOUSEHOLD WASTE

Kumar (2016: 29) and Chandra (2015:30) define household waste as the day-to-day rubbish, garbage and other waste originating from daily household consumption. In this study, the term household waste is defined as the waste material generated in the residential environment.

1.7.4 DOMESTIC WASTE DISPOSAL

Miller (2002:518-519) and Chandra (2015:30) define domestic waste disposal as all exercises embraced to evacuate domestic waste through arranging, gathering, transporting and discarding it in assigned areas for treatment, reusing or recycling. For the purpose of this study, domestic waste disposal refers to the required activities for efficient the disposal of domestic waste.

1.7.5 RECYCLING

Williams (2005:63) and Medina (2010) states that recycling is a solid waste management strategy that entails the conversion of discarded consumer products, i.e. waste, into useful or environmentally desirable products. In this study, recycling is defined as an arrangement of procedures for converting recovered materials, which would some way or another be discarded as wastes, into valuable materials.

1.7.6 REUSING

According to Williams (2005:64) and the South African Waste Information Centre (2016), Waste Amendment Act, 2014 (Act No 26 of 2014), reusing is defined as using a waste product again for the same or a different purpose without further manufacture. For the purpose of this study, reusing is classified as the act of using a material from the waste stream again for the same or an alternate reason without further manufacture.

1.7.7 REDUCING

Kumar (2016: 81) and Medina (2010) state that reducing is classified as the process of purchasing products with little or no packaging, or simply reducing the consumption of goods in order to reduce the amount of waste entering the waste stream. For the purpose of this study, reducing waste is defined as the act of an individual undertaking activities in order to lessen the amount of waste entering the waste stream.

1.7.8 INTEGRATED WASTE MANAGEMENT

Tchobanoglous (2003) states that "Intergrated Waste Management (IWM) can be defined as the selection and application of suitable techniques, technologies and management programs to achieve specific waste management objectives and goals." Mcdougall (2008) defines an IWM as "a system that takes an overall approach to manage all the materials in the waste stream in an environmentally effective, economically affordable and socially acceptable way."

1.8 DIVISION OF CHAPTERS

The structure of the research is divided into five chapters:

- Chapter one provides an introduction and background to the study. In addition, reference will be made to the problem statement, and the primary and secondary research objectives. Following this, a list of detailed research questions, clarity on key concepts and a brief literature overview will be provided. Furthermore, the research methodology consisting of the research paradigm, research approach, population, sampling, data collection, questionnaire design, and data analysis, will be provided. Following the research methodology, the validity and reliability of the measuring instruments will be stated. Finally, the demarcation of the study, the division of the chapters, and the time frame of the study will be provided.
- Chapter two will provide a literature study regarding the effect of an individuals' attitudes toward recycling household waste, household waste in NMB, the importance of recycling household waste, recycling and waste management laws in South Africa, and the practices available for consumers i.e. recycle, reuse and reduce.
- Chapter three will focus on the research design and methodology to be used in this study and the rationale behind the selected methodology, by elaborating on the sample and sampling techniques, the measuring instrument to be used, and the primary data collection method that will be utilised. The chapter will conclude with the statistical techniques used.
- In chapter four, the empirical results of the study, and the research findings and outcomes relating to the reliability and validity assessments will be presented.
- Chapter five will conclude the study by providing a brief overview of the preceding chapters, together with an abstract of the main findings. Based on the findings of the literature review and the empirical investigation, conclusions will be drawn.

Furthermore, the contributions and limitations of the study will be explained, and recommendations for future research will be proposed.

1.9 SUMMARY AND CONCLUSIONS

The first chapter presents an overview of the proposed research study. An introduction to the topic was provided in order to identify the need and of conducting a study on the attitudes and practices of consumers towards household recycling in NMB.

Waste generation has become an inevitable consequence of lifestyles and daily living. The increasing practices of littering, dumping and burning of solid waste by households in South Africa indicates that household waste is being irresponsibly managed. In this regard, it becomes necessary to investigate the attitudes and practices of consumers toward solid waste practices, which further incorporate mitigating measures, such as recycling, reducing and reusing for the generation of solid waste.

The main objective of this study is to investigate the attitudes and practices of consumer towards household recycling in NMB. Various other secondary objectives are also identified, such as to select an appropriate research methodology and research methods for the study.

The research design and methodology section comprised of the research paradigm, research approach, the population, sampling, data collection, questionnaire design, pilot study, data analysis and the reliability and validity of the research methodology. The research approach will be quantitative research with the help of convenience sampling in NMB.

A literature overview consisting of the effect of an individuals' attitudes towards recycling household waste, household waste in NMB, the importance of recycling household waste, recycling and waste management laws in South Africa and practices available.

The first chapter of the study concluded with a preview of upcoming chapters of the treatise on the topic of the attitudes and practices of consumers towards household recycling in NMB.

Chapter two of this study will provide a comprehensive literature review in order to present the reader with the necessary background knowledge regarding the topic at hand.

CHAPTER TWO

A THEORETICAL OVERVIEW OF WASTE MANAGEMENT AND RECYCLING

2.1 INTRODUCTION

The preceding chapter (Chapter One) provided a detailed introduction to the topic of attitudes and practices of consumers toward recycling of household waste in NMB.

The primary objective of this study is to investigate the attitudes and practices of NMB households towards the recycling of household waste. Therefore, this chapter provides a theoretical overview of waste management and recycling and addresses a wide range of topics related to waste management and recycling. Waste management and recycling is a widely discussed topic in today's business and organisational environment and it is vital for the success of a sustainable future.

While recycling of solid waste is a well-established practice in many developed countries, South Africa unfortunately lags behind in this respect. For example, although the South African Department of Environmental Affairs and Tourism (2012) recognised recycling as a strategic goal towards integrated waste management, only about 10% of waste is recycled. Furthermore, current legislation requires for the initiation of waste separation at the source activities in all major cities and towns. Household participation in recycling is evidently imperative if the latter is to be accomplished. However, only 3.3% of South African households currently recycle (Oelofse 2013). This low level of household participation in recycling necessitates a closer analysis of household recycling attitudes and practices.

International research on factors affecting household recycling attitudes and practices abounds, highlighting the interplay of various factors, and in particular the importance of environmental education in order to change attitudes (Yusof 2004; Thomas *et al*. 2003). However, research in South Africa is limited. Anderson, Romani, Wentzel and Phillips (2013) examined household recycling behaviour in urban areas in South Africa, while Kamara (2006) examined recycling behaviour in the City of Tshwane Metropolitan Municipality (which includes Pretoria). Both found low levels of awareness about environmental implications of household waste and consequent low levels of participation in recycling, especially amongst African households. Oelofse and Strydom (2010) examined drivers of recycling both in a household-and industry

context and found higher participation levels amongst households where members were better educated and more environmentally conscious.

In the context of NMB, the Nelson Mandela Bay Municipality (2005:30) identifies household waste as 25% of the total waste stream and emphasises that there is much scope for the separation, composting, recycling and transformation of approximately 90% of this waste stream. In 2016, the first drop-off site for recyclables next to the Kragga Kamma Road opened to the public in an effort to encourage waste separation at source and to provide accessible facilities for the drop-off of recyclable household waste material (News24 2016).In this regard, a question arises about the relative effect of different social and physical factors on recycling behaviour in NMB.

2.2 HISTORY OF WASTE MANAGEMENT AND RECYCLING

The poor state of solid waste management (SWM) in urban areas of developing countries is currently an ecological issue as well as a noteworthy social impair (Srivastava, Singh & Singh 2014:1).

The generation of waste has been part of history since the earliest times. With the unavailability of proper waste management systems, large amounts of waste were released back into groundwater, creating a significant environmental impact. The root of waste management was planted in early 1751 by Corbyn Morris in London. The health of people was of great importance and firmly promoted his idea to have uniform public management. The garbage and scraps of the city should be diverted to the River Thames in order to have a clean and sanitized city. Current research shows that an organised SWM in the city came into place in the eighteenth century (Kumar 2016:17).

For over three decades recycling has been occurring in South Africa. Godfrey and Oelofse (2017:2) identified four phases through which the South African recycling and waste sector has progressed in the course of recent decades. The first phase, named “The Age of Landfilling”, is a period beginning in 1989 and from which, one might contend, South Africa has not yet emerged. The next phase, is “The Emergence of Recycling” which began in 2001 with the publication of the Polokwane Declaration and the emergence of prohibiting of single-utilise plastic bags. Since 2001, South Africa has developed a waste recycling economy, but has only managed to recycle 10% of all waste generated. The third phase, is “The Flood of Regulation”, a period beginning in 2008 with the announcement of the Waste Act (Act 59 of 2008), which brought about an influx of new waste regulations and legislation, aimed at largely

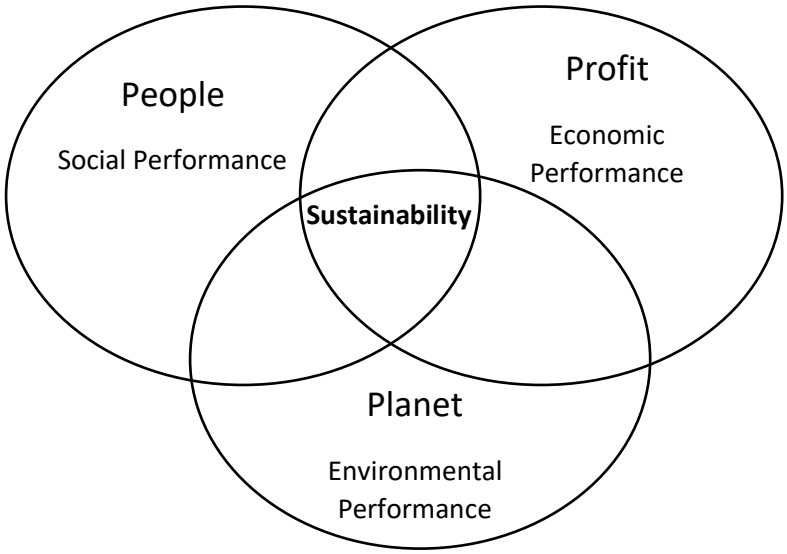
controlling the waste and secondary resources sector. The last phase, is “The Drive for Extended Producer Responsibility (EPR)”, which began in 2012 with the publication of the Integrated Industry Waste Tyre Management Plan (IIWTMP). Through a mandatory (EPR) scheme, the IIWTMP was intended to fulfil tyre producers’ responsibilities for end-of-life waste tyres (Godfrey and Oelofse 2017:2).

A recycling economy has successfully been developed in South Africa in the course of recent decades, mostly due to hard work from an informal waste sector. However, it is clear that there is much room for improvement, given that critical amounts of recyclable waste are still being discarded to landfill (Godfrey and Oelofse 2017:8).

2.3 TRIPLE BOTTOM LINE

Economic, environmental and social perspectives should be considered all together for sustainable waste management (Tasherzadeh & Richards 2016:23). Economic aspects such as financial incentives for citizens and organisations to effectively take an interest in waste management. Waste ought to be viewed as a resource that can create economic wealth. Numerous kinds of waste, for example, plastics and electronics, are of harm to the environment and should be recycled or reused. This sort of resource recovery is "cradle to the cradle" or "zero waste" and intends to protect the environment from the effects of waste (Greyson 2007; Lehmann 2011). Waste management social aspects are also vital for sustainable implementation. For instance, in developed countries ones level of utilisation is frequently compared with one's status or well-being. These societal aspects should be considered when creating strategies for sustainable waste management (Tasherzadeh & Richards 2016:24).

Figure 2.1 The triple bottom line



(Source: River side rediscovered 2018)

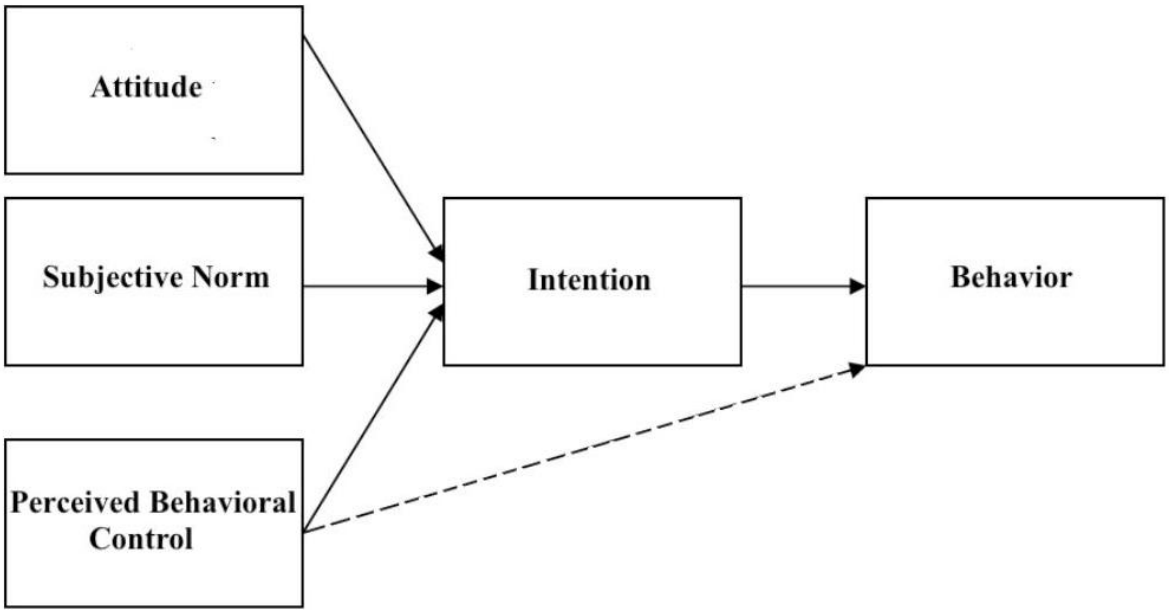
2.4 THEORY OF PLANNED BEHAVIOUR

An understanding is required of the recycling choices made by householders, and of the factors which underpin these choices. The Theory of Planned Behaviour (TPB) (Ajzen 1985) is a widely used psychological theory for explaining environmental behaviour and has become popular in studies on recycling. Psychological and situational variables as well as environmental attitudes have been recognised as important predictors of recycling behaviour, however, in order to further investigate the influence of these factors, a theoretical framework for systematically identifying the determinants of household recycling behaviour is required (Tonglet, Phillips & Read 2004). As noted by Ajzen (1991) the TPB provides a theoretical framework for systematically investigating the factors which influence behavioural choices. According to Ioannou, Zampetakis and Lasaridi (2013:2035) the TPB provides one of the most robust theoretical frameworks for identifying the determinants of a variety of behaviours, in both non-environmental and environmental domains.

The TPB assumes that there is a certain degree of conscious reasoning involved when individuals develop intentions to carry out a certain behaviour, this idea forms the bases of the TPB. Furthermore an intention to act in a particular way influences behaviour (Ioannou *et al*. 2013:2035). According to the TPB, the intention of an individual to act can be predicted by three specific factors: a) the Attitude towards the behaviour; b) the Subjective Norm; and c)

the Perceived Behavioural Control (Du Toit, Wagner & Fletcher 2016:2). The Attitude refers to an individual's general assessment of the disadvantages and advantages of carrying out a particular behaviour. The Subjective Norm assesses an individual's perception of the social pressure from "significant others" to carry out the behaviour, while the Perceived Behavioural Control depends on the perceived difficulty or ease of carrying out an action and relates to self-efficacy. Suitable changes of the three predicting factors can raise the likelihood of an individual having the intention of doing a certain action and therefore, increase the likelihood that he/she will actually do it (Ioannou *et al*. 2013:2035). In other words, if an individual's attitude towards a certain behaviour is positive, there is enough peer-pressure, and they believe they are able to perform the behaviour, then their intention to perform that behaviour (in this case the recycling of household waste) should be strong (Ajzen, 2013). According to Ioannou *et al* (2013:2035) there is a general rule in the TPB that the more positive the attitude and subjective norm and the larger the perceived control, the individuals intention to act out the behaviour in question is greater.

Figure 2.2 Theory of planned behaviour



(Source: Model depicting the theory of planned behaviour, Ajzen, 1991)

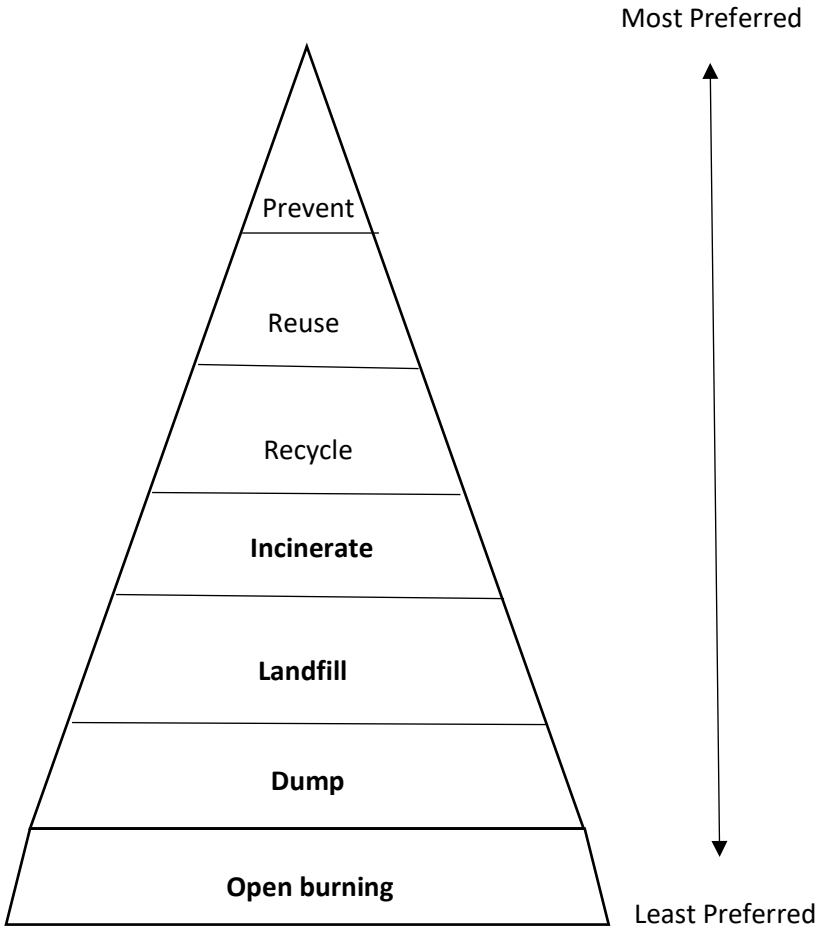
2.5 INTEGRATED WASTE MANAGEMENT APPROACH

The European Community in the Framework Directive first developed and accepted the hierarchy of waste into policy in 1975, which encouraged waste reduction, re-use and recovery (Grodfrey & Oelofse 2017; Williams 2005). The aim of the Framework Directive was to

prevent waste where possible, recycle, recover and re-use it in order to reduce its harmful impact the environment, reduce the overall volumes of waste and to dispose of unrecoverable waste in landfill sites as a last resort (Grodfrey & Oelofse 2017; Williams 2005). According to McDougall (2008:13) previous choices relating to the structure of waste management systems relied heavily on the waste management hierarchy. The hierarchy approach gave general guidelines on the relative desirability of the different waste management options (Van Ewijk and Stegemann 2014:3). However (Van Ewijk and Stegemann 2014:4) expressed concerns regarding limitations of the hierarchy approach in that it is not always going to be the most effective method to reduce the environmental impact. McDougall (2008) further expressed that the only way to ensure environmental impacts are kept to a minimum is to measure these throughout the wastes life cycle. Therefore they propose a more holistic approach to waste management, an approach recognising that all disposal options have a role to play in an integrated waste management system.

The integrated waste management (IWM) approach involves a hierarchal and coordinated group of actions that aims to maximise the recovery of recyclable and reusable waste, protects environmental and human health and reduces pollution (Medina 2010). Flexibility is key to the IWM approach, with Medina (2010) stating that when being implemented in developing countries it should be adapted to suit local conditions in order to best meet its aims of being environmentally sound, economically viable and socially desirable. Furthermore, the IWM approach places a strong emphasis on the re-use, recycling and prevention of waste.

Figure 2.3 Waste hierarchy



(Source: Reddy 2011:11)

Waste hierarchy: Prevention, reuse and recycling have the highest priority on the waste hierarchy, while open burning, dumps and landfills are the least preferable. Therefore the actions which result in the most harmful impacts on the environment, are the least acceptable ones. Waste management systems should be designed to create the most useful benefits from products in order to generate the minimum amount of waste, and the options available are sorted according to their desirability in terms of waste minimization (Reddy 2011:10).

2.6 EFFECT OF AN INDIVIDUALS ATTITUDES TOWARD RECYCLING HOUSEHOLD WASTE

According to Yusof (2004:54), a persons' attitudes toward and knowledge about recycling play a major role in determining whether they recycle or not, therefore, a positive attitude towards and efficient knowledge about recycling is essential for the successful implementation of an effective solid waste management system.

One of the key findings of research done by Thomas *et al.* (2003:1) on people's attitudes and behaviour towards recycling is the need for and importance of information about recycling, stating that it is one of the main influences on people's attitudes and behaviour towards recycling and a key factor to increasing the rates of recycling. Furthermore their research finds that lack of awareness about and a regular consideration for recycling issues, rather than a lack of concern for the environment, has a greater impact on people's attitudes and behaviours towards recycling their waste. Similarly, research by Kumar (2016:35) found that in developing countries, lack of awareness and interest in waste management also negatively impacted recycling attitudes and behaviours, however, additional socio-economic factors, such as illiteracy, poverty, and irresponsible waste management also played a role. Strydom (2012:2) recognises three main areas affecting people's attitudes and behaviours towards recycling namely knowledge, convenience and barriers to recycling. According to Strydom (2012:2), individuals need knowledge of how a recycling scheme works, how to sort their recyclables and where to recycle their waste. Additionally, Bolaane (2006:731-740) confirms that the success of recycling initiatives is dependent on individuals experience and knowledge about recycling coupled with a change in attitude towards such issues.

South Africa is a developing nation with an extremely diverse society, therefore it is important to take into account a number of socio-economic factors when implementing any waste management system (Poswa 2004:1).The recognition and evaluation of how various socio-economic factors may influence public participation and cooperation with waste management projects is an important aspect of effective solid waste management. Previous studies have indicated that there is often a correlation between an individual's attitudes towards recycling and their socio-economic status (Yusof 2004:25).

Ultimately, Strydom (2012:2) states that a recycling and solid waste collection systems must be designed to meet the needs of all the individuals in the community for whom it is intended. The reason for this is that a convenient way of recycling household waste for some people may not be equally as convenient for others whom may face different circumstances. Therefore, the acceptance level of a specific recycling initiative may differ between different households and different communities (Miafodzyeva *et al*. 2010:340-346). In order to solve this issue, local authorities must ensure an effective waste management service is provided to the public, therefore, taking a number of factors into consideration when deciding the most suitable waste management approach for a community. Such factors include: subsidies or grants available, affordability, accessibility due to location, potential benefits, on-site storage facilities, potential

pollution, level of education, and available facilities and infrastructure (Guidelines for Human Settlement Planning and Design 2000:11).

2.7 THE IMPORTANCE OF RECYCLING HOUSEHOLD WASTE

Rapid urbanisation, increasing population growth and industrialisation have caused dramatic increases in the amount of waste generated by societies. Increased consumption of food and electricity, as well as changing lifestyles have led to a massive increase in the volume of domestic waste, thus creating a serious problem for both developing and developed countries (Kamara 2006). Most of these developing countries face serious issues with regard to their waste management systems. Two of the major issues are the unsuitable final disposal of wastes and insufficient collection services. Most domestic waste is either burned or disposed of in landfill sites or on vacant land. The inadequate disposal generate and insufficient collection of waste has led to significant problems of pollution and risks to human health and the environment (Medina 2010).

The recycling of household waste can have a significant effect on reducing these problems and help move societies towards sustainable living. According to The Economist (2007) recycling is one of the most effective ways householders can lessen their impact on the environment. Recycling encourages people to think about the impact their production and consumption of waste is having and encourages them to make lifestyle choices that reduces the amount of waste they create and therefore their impact on the environment. Greyson (2007:6) states that the process of recycling, from the reprocessing and sorting of recyclables to kerbside collection of household waste, also generates more jobs than landfill and incineration. Studies have indicated that roughly 5.9 jobs are created for every tonne of waste recycled (Friends of Earth 2008:3-4). Recycling reduces the need for raw materials and thereby contributes to saving raw materials and lessening humans' impact on the environment. The extraction of raw materials from the environment has been a major cause of global habitat loss. These raw materials need to be processed and refined to produce products, which requires using polluting chemicals and enormous amounts of energy only further contributing to the destruction of the environment (The European Environment 2012:18). While recycling does require energy, it does work to reduce climate emissions overall, as it generally requires far less energy to recycle a material than it does to manufacture it from raw materials (Science Daily 2007).

According to Lehmann (2011:161) it is difficult to distinguish between different waste management system approaches in purely economic terms as they subject to many variables.

However, when comparing recycling, incineration and landfill, recycling shows substantial economic value (PETCO 2018). Separating waste for recycling requires separate storage and collection facilities, after collection, the waste is sent to recycling facilities and then to re-processors where the materials are processed and made into new products. Although this creates considerable costs for local authorities, domestic waste disposal and landfill costs are reduced and money generated from the new products produced when recycled and sold can be fed back into the waste management system (PETCO 2018; Nelson Mandela Metropolitan Municipality 2005:30).

According to Kamara (2006:3) developing countries, such as South Africa, often have more urgent issues to attend to such as threats from pandemic diseases or food insecurity. Therefore the rising levels of human waste created by changing lifestyles, have often been overlooked and have created a critical problem. Furthermore, in the absence of regulations, stringent rules and strong government commitment individuals tend to dumb their household waste as conveniently and quickly as possible. This has resulted in most countries now including waste management in their Country Position Papers on the environment, clearly showing the importance of recycling and significance of effective domestic waste management and disposal (Miller 2002: 523-524).

2.8 HOUSEHOLD WASTE IN NELSON MANDELA BAY

According to Nelson Mandela Metropolitan Municipality (2005:30), household waste in NMB comprises of approximately 25% of the total waste produced. Nelson Mandela Metropolitan Municipality (2005:30) states that there is much scope for the separation, composting, recycling, and transformation of approximately 90% of this household waste stream which could ultimately lead to an amount of approximately only 10% of waste being landfilled. According to Treevolution (2018), the current recovery rates for various types of household waste in South Africa are approximately:

- Plastic: 17 percent
- Glass: 25 percent
- Paper: 59 percent
- Cans: 69 percent

Furthermore, the Nelson Mandela Metropolitan Municipality (2005:30) states that it is ideal for recyclable waste to be separated at the source, i.e. in the household, as sorting through

different types of mixed waste is difficult and time consuming. According to Treevolution (2018) most of this sorting is currently performed by informal recyclers who retrieve most of the recyclable waste from landfill sites and dustbins. This is not ideal, as it is potentially harmful to the recyclers' health and safety and also this waste is too often contaminated with other waste making it non-recyclable. Waste which is separated at the source is usually "uncontaminated" and therefore ideal for collection and recycling. Separate storage and collection systems would be required for separating waste at the source, and although this would make the collection and storage of the waste very costly, the downstream costs of domestic waste handling and disposal would be significantly reduced. Additionally, the Nelson Mandela Metropolitan Municipality (2005:30) states that very little waste separation currently occurs in NMB, as most households have very little awareness about recycling and the environment. Currently, most waste is disposed of in a single bag or bin. In 2005, the Nelson Mandela Metropolitan Municipality (2005:30) estimated that only 1% of the total waste stream was being recycled, however, did note that there are incidences of separation and recycling that occur from waste on garden sites, the kerbside, and waste disposal sites, which goes unaccounted for.

In 2016 the first drop-off site for recyclables next to the Kragga Kamma Road opened to the public. Its main purpose is to provide a drop-off facility to the surrounding residents for the disposal of certain household waste categories such as cardboard, cans, plastic, paper and glass. The waste will not be removed by the normal kerb side collection service and will instead be diverted away from disposal at the current landfill sites for recycling. It is hoped this will encourage waste separation at source and to provide accessible facilities for the drop-off of recyclable household waste material (News24 2016).

2.9 WASTE MANAGEMENT LAWS AND RECYCLING PROGRAMMES IN SOUTH AFRICA

On 1 July 2009, the National Environmental Management: Waste Act (Act No. 59 of 2008) (Republic of South Africa 2008) came into effect. Section 23(2) of the Waste Act stipulates the establishment of "receptacles for the collection of recyclable waste that are accessible to the public" (Republic of South Africa 2008) and according to Section 22(2) recyclable waste is not required to be disposed of in the receptacles for general waste. Therefore, changes in municipal collection services as well as the introduction of waste separation at a household level are implied for the implementation of this Waste Act. Thus, individuals recycling behaviour and

attitudes at a household level are vital to the successful implementation of this Waste Act (Strydom 2012:1). According to Palm (2012:9) the sorting and separating of recyclable material at the household level is crucial and strongly depends on the public's participation. Further stating that municipalities must embark on continuous public awareness campaigns to in order to boost public participation. Waste separation at the source activities conducted by the City of Cape Town managed to get a participation rate of 80% in the Pinelands suburb which lead to a recovery rate of approximately 12-15%, unfortunately though this rate of participation could not be replicated in other communities (Palm 2012:9).

The separation of waste at the source is strongly encouraged by the National Domestic Waste Collection Standards, as a way of diverting waste away from landfill sites towards recovery and recycling (Republic of South Africa 2011). As outlined in Section 4.1 of the Standards, "separation at source must be encouraged and supported in line with the relevant industry waste management plans", with all domestic waste from secondary and Metropolitan cities being sorted at the household level. Additionally the Standards note that "an enabling environment for households to recycle domestic waste..." which"...could include kerbside collection and/or a well-kept drop-off centre within easy reach" must be provided by the Municipalities (Republic of South Africa 2011:16). Furthermore, co-operation between the recycling sector and municipalities is encouraged to promote the establishment of facilities for household recycling.

The National Waste Management Strategy (NWMS) has set the goal of promoting waste re-use, recovery, recycling and minimisation (Goal 1), through short-term (5 year) targets of, diverting 25% of recyclable waste from landfills for recovery, recycling or re-use by 2016, and the initiation of separation at the source programmes in all secondary cities, metropolitan municipalities and large towns (Department of Environmental Affairs and Tourism 2012:6).

Additionally, Goal 4 of the NWMS, aims to increase public awareness of the importance of household recycling among other issues, with a short term (5 year) target of 80% of municipalities engaging in local awareness campaigns (Department of Environmental Affairs 2012:7). The NWMS notes that, increasing the recovery, recycling and re-use of waste resources requires "a coordinated effort by generators of waste, including households, businesses and organisations", and that promoting the recovery, recycling and re-use of waste resources will be accomplished through, amongst others, "nationally coordinated awareness campaigns which support separation of recyclables from the domestic waste stream at source

for all households, businesses and organisations". The strategy to raise awareness about waste is based on municipal campaigns planned and executed in partnership with local stakeholders, including NGOS, civil society industry and labour (Department of Environmental Affairs 2012:28).

According to Strydom (2016) although South Africa still lacks a national waste and recycling communications and awareness programme, the private sector has taken up this challenge, with material organisations such as Collect-a-Can, The Glass Recycling Company, PETCO, PolyCo and PRASA, increasingly investing in awareness and communication initiatives in an effort to boost consumer awareness of the importance of recycling, although they remain largely disconnected. South Africa has experienced a growth in paper and packaging recycling rates from 47.3% in 2010 to 52.6% in 2014 (Strydom 2016). This has come on the back of considerable investment by the private sector in new recycling infrastructure, thereby growing local markets and increasing the demand for recyclable waste, mostly paper and packaging waste. Material organisations have invested in both collection infrastructure and recycling infrastructure, thereby growing both the supply and demand for recyclable waste (Strydom 2016). Several municipalities, in particular the larger metropolitan municipalities have put pilot separation at source initiatives in place (e.g. Johannesburg, Cape Town) thereby increasing the supply of recyclable waste (Palm 2012:9). All of these public and private sector initiatives have supported the growth of South Africa's recycling economy (Strydom 2016). South Africa's policy environment therefore creates a strong motivation to drive separation at source, to strengthen awareness and communication initiatives and resultant increased recycling behaviour amongst all generators of waste, including households.

2.10 WASTE MANAGEMENT PRACTICES WITH REGARDS TO HOUSEHOLDS

2.10.1 PREVENTION

According to Medina (2010), the highest priority in an integrated waste management system is given to waste prevention. Medina (2010) adds that it is a preventative action seeking to lessen the amount of waste generated by individuals, businesses and households. The concept behind prevention is that you should limit the number of purchases you make, by buying only what you need in the correct amounts, in order to simply create 'less' waste. Individuals can reduce waste at household level through various methods, such as buying items in bulk or as refills in order to reduce packaging waste, engaging in opportunities to operate their home more efficiently, using rechargeable batteries and buying local products to reduce the negative

environmental impacts from transportation etc. (Waste management 2017). Tchobanoglous (2003) believes that the best time to consider source reduction is at the product or process design phase. Engeldow (2005) states that if it is possible to reduce the amount of waste generated initially, then it would be less of a problem to dispose of it.

2.10.2 REUSE

Reuse means passing an item along to another person for continued use or purchasing non-disposable items (Williams 2005). People are accustomed to think of things that are empty, old, broken, worn, or marred, as useless, so they dispose of them without thinking about the consequences, therefore, the process of reusing begins with the assumption that used materials can be a resource rather than refuse. Individuals can reuse materials at household level through various methods, such as reusing shopping bags, donating old items to charities etc. ultimately, reusing preserves resources, saves money, and satisfies the human urge to be creative (Abdul-Rahman 2014:2). Williams (2005) recognizes that despite the fact that reuse can be financially beneficial it may not be attractive in all cases as environmental and economic expenses of reuse in terms of cleaning, energy use, recovery, and transportation may overweigh its advantages.

2.10.3 RECYCLING

After the re-use of products and materials, recycling follows in the integrated waste management hierarchy. Recycling is a solid waste management strategy that entails the conversion of discarded consumer products, i.e. waste, into useful or environmentally friendly products (Williams 2005:63). Recycling involves the collecting, processing and manufacturing of materials in order for customers to purchase new products made from recycled materials. Various items can be recycled at household level, such as metals, glass, textiles, paper, organics, plastic etc. (Williams 2005:63). Tchobanoglous (2003) believes that recycling is the most doable and positively perceived. Recycling spares valuable finite resources by decreasing the requirement for mining of virgin materials, which lowers the environmental impact through mining and processing (Tchobanoglous 2003). According to Medina (2010) recycling lessens the amount of waste that needs to be gathered, disposed of and transported and further adds to saving money for municipalities and expanding the life of disposal facilities. Williams (2005) warns that even though the potential to recycle material from waste can be high it may not be beneficial. Recycling takes place differently in developing countries as municipalities usually lack recycling programmes. However, this does not mean recycling does not exist. Informal

recycling is the most practiced form of recycling and is common in developing countries where most recycling is carried out by scavengers (Medina 2010).

2.11 CHALLENGES OF WASTE MANAGEMENT IN DEVELOPING COUNTRIES

2.11.1 SOURCE SEGREGATION

In developing countries waste disposal occurs unscientifically with insufficient planning. This causes source segregation to be a challenge for sustainable waste management systems. Individuals living in urban areas rarely separate their waste, leaving waste collectors in charge of the sorting of waste. The segregation proficiency is extremely poor in developing countries due to the fact that waste collectors separate only the items they see of value for themselves and/or which have high financial incentive in the recycling industry (Tasherzadeh & Richards 2016:63-64).

2.11.2 EDUCATION/AWARENESS PROGRAMMES

A shortage of educational programmes, with regards to solid waste management, has caused in improper management. Additionally, the population working in this field don't have the knowledge or exposure, so there is a need of experts to fill this current gap (Ramachandra 2009:32).

2.11.3 HUMAN AND TECHNICAL FACTORS

Current human resources for waste management are inadequate. The officials that are in charge of waste management in developing countries are often uneducated with regard to waste management or lack the necessary technical training in order to handle the complex issues involved. The inadequate human resources available to manage solid waste is also a cause for the absence of waste management planning in developing countries (Kumar 2016:83-84). Additionally Reddy (2011:59) states that inadequate attention is given to the collection and analysis of solid waste data. Consequently, there are limited opportunities for administrators of waste management to become specialists and to develop and implement waste management plans that are tailored to the actual circumstances in developing countries. Ultimately, making it difficult to develop or license technologies that are best suited to these circumstances.

2.11.4 FINANCIAL ISSUES

Access to cash resources is fundamental for the effective execution of solid waste management systems. The government cannot adequately generate sufficient funds from their own tax

sources in developing countries. Furthermore, reluctance of the citizens to pay for the provided services and inadequate profits make it less appealing to privately owned businesses to invest in this sector (Sujauddin, Huda & Rafigul 2008). The local authorities often face many difficulties when required to provide services to the public, together with financial sustainability, therefore, it is vital to encourage the involvement of the private sector in order to overcome limitations created by a lack of professional experience and funds (Joseph & Nagendran 2007). Lohri (2014) revealed that an alliance between private companies and the Municipal Corporation is providing the financial resources to the MSW system.

The financial base for waste management activities is weak as waste management is a low-priority item in government budget allocations. To compensate for the deficiencies in the budget allocations, municipalities have resorted to outsourcing contracted services.

2.11.5 WASTE COLLECTION AND DISPOSAL

According to Medina (2010), insufficient waste collection and inappropriate final waste disposal are two of the major problems affecting cities in developing countries such as South Africa. Khatib (2011) states that MSW generated by the urban areas of most developing and least developed countries are collected and dumped in dump sites that have no norms. Jin, Wang and Ran (2006:1049) mention that the collection and transportation of solid waste create the greatest demand on municipal budgets and have an impact on urban living. Zuurberg (2003) states that a limited part of the urban population in developing countries has access to waste collection, leaving the low-income people residing in peri-urban areas without waste collection. Zuurberg (2003) attributes this lack to insufficient financial resources to manage the increasing amount of waste produced by the rapidly growing cities (Medina 2010; Zuurberg 2003).

According to Medina (2010) non-collection of waste that usually takes place in low-income communities leads to dumping in public open spaces and on vacant land, or the burning of waste. By accumulating on the streets uncollected waste can cause flooding by clogging drains when it rains. Uncollected waste also impacts on the social environment which poses various health hazards. Sometimes animals feed at the dumps of uncollected refuse and they can transmit diseases to humans living nearby (Medina 2010).

Zuurberg (2003) believes that institutional and financial constraints are the main contributing factors to poor waste discarding especially in situations where the local governments are weak or under financed and rapid urbanisation takes place (Zuurberg 2003).

2.12 HEALTH AND ENVIRONMENTAL IMPACTS OF INEFFICIENT WASTE MANAGEMENT

As a result of the continuous growth in the generation of solid waste, poor public attitudes towards effective waste management, mismanagement of waste and its ever-changing composition has exposed individuals to health risks. Giusti (2009) states that the disposal methods, treatment and handling of waste has indirect and direct effect on human health. Waste management has been made exasperating by the poor attitude of waste generators in developing countries. Waste is regularly thrown on the streets, which is further spread by animals searching for food and rag pickers in search of recyclables. Subsequently, this waste clogs the drains, resulting in stagnant water conditions which is favourable for mosquitoes and insects to breed which causes lymphatic filariasis, malaria and other diseases, thus creating risks to human health (Castro, Kanamori, Kannady, Mkude & Killeen. 2010).

Other health impacts consist of exposure to toxic chemicals through water, soil and air, risk of fires, stress related to odour, exposure to transport emissions, accidents, spills, subsidence, explosions, visual amenity, pests, noise, biological contaminants and infection (Reddy 2011:11).

All wastes that are generated need to be managed in a suitable manner. The environment is deteriorated by the mismanaged and unscientific disposal of waste (Venkatesan and Swaminathan 2009). Irresponsible waste management practices pollutes the air, water and soil as uncollected refuse can be carried away by run-off water into rivers, estuaries and oceans causing negative impact on the ecosystems (Medina 2010).

Individuals, communities and industries have found numerous approaches to decrease and improve the management of MSW through a variety of methods to separate recyclable materials and to generate energy in the form of electricity and heat. There are numerous factors which have an impact on the successful management of the solid waste, such as, creating a sense of awareness amongst individuals with regards to the advantages of appropriate waste management, emphasis on waste reduction, self-sustainability as well as technical feasibility and institutional arrangements (Reddy 2011:13).

2.13 SUMMARY AND CONCLUSION

The main objective of this chapter was to provide a comprehensive literature overview, of the various topics relevant to waste management and recycling, in order to have a clear understanding of all the topics being researched.

The clarification of key concepts, such as waste, MSW, household waste, domestic waste disposal, recycling, reusing, reducing and integrated waste management were provided in order to identify and relate to the various topics discussed in this chapter. The history of waste management and recycling was studied in order to provide the reader with greater knowledge with regards to how waste management and recycling originated. The triple bottom line was explained in order to ensure that the reader understands the idea of economic, environmental and social perspectives all playing a role to achieve sustainable waste management. The Theory of Planned Behaviour was examined because it provides a theoretical framework for systematically identifying the determinants of household recycling behaviour, and further investigating the influence of these factors on behaviour. Additionally, the waste hierarchy was explained to allow the reader to recognise the order of preference with regards to the handling and disposal of wastes. The effect of an individuals' attitudes toward the recycling of household waste was explored and it can be concluded that they play a major role in determining whether the individual recycles or not. This makes it essential for individuals to grasp a positive and willing attitude toward the recycling of household waste. The importance of the recycling of household waste was investigated for the purpose of informing the readers that it is a vital need. Relating to this, the health and environmental impacts of inefficient waste management were discussed to create a sense of awareness and shock amongst the readers. Household waste in NMB was discussed for the purpose of providing the reader with the amount of waste being recycled within their community, as well as to inform readers about the importance of households separating their wastes at the source. Furthermore, the waste management laws and recycling programmes in South Africa were investigated to inform readers about their rights and obligations with regards to waste management, and recycling programmes that are available for households to utilise. Household waste management practices were investigated for the purpose of informing the reader about the numerous practices available in order to reuse, reduce and recycle wastes. The major challenges that developing countries face, with regards to efficient waste management, were discussed to put the recycling of household waste in NMB in perspective for the readers.

The following chapter (Chapter Three) will provide the reader with the research design and methodology that was followed in order to obtain and analyse the information required to perform this study.

CHAPTER THREE

RESEARCH DESIGN AND METHODOLOGY

3.1 INTRODUCTION

The two preceding chapters provided a detailed introduction to the topic of attitudes and practices of consumers towards household recycling in NMB as well as a comprehensive theoretical overview of the topic.

This chapter focuses on the research design and methodology and explains which research method will be utilised and how the necessary secondary and primary data required for the study will be obtained. The quantitative research approach, along with a descriptive research method, will be selected as the chosen starting point in conducting the research.

More specifically, this chapter provides a detailed insight into the methodology of the research. Specific attention will be given to the concepts of research design, research methodology, research methods, population, sample and sampling techniques. Furthermore, the data collection sections deal with ways in which both secondary and primary data will be collected, where after the research instrument (questionnaire) used will be discussed. In addition, a short description of a pilot study will be provided, followed by the data analysis with specific focus on how the questionnaire will be analysed with the use of descriptive statistics in order to draw conclusions.

Lastly, a discussion of the importance and measures of reliability in this study are provided, followed by a summary and conclusion to indicate the main topics covered in this chapter.

3.2 RESEARCH DESIGN

Research design specifies which research questions must be answered, how and when the data will be collected and how the data will be analysed (Lamb, Hair, McDaniel, Boshoff & Terblanche 2008:151). The research design will be conducted in order to identify the problem statements and objectives of this study, which is to investigate the attitudes and practices of consumers toward household recycling in NMB. In the following section, the two main research methodologies will be explained.

3.3 RESEARCH PARADIGM

There are two main research methodologies, namely a positivistic methodology (quantitative research) and a phenomenological methodology (qualitative research).

3.3.1 A POSITIVISTIC RESEARCH METHODOLOGY (QUANTITATIVE)

According to various researchers (Cooper & Schindler 2014:146; Struwig & Stead 2013:3) quantitative research involves the analysis of numerical data, even though the key role of quantitative research is to test specific hypotheses and examine specific relationships between the dependent and independent variables.

Advantages of the quantitative research method include an approach that is objective in nature and concentrates on measuring phenomena (Collins & Hussey 2003:13). Another advantage is that quantitative research tends to be unbiased (Collins & Hussey 2003:45).

A disadvantage of the quantitative research method is that many social and cultural aspects of organisations are lost or treated in a superficial manner (Myers 2009:9).

3.3.2 A PHENOMENOLOGICAL METHODOLOGY (QUALITATIVE)

Qualitative methods rely on observation, interview, case study and analysis of diaries or written documents and produce flow diagrams and narrative description of events or processes (Landy & Conte 2007:55).

Qualitative research is data that are not characterised by numbers and instead are textual, visual or oral. The focus is on stories, visual portrayals, meaningful characteristics, interpretations and other expressive descriptions (Zikmund, Babin, Carr & Griffon 2010:146).

An advantage of the qualitative research method is that it is more subjective in nature and it involves examing and reflecting on perceptions in order to gain an understanding of social and human activities (Collins & Hussey 2003:13).

A disadvantage of the qualitative research method is that, due to its subject nature it can be biased (Collins & Hussey 2003:48).

3.3.3 RESEARCH PARADIGM ADOPTED IN THIS STUDY

Quantitative research will be conducted as the research methodology approach, consisting of a survey in the form of a self-administered questionnaire. The quantitative research approach consists of the attitudes and practices of consumers toward household recycling in NMB. The

research approach followed in this study requires the collection and analysis of quantitative data.

3.4 RESEARCH APPROACH

Exploratory research is conducted to clarify ambiguous situations or discover ideas that may be potential business opportunities (Zikmund *et al.* 2010:652).

Descriptive research describes characteristics of objects, people, groups, organisations or environments and tries to illustrate a given situation (Zikmund *et al.* 2010:651).

A descriptive research method will be used in this study in order to obtain the relevant data needed that will assist the researchers to determine the attitudes and practices of consumers toward household recycling in NMB.

3.5 POPULATION

A population or universe is any complete group of people, companies, hospitals, stores, university students, or the like, that share some set of characteristics. A population and universe can be distinguished in the way that a group is either finite (a population) or infinite (a universe) (Zikmund 2003:368). For the purpose of this study, the research population consists of all consumers in NMB. However, due to the inability of researchers to test all consumers in NMB, a sample will be selected.

3.6 SAMPLING

According to Crossman (2015) a sample is defined as a subset of the population. After having identified the appropriate population for the study, either probability or non-probability sampling will be used. In probability sampling, the sample is selected using deliberate, unbiased process, so that each sample unit in a group has an equal chance of being selected. In non-probability sampling, the decision of sample group is left to the researcher and hence element of bias always appears in such examinations. Researchers are able to choose from various non-probability sampling techniques, including convenience, judgemental, quota and snowball sampling (Bryman & Bell 2011:181; Collis & Hussey 2014:132; Struwig & Stead 2013:116-117). A convenience sample is chosen purely on the basis of availability, while judgement sampling is when a sample is chosen on the basis of expert judgement, where specialists in the subject of the survey choose what they believe to be the best sample for that specific study (Struwig & Stead 2013:116).

For the purpose of this study, non-probability sampling will be used, adopting convenience and judgemental sampling as the techniques. The sample size for this research will consist of 120 NMB consumers. A computerized random sampling procedure in STATISTICA selected a sample of households.

3.7 DATA COLLECTION

In order to successfully address the research objectives of this study, the research is divided into two categories, namely secondary and primary research.

3.7.1 SECONDARY DATA COLLECTION

Secondary data is data that is not directly gathered, but is already available. In other words, secondary data are data that has already been gathered and recorded by someone else, other than the user, for an alternative reason than the current research (Boone & Kurtz 2015:316; Collis & Hussey 2014:59; Struwig & Stead 2013:82). Sources of secondary data include annual reports, journal articles, newspaper articles, government publications and business reports (Struwig & Stead 2013:82; Wilson 2010:170).

In order to achieve the primary objective of this study, the secondary research of this study will consist of an extensive literature review in order to identify and describe the attitudes and practices of consumers towards household recycling in NMB. The secondary research of this study will be conducted by consulting a variety of relevant textbooks and well known journal articles such as Kumar (2016), Reddy (2011) and Sharholy *et al*. (2008).

In addition, the library facilities available at the Nelson Mandela University (NMU) will be used to access National and International databases, such as Emerald, EBSCOhost and Sabinet, which will be consulted to identify preceding research on the attitudes and practices of household recycling.

3.7.2 PRIMARY DATA COLLECTION

Due to the study being quantitative in nature, a large sample will be required, resulting in the researchers using of a survey research method, whereby a structured questionnaire will be used to collect the data, which will in turn be statistically analysed and interpreted. For the purpose of this study, convenience sampling will be used as a sampling technique to conduct the research due to the ease of access to consumers in NMB, as well as the fact that there are currently no databases of all consumers in NMB. Consumers in NMB will be approached by

field-workers from NMU, where a self-administered questionnaire will be handed out to willing participants and upon completion, the field-workers will collect the completed questionnaire.

3.8 RESEARCH INSTRUMENT (QUESTIONNAIRE)

The items of the measuring instrument will be sourced from existing measuring instruments used in similar research, and which have been deemed both, valid and reliable. The respondents will be required to complete a structured self-administered questionnaire which will be used as the basis for the data collection. Respondents will be required to evaluate their responses using a nominal and ordinary scale, namely the five point Likert scale.

The questionnaire will be accompanied by a cover letter and will consist of four sections. The cover letter that will accompany the questionnaire highlights the research topic, the objective of the research, as well as the promise of confidentiality. Furthermore, instructions for the completion of the questionnaire will be included, as well as details applicable to NMU and the division responsible for the research.

The questionnaire will be developed according to the requirements of the study and consist of three sections as follows:

- Section A of the questionnaire will focus on the general perceptions regarding environmental sustainability.
- Section B of the questionnaire will investigate consumers' attitudes toward recycling of household waste using five-point Likert-type ordinal scale.
- Section C will investigate practices regarding household waste by means of five-point Likert-type ordinal scale.
- Section D of the questionnaire will focus on the biographical information of respondents using a nominal scale.

A copy of the research instrument (questionnaire) is attached as Annexure A at the end of this document.

3.9 PILOT STUDY

Zikmund *et al*. (2010:65) indicate that a pilot study is a small-scale research project that collects data from respondents similar to those to be used in the full study. The researchers will conduct a pilot study through distributing ten self-administered questionnaires among potential

respondents in order to determine whether the questionnaire is understandable and efficient to use among various respondents.

3.10 DATA ANALYSIS

Cooper and Schindler (2014:86) indicate that data analysis involves reducing accumulated data to a manageable size, developing summaries, looking for patterns, and applying statistical techniques. Furthermore, it is during this phase that raw data is converted into useful information, whereby patterns can be identified, and statistical techniques applied (Cooper & Schindler 2014:86). For the purpose of this study, the primary data collected from the research questionnaire will be captured in Microsoft Excel 2013. Once the data is cleaned, the statistical programme, known as Statistica, will be utilised to analyse the captured data.

Descriptive statistics will be utilised to analyse the data collected by the quantitative study. These statistics includes measures of mean, mode, median and standard deviations as well frequency distributions. These results will be analysed and conclusions and recommendations will then be formulated.

3.11 VALIDITY AND RELIABILITY OF THE MEASURING INSTRUMENT

Validity is defined as the accurateness of inferences made, based on test or performance data. It also addressed whether a measure accurately and completely represents what was intended to be measured (Landy & Conte 2007:73). Face validity is when a scale's content logically appears to reflect what was intended to be measured, while content validity is the degree that a measure covers the breath of the domain of interest (Zikmund *et al.* 2010:307). A pilot study, along with expert opinion will be utilised, in order to prove the validity of this study.

3.12 SUMMARY AND CONCLUSION

The main objective of this chapter was to provide a comprehensive analysis of the research methodology used in this study. The research methodology has been identified and discussed and the quantitative research method was adopted according to the requirements of the study. Furthermore, it was determined that the descriptive research method was the appropriate choice to facilitate the quantitative research method.

The population of this study consisted of all consumers in NMB, where samples of a maximum of 120 (one hundred and twenty) selected respondents were selected for the purpose of the research.

The two different sampling techniques namely probability and non-probability sampling techniques have been identified and discussed. In this study a non-probability sampling technique has been adopted, due to the fact that the researchers selected the sample on the basis of convenience sampling in order to obtain the input of the different consumers identified in the population section of the study.

Primary and secondary data were utilised to assist the researchers in collecting the necessary data needed to conduct the study. The secondary data was used in order to establish a theoretical framework of the attitudes and practices of consumers toward household waste management. The secondary data consisted of books, contemporary journal articles, the Google search engine, textbooks and existing studies. Primary data was used to obtain information from different consumers in NMB. A survey in the form of a self-administered questionnaire was the main source of primary data used.

The research instrument consisted of a self-administered questionnaire formulated for this particular study and utilises closed-ended questions. The questionnaire consisted of four sections and is included as annexure A at the end of this study.

A pilot study will be conducted through distributing 10 (ten) self-administered questionnaires among potential respondents in order to determine whether the questionnaire is understandable and efficient to use for various respondents.

The data that was collected was analysed with the aid of descriptive statistics, in order to establish reliable and valid interpretations, conclusions and recommendations on the attitudes and practices of consumers toward household waste management in NMB.

The following chapter (Chapter Four) of this study will provide the reader with the results of the empirical study.

CHAPTER FOUR

EMPIRICAL FINDINGS

4.1 INTRODUCTION

The preceding chapters have dealt with the theoretical overview of the attitudes and practices of consumers towards household recycling in NMB and the research methodology associated with the collection of the data applicable to this study.

This chapter (Chapter Four) focuses on the results of the empirical study concerning the attitudes and practices of consumers toward household recycling in NMB.

The chapter follows with a discussion on the reliability and validity of the study, followed by a section which includes preliminary data analysis, consisting of the descriptive statistics used for data inspection (such as measures of central tendency and the measures of variability) and the variables of the study.

Subsequently, the results of the empirical investigation will be discussed, starting with the biographical information (Section D) of the respondents. The subsections of the biographical information include the respondent's gender, ethic classification, highest qualification, position in the household, age, size of family, type of dwelling and current employment status.

Thereafter, the results of the general perceptions regarding environmental sustainability (Section A), consumer attitudes regarding household waste management (Section B) and perceptions regarding household waste management practices (Section C) will be discussed.

Furthermore, a brief summary of the main findings obtained from the empirical results will be provided, consisting of the biographical information, the general perceptions regarding environmental sustainability, consumer attitudes regarding household waste management and perceptions regarding household waste management practices. This chapter concludes with a summary and conclusion.

4.2 SAMPLE DESCRIPTION

In this study the majority of the respondents (62%) were female, while male respondents accounted for (38%) of the sample. Most of the respondents were between the ages 31-40 years (22%). Most of the respondents were white (65%), followed by black (15%) and coloured

(15%). The majority of the respondents lived in a house (56%) and had a family size of between three to four members (47%). Most of the respondents had a diploma or national certificate (29%), followed by a grade 12 (27%). The majority of the respondents held the position as a mother/father (68%) in the household and were full time employed (42%).

4.3 RESULTS OF THE EMPIRICAL INVESTIGATION

The results of Section A, B, C and D of the questionnaire are presented in the following sections.

A total of 120 (one hundred and twenty) reliable and valid questionnaires were distributed among respondents in NMB. Each questionnaire was personally delivered and collected from various respondents, resulting in a response rate of 100 percent.

The empirical investigation consisted of a total of 120 duly completed questionnaires.

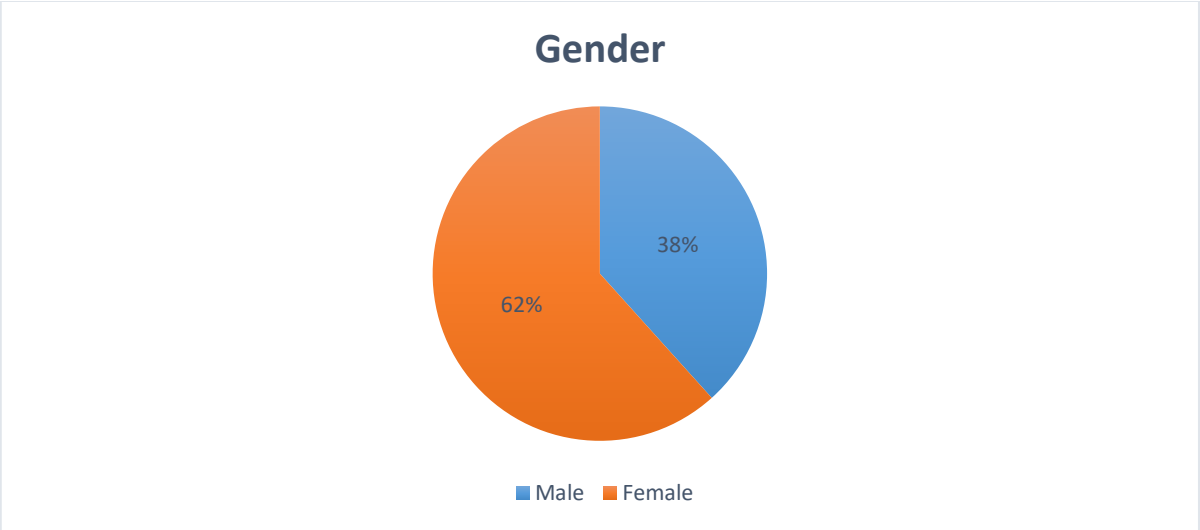
4.4.1 BIOGRAPHICAL INFORMATION (SECTION D)

Section D of the questionnaire requested biographical information from various respondents.

4.4.1.1 Gender

Figure 4.1 below describes the frequency of gender for the respondents. A total of 38 percent of the respondents were male and the remaining 62 percent of the respondents were female. Thus the majority of the respondents were female.

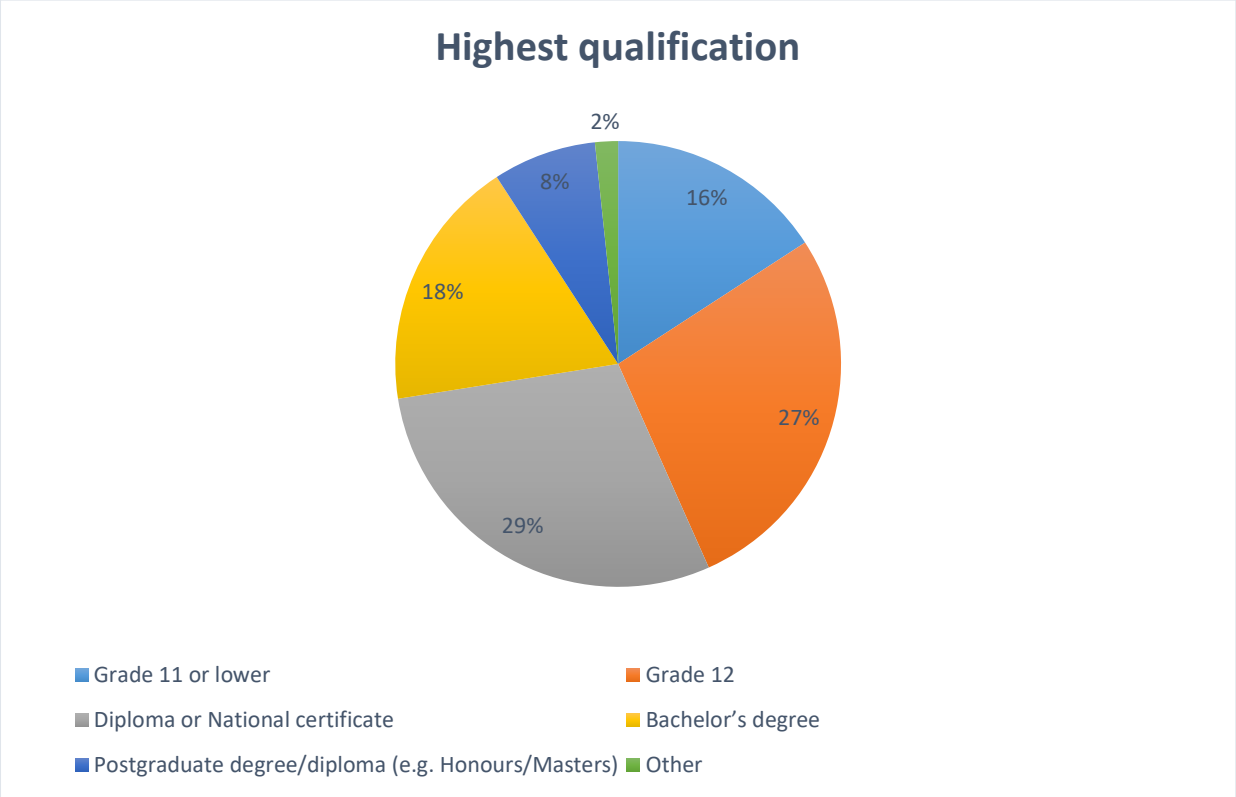
Figure 4.1 Gender of respondents



4.4.1.2 Education

Figure 4.2 indicates the highest education level obtained by the respondents. A total of 19 percent of the respondents represent the grade 11 or lower category, 33 percent have obtained a grade 12, 35 percent of the respondents have a diploma or national certificate and 22 percent represent the bachelor's degree category. 9 percent of the respondents obtained a postgraduate degree or diploma. The remaining 2 percent represent the other category. It appears that the majority of the respondents have achieved a diploma or national certificate.

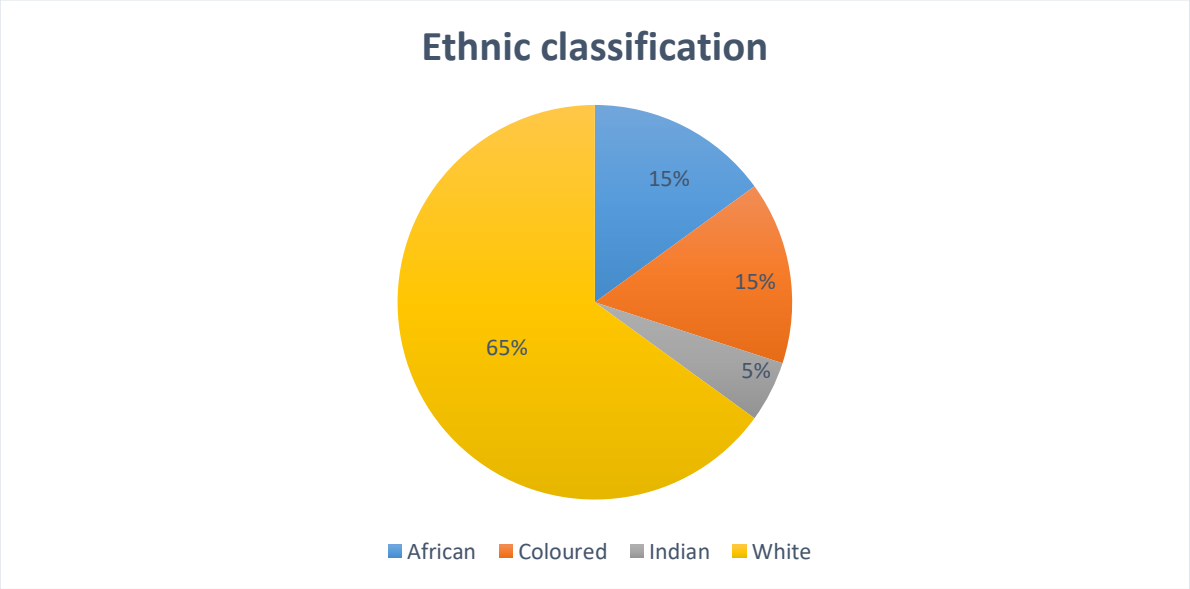
Figure 4.2 Education of the respondents



4.4.1.3 Ethnicity

The figure below shows the ethnicity of various respondents. A total of 65 percent of the respondents represent the white ethnic group, 15 percent were black, another 15 percent of the respondents were coloured and the remaining 5 percent of respondents were Indian. The majority of respondents were from the white ethnic group with the other ethnic groups being sufficiently represented for the purposes of the study.

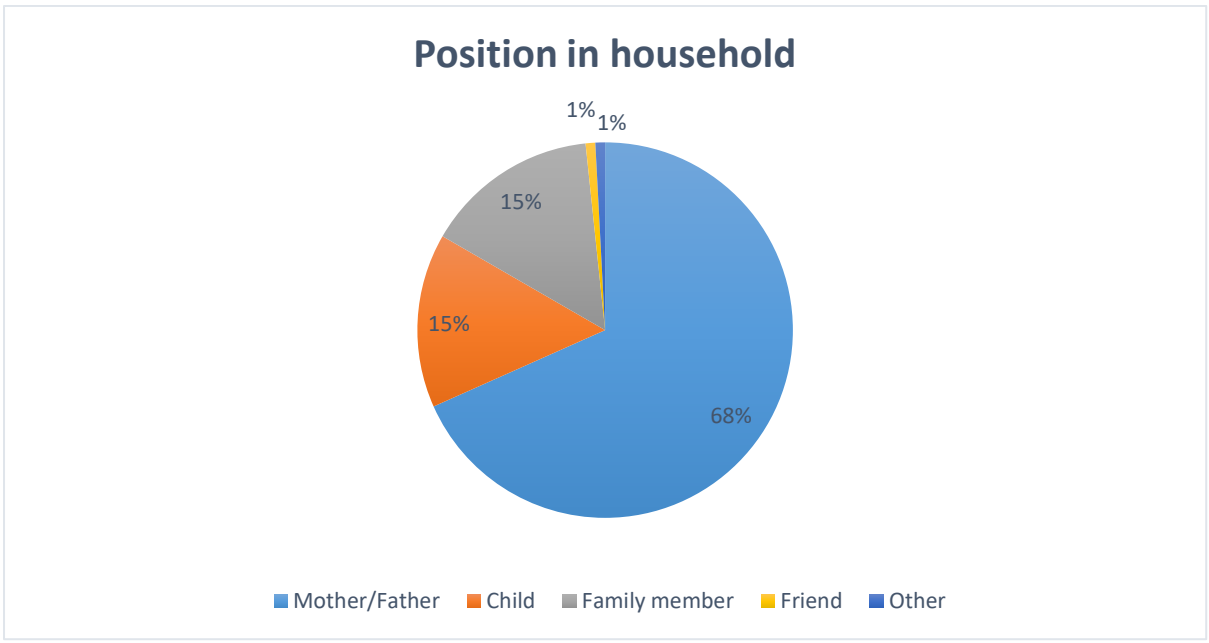
Figure 4.3 Ethnicity of respondents



4.4.1.4 Position in household

Figure 4.4 indicates the respondent's position in their household. A total of 82 percent of the respondents indicated that they were either the mother or father of the household, 18 percent were a child in the household and another 18 percent were family members of the household. The remaining 2 percent was split in 1 percent being a friend of the household and the other 1 percent indicating other. The majority of the respondents were either the mother or the father of the household.

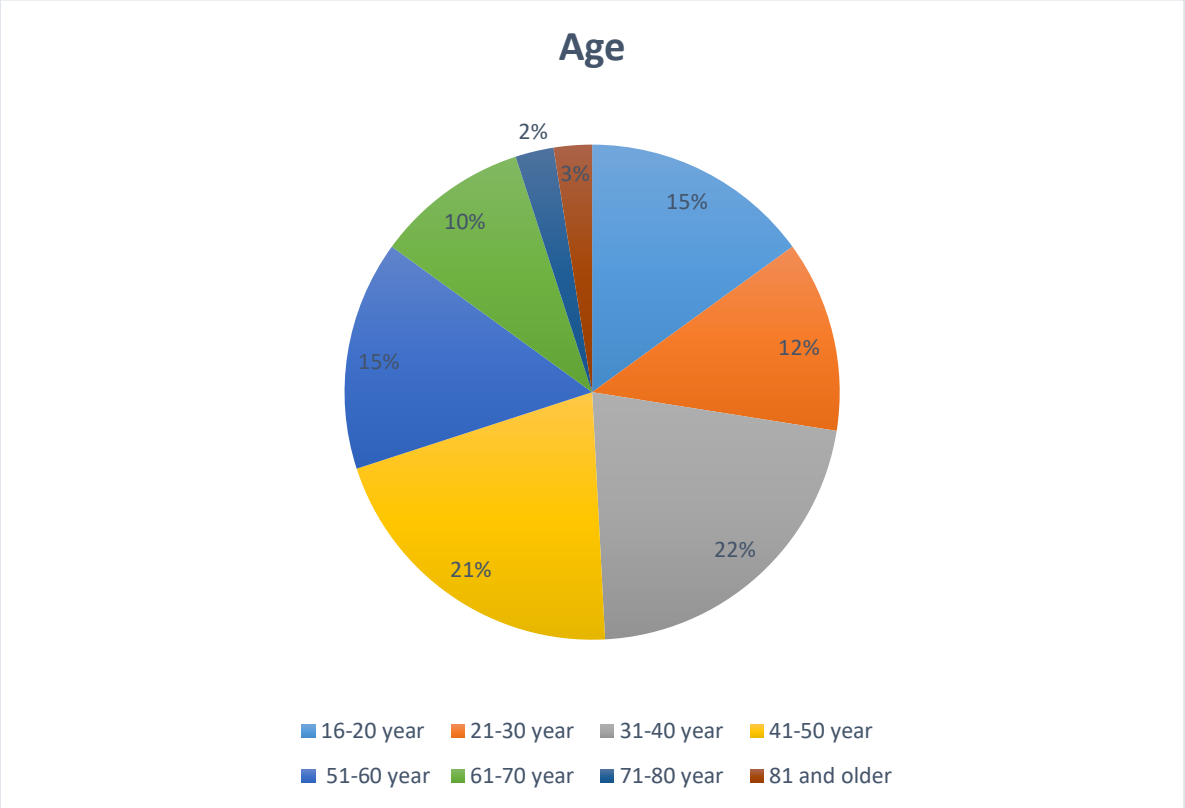
Figure 4.4 Respondents position in household



4.4.1.5 Age

Figure 4.5 below indicates the age distribution of the respondents of the empirical study. A total of 15 percent of respondents represent the age category of 16-20 years, 13 percent the age category 21-30, 22 percent represent the age category 31-40, 21 percent indicated they represent the age category 41-50, 15 percent the age category 51-60, 10 percent fell under the age category 61-70, just 3 percent the age category 71-80 and 3 percent were 81 or older. The largest age category represented in our study is therefore 31-40 years of age.

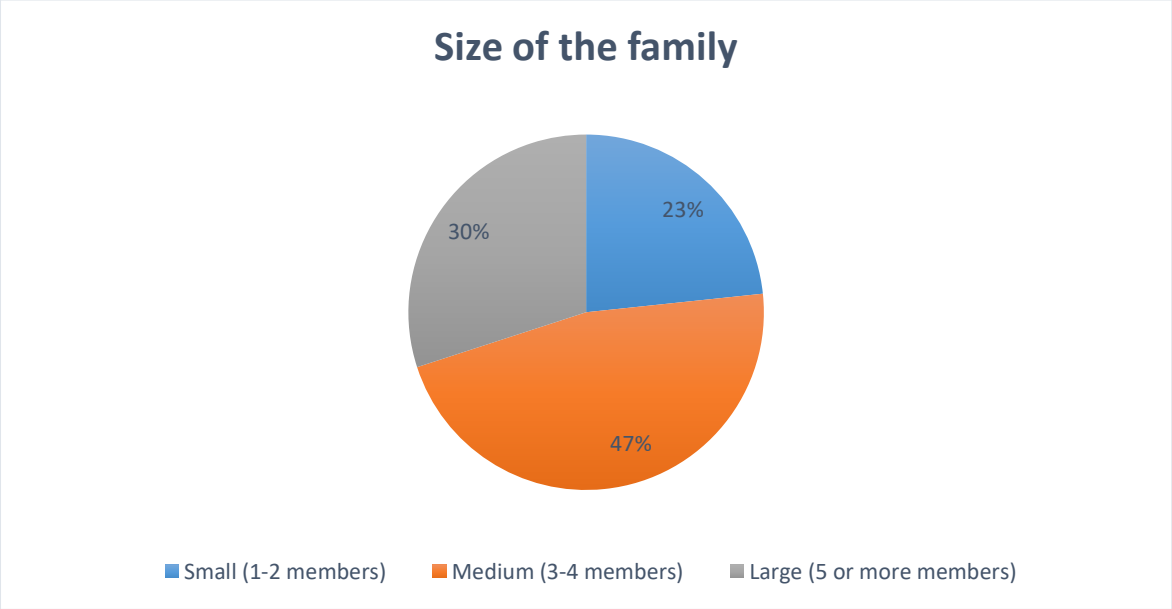
Figure 4.5 Age of the respondents



4.4.1.6 Size of respondents family

Figure 4.6 shows the size of the respondent's family size. A total 56 percent of the respondents represent the medium (3-4 members) size category, 36 percent of the respondents had a large family size (5 or more members) and the last 28 percent had small family size of 1-2 members. The majority of the size of the respondent's families was represented by the medium sized families.

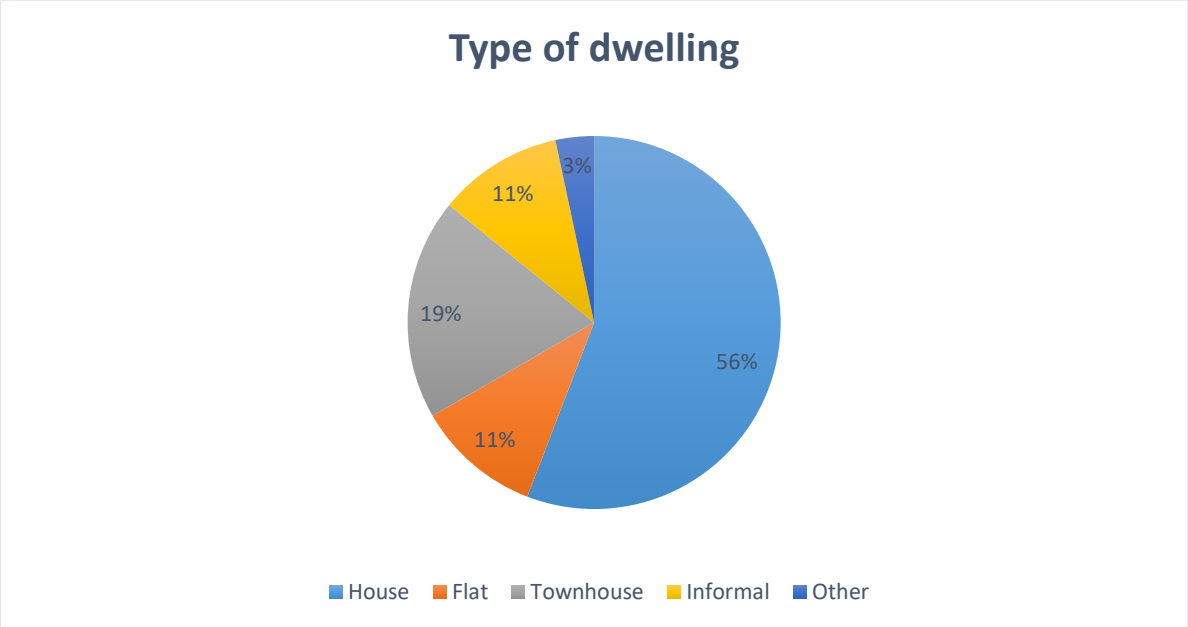
Figure 4.6 Respondents family size



4.4.1.7 Type of dwelling

The figure below shows types of dwelling of the various respondents. A total of 58 percent of the respondents indicated that they reside in a "house", 11 percent of respondents indicated that a "flat" was there place of residence, 20 percent live in a townhouse and 11 percent live in informal residences. The majority of respondents live in houses with the other types of residences being sufficiently represented for the purposes of the study.

Figure 4.7 Respondents type of dwelling



4.4.1.8 Respondents current employment status

Figure 4.8 indicates the current employment status of the respondents. A total of 50 percent of the respondents are employed full time. The remaining 50 percent of the respondents indicate that 16 percent are employed part time, 14 percent are students, 13 percent are retired, another 13 percent are unemployed, 10 percent are self-employed, 3 percent are unable to work and 1 percent indicated other.

Figure 4.8 Current employment status of the respondents

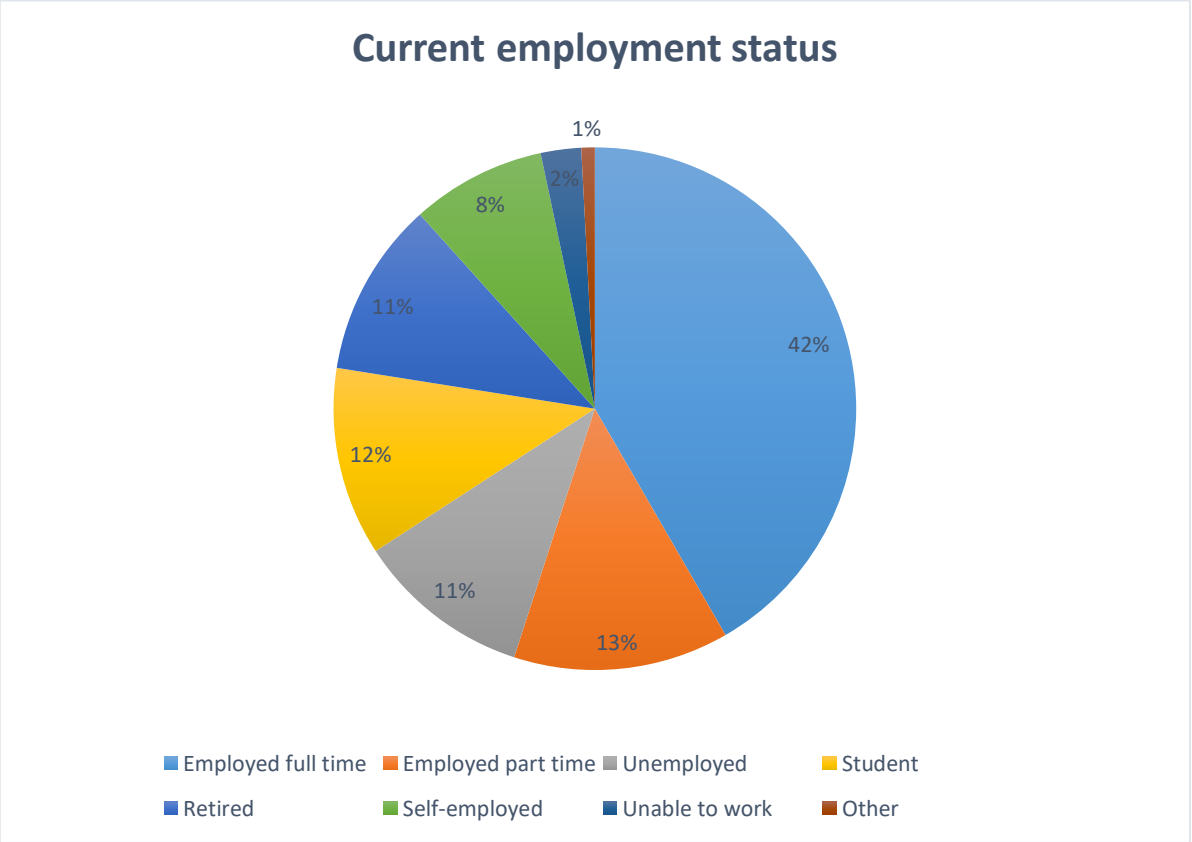


Table 4.1 illustrates a summary of the biographical information of the respondents.

Table 4.1 Summary of biographical information (Section D)

Characteristic	Category	%
Gender	Male	38
	Female	62
Ethnic classification	African	15
	Coloured	15
	Indian	5
	White	65
Highest qualification	Grade 11 or lower	16
	Grade 12	27
	Diploma or National certificate	29
	Bachelor's degree	18
	Postgraduate degree/diploma	8
	Other	2
Position in household	Mother/father	68
	Child	15
	Family member	15
	Friend	1
	Other	1
Age in years	16-20 years	15
	21-30 years	12
	31-40 years	22
	41-50 years	21
	51-60 years	15
	61-70 years	10
	71-80 years	2
	81 and older	3
Size of the family	Smaller (1-2 members)	23
	Medium (3-4 members)	47
	Large (5 or more members)	30
Type of dwelling	House	56
	Flat	11
	Townhouse	19
	Informal	11
	Other	3
Current employment status	Employed full time	42
	Employed part time	13
	Unemployed	11
	Student	12
	Retired	11
	Self-employed	8
	Unable to work	2

	Other	1

4.4.2 GENERAL PERCEPTIONS REGARDING ENVIRONMENTAL SUSTAINABILITY (SECTION A)

The following section (Section A), relating to the general perceptions regarding environmental sustainability, will now be analysed in the form of a table which will further be explained.

4.4.2.1 Descriptive statistics relating to general perceptions regarding environmental sustainability

Table 4.2 illustrates descriptive statistics relating to the general perceptions regarding environmental sustainability, indicating the mean, mode, median and standard deviation. With regards to the standard deviation, low scores, thus being scores below one, indicate that the data points tend to be close to the mean of the set, and high scores, thus being scores above one, indicate that the data points are spread out over a wider range of values.

Table 4.2 Descriptive statistics relating to general perceptions regarding environmental sustainability

Question	Mean	Mode	Median	Standard deviation
A1	3,88333333	5	4	0,988873677
A2	3,5	4	4	0,943798868
A3	2,88333333	3	3	0,75796425
A4	3,125	3	3	0,8940748
A5	3,55833333	4	4	0,896265204
A6	2,76666667	2	3	0,886247242
A7	2,61666667	2	2	0,75796425
A8	4,175	5	4	0,913599401
A9	3,93333333	4	4	0,950305863
A10	4,625	5	5	0,51957481
A11	2,975	3	3	0,947907913
A12	4,5	5	5	0,67363307
A13	2,675	2	3	1,146148098
A14	2,73333333	2	2	1,193352268
A15	2,41666667	2	2	1,10448538
Overall	3,35777778	2	3	0,90494634

The average mean (3.36) and standard deviation (0.90) for statements A1-A15 were calculated.

The mean of 3.36 indicates that the data lies in the 'neutral' range, however, the most common mode of 2 indicates that most respondents tended to disagree with the statements present in Section A. The standard deviation score of 0.90 indicates that there is a relatively low dispersion of the data values. Statement A10, thus being 'In my household we are of the opinion that insufficient collection of waste could lead to significant problems (e.g. pollution and health risks)', had the highest mean (4.63) and a mode of 5 suggesting that the majority of the respondents strongly agreed with this statement. This is a significant result as literature on this topic suggests that in developing countries the inadequate disposal and insufficient collection of waste has led to significant problems of pollution and risks to human health and the environment (Medina 2010). Only 4% of the respondents disagreed with this statement, further noting that they all had Grade 12 as their highest qualification and were younger than 30 years of age. Additionally, statement A12, thus being 'In my household we believe that we need to make sacrifices in order for a greener future', had a mean of 4.50, a mode of 5, a median of 5 and a standard deviation of 0.67. This low standard deviation value is notable as it indicates that majority of the respondents answered this statement in a similar way. Only one individual disagreed with this statement, his highest qualification was Grade 11 or lower and he lived in an informal residence. Statement A15, thus being 'In my household we know the complications of improper waste management', illustrates the lowest mean (2.42). Only 9 respondents agreed or strongly agreed with this statement, of these respondents, 2 respondents had a post graduate degree, 4 respondents had a bachelor's degree and the remaining 3 respondents had a diploma or national certificate. Furthermore, it is evident that the respondents were not aware of the segregation of waste as statement A14, thus being 'In my household we are aware of the segregation of waste', had a mean of 2.73. Only 13 respondents agreed or strongly agreed with this statement and stated that they were all full time employed. Furthermore, 8 of the 13 respondents lived in a house, while the others lived in either a townhouse or a flat. The results of statement A14 correlates with research done by the Nelson Mandela Metropolitan Municipality (2005:30) which states that very little waste separation currently occurs in NMB, as most households have very little awareness about recycling and the environment. This is a cause for concern as according to Palm (2012:9), the sorting and separating of recyclable material at the household level is crucial and strongly depends on the public's participation.

For the purpose of this study and data analysis the following statements in Section A have been grouped in order to be analysed in a more effective way. Statements A1-A7 represent the

concern for the environment, A8-A11 consist of the knowledge of effects and A12-A15 deal with knowledge of practices.

4.4.2.2 Concern for the environment

In Section A, questions A1-A7 relate to the respondents' concern for the environment. These statements had an overall mean of 3.19 and standard deviation of 0.97. Below is a table summarising these descriptive statistics.

Table 4.3 Concern for the environment

CONCERN FOR ENVIRONMENT							
MEAN	3,19	**STEDV**	0,97	**MODE**	4	**MEDIAN**	3

With regards to the mean, most of the statements delivered different individual means compared to the average mean calculated above. Statement A5, thus being 'In my household we are mindful of not harming the environment through household waste disposal', was found to have the highest mean (3.56). 83% of the respondents that disagreed or strongly disagreed with this statement lived in an informal dwelling, and 70% of the respondents that disagreed or strongly disagreed with this statement had large families (5 or more members). Conversely, 81% of those that either agreed or strongly agreed with this statement had a degree and 72% lived in a house. This result corresponds with current literature which states that socioeconomic factors, such as illiteracy and poverty, affect an individuals' means of waste disposal. Additionally, previous studies have indicated that there is often a correlation between an individuals' attitudes towards recycling and their socioeconomic status (Yusof 2004:25). Statement A7, thus being 'In my household we consider the environment when buying a product or service', indicates the lowest mean (2.61). Only 3 respondents strongly agreed with this statement and they all lived in a house and had a degree. Furthermore, statement A6, thus being 'In my household responsible waste management is seen as an essential part of our daily life', also had a low mean (2.77). 87% of the respondents that either disagreed or strongly disagreed with this statement lived in an informal dwelling and 56% were part time employed.

4.4.2.3 Knowledge of effects

In Section A, statements A8-A11 relate to the respondents' knowledge of effects of excessive waste. These statements had an overall mean of 3.93 and a standard deviation of 0.83. Below is a table summarising these descriptive statistics.

Table 4.4 Knowledge of effects

KNOWLEDGE OF EFFECTS							
MEAN	3.93	**STEDV**	0,83	**MODE**	5	**MEDIAN**	4

Most of the statements delivered approximately the same individual values as the average mean mentioned above. The most common mode was 5, therefore, indicating that majority of the respondents strongly agreed with these statements. Additionally, statement A10, thus being 'In my household we are of the opinion that insufficient collection of waste could lead to significant problems (e.g. pollution and health risks)', was found to have the highest mean (4.63). This result is significant as literature suggests that currently most domestic waste is either burned or disposed of in landfill sites or on vacant land. This insufficient and inadequate disposal of waste has led to significant problems of pollution and risks to human health and the environment (Medina 2010). Statement A11, thus being 'We are conscious about the impact of our daily living on generating/disposing of household waste', indicates the lowest mean (2.97). Additionally, statement A9, thus being 'In my household we are aware that the greenhouse effect is caused by the release of excessive carbon dioxide into the atmosphere', indicates a mean (3.93). Respondents with either a bachelor's degree or a post graduate degree/diploma scored above the average mean score with mean scores of 4.27 and 4.44 respectively, whereas respondents with their highest qualification being a diploma or national certificate scored below the mean score. The results of statements A11 and A9 above are significant as research done by Oelofse and Strydom (2010) examined drivers of recycling both in a household-and industry context and found higher participation levels amongst households where members were better educated and more environmentally conscious.

4.4.2.4 Knowledge of practices

In Section A, statements A12-A15 relate to the respondents' knowledge of practices regarding waste. These statements had an overall mean of 3.08 and a standard deviation of 1.03. Below is a table summarising the descriptive statistics of these statements.

Table 4.5 Knowledge of practices

KNOWLEDGE OF PRACTICES							
MEAN	3,08	**STEDV**	1,03	**MODE**	2	**MEDIAN**	2

The majority of the statements delivered different individual means compared to the average mean and the high standard deviation score of 1.15 indicates that the there is a great deal of variation among the results. Statement A12, thus being 'We believe that we need to make sacrifices in order for a greener future' had the highest mean (4.5). Statement A15, thus being 'In my household we know the complications of improper waste management', illustrates the lowest mean (2.30). Additionally, statement A14, thus being 'In my household we are aware of the segregation of wastes', indicated a mean of (2.73). These findings are important as literature from Strydom (2012:2), states that individuals need knowledge of how a recycling scheme works, how to sort their recyclables and where to recycle their waste. Additionally, Bolaane (2006:731-740) confirms that the success of recycling initiatives is dependent on individuals experience and knowledge about recycling coupled with a change in attitude towards such issues.

4.4.3 CONSUMER ATTITUDES REGARDING HOUSEHOLD WASTE MANAGEMENT (SECTION B)

The following section (Section B), relating to consumer attitudes regarding household waste management, will now be analysed in the form of a table which will further be explained.

4.4.3.1 Descriptive statistics relating to consumer attitudes regarding household waste management.

Table 4.3 illustrates descriptive statistics, relating to consumer attitudes regarding household waste management, indicating the mean, mode, median and standard deviation. With regards to the standard deviation, low scores, thus being scores below one, indicate that the data points tend to be close to the mean of the set, and high scores, thus being scores above one, indicate that the data points are spread out over a wider range of values.

Table 4.6 Descriptive statistics relating to consumer attitudes regarding household waste management.

Question	Mean	Mode	Median	Standard deviation
B1	2,891667	4	3	1,36459329
B2	3,741667	4	4	1,148589441
B3	2,866667	2	3	1,334313365
B4	4,325	5	4	0,746560742
B5	4,258333	5	5	0,939299161
B6	1,933333	1	2	1,193352268
B7	2,608333	3	3	1,176062604
B8	2,6	1	2,5	1,305450758
B9	2,7	2	2	1,344768888
B10	2,708333	1	3	1,35594448
B11	4,366667	5	5	0,859287699
B12	4,183333	4	4	0,879107008
B13	4,308333	5	5	0,923965088
B14	4,216667	5	4	0,945429815
B15	3,25	5	3	1,47955251
B16	2,575	2	2	1,332606595
B17	4,008333	4	4	0,930309728
B18	4,533333	5	5	0,829430637
B19	1,8	1	1	1,06589608
B20	4,5	5	5	0,898177426
Overall	3,41875	5	3,5	1,102634879

The overall average mean was 3.42 and the standard deviation was 1.1 for statements B1-B20.

The mean of 3.42 indicates that the data lies in the ‘neutral’ range, however, the most common mode of 5 indicates that most respondents tended to agree with the statements present in Section A. The standard deviation score of 1.10 indicates that there is a relatively large dispersion of the data values. Furthermore, statement B18, thus being ‘My household believes that socio-economic factors (e.g. illiteracy, poverty, and irresponsible waste management) have the potential to impact an individuals’ waste management attitudes’ had the highest mean (4.53), a mode of 5 and a standard deviation of 0.83, suggesting that the majority of the respondents strongly agreed with the statement and that there was a low dispersion of the data

values. Only 4 respondents disagreed with this statement. This corresponds with literature research by Kumar (2016:35) which found that in developing countries, socio-economic factors, such as illiteracy, poverty, and irresponsible waste management along with lack of awareness and interest in waste management negatively impacted recycling attitudes and behaviours. Additionally, it is evident that the respondents believe that improper waste disposal is a threat to our environment due to the fact statement B5 had a mean of 4.26, a mode of 5, a median of 5 and a standard deviation of 0.94.

Statement B19 illustrates the lowest mean (1.8), a mode of 1, a median of 1 and a standard deviation of 1.07 signalling that most of the respondents strongly disagreed with the statement, thus being, 'My household believes that the current facilities provided encourage their household to recycle'. 100% of the respondents living in informal houses strongly disagreed or disagreed with this statement. This is significant as outlined in Section 4.1 of the National Domestic Waste Collection Standards which state that municipalities need to provide an enabling environment for households to recycle domestic waste which could include kerbside collection and/or a well-kept drop-off centre within easy reach (Republic of South Africa 2011:16). Furthermore, co-operation between the recycling sector and municipalities is encouraged to promote the establishment of facilities for household recycling (Republic of South Africa 2011:17).

Respondents with good general perceptions regarding environmental sustainability (Section A) proved to have better attitudes regarding household waste management (Section B), whereas the respondents with bad general perceptions regarding environmental sustainability (Section A) had negative attitudes regarding household waste management (Section B). This was evident as the respondents that obtained a mean score of above 3.35 for Section A obtained a mean score of 3.7 for Section B. Contrary to this, the respondents that had a mean score below 3.35 for Section A had a mean score of 3.1 for Section B.

For the purpose of this study and data analysis the following statements in Section A have been grouped in order to be analysed in a more effective way. Statements B1-B6 relate to respondents general beliefs regarding effective waste management and recycling. Statements B7-B10 relate to respondents having knowledge and awareness of recycling and statements B11-20 relate to respondents attitudes on various factors that could influence recycling participation.

4.4.3.2 General beliefs regarding effective waste management and recycling

In Section B, statements B1-B6 relate to the respondents' general beliefs regarding effective waste management and recycling. These statements had an overall mean of 3.34 and a standard deviation of 1.12. Below is a table summarising the descriptive statistics of these statements.

Table 4.7 General beliefs regarding waste management and recycling

GENERAL BELIEFS REGARDING EFFECTIVE WASTE MANAGEMENT AND RECYCLING							
MEAN	3,34	**STEDV**	1,12	**MODE**	4	**MEDIAN**	3

The majority of the statements delivered different individual means compared to the average mean and the high standard deviation score of 1.15 indicates that the there is a great deal of variation among the results. Statement B4, thus being 'my household believes that non-collection of waste could lead to dumping in public open spaces/vacant land or the burning of waste' had the highest mean (4.33) and a mode of 5 signalling that the majority of the respondents strongly agreed to this statement. Only 3 respondents strongly disagreed or disagreed with statement B4. These 3 respondents were between the ages of 21-30 years old and lived in informal residence. This corresponds to the literature which states that most domestic waste is either burned or disposed of in landfill sites or on vacant land. The inadequate disposal generate and insufficient collection of waste has led to significant problems of pollution and risks to human health and the environment (Medina 2010).Statement B6, thus being, 'my household is of the opinion that our local municipality is serious about effective waste management', illustrates the lowest mean (1.93) and a mode of 1 signalling that most of the respondents strongly disagreed to this statement. No respondents agreed or strongly agreed to this statement. This relates to the literature as outlined in Section 4.1 of the National Domestic Waste Collection Standards, municipalities must provide an enabling environment for households to recycle domestic waste which could include kerbside collection and/or a well-kept drop-off centre within easy reach (Republic of South Africa 2011:16). Furthermore, co-operation between the recycling sector and municipalities is encouraged to promote the establishment of facilities for household recycling (Republic of South Africa 2011:6).

4.4.3.3 Knowledge/awareness of recycling

In Section B, statements B7-B10 relate to the respondents' knowledge /awareness of recycling. These statements had an overall mean of 2.65 and a standard deviation of 1.30. Below is a table summarising the descriptive statistics of these statements.

Table 4.8 Knowledge/awareness of recycling

KNOWLEDGE/AWARENESS OF RECYCLING							
MEAN	2,65	**STEDV**	1,3	**MODE**	1	**MEDIAN**	4

The majority of the statements delivered different individual means compared to the average mean and the high standard deviation score of 1.30 indicates that the there is a great deal of variation among the results. The most common mode was 1, therefore, indicating that majority of the respondents strongly disagreed with these statements. Statement B8 had the lowest mean (2.6) and mode (1), indicating that the majority of the respondents strongly disagreed with the statement, thus being 'My household has a high level of awareness about recycling issues'. 36 respondents agreed or strongly agreed with statement B8. Of the 36 respondents that agreed or strong agreed, 83% of the respondents had some form of tertiary qualification and the remaining 17% had a grade 12. 65% of the 36 respondents were full time employed, 10% were part time employed, 20% were self-employed and the remaining 5% were retired. This corresponds with the literature research by Kumar (2016:35) which found that in developing countries, lack of awareness and interest in waste management also negatively impacted recycling attitudes and behaviours. Furthermore, these results correspond to the research by Nelson Mandela Metropolitan Municipality (2005:30) which states that very little waste separation currently occurs in NMB, as most households have very little awareness about recycling and the environment.

22 respondents agreed or strongly agree to statements B7-B10. These 22 respondents scored a mean score of 4.45 for consumer attitudes regarding household waste management (Section B), indicating that respondents with greater knowledge and awareness have better attitudes towards household waste management. This corresponds to the literature research by Bolaane (2006:731-740) which confirms that the success of recycling initiatives is dependent on individuals experience and knowledge about recycling coupled with a change in attitude towards such issues.

4.4.3.4 Influencing factors on recycling participation

In Section B, statements B11-B20 relate to the influencing factors on recycling participation. These statements had an overall mean of 3.77 and a standard deviation of 1.01. Below is a table summarising the descriptive statistics of these statements.

Table 4.9 Influencing factors on recycling participation

INFLUENCING FACTORS ON RECYCLING PARTICIPATION							
MEAN	3.77	**STEDV**	1,01	**MODE**	5	**MEDIAN**	4

Most of the statements delivered approximately the same individual values as the average mean calculated above with exception of statement B15 which delivered a relatively high standard deviation of 1.48. The most common mode (5) indicates that most of the respondents strongly agreed to statements B11-B15. Statements B11-B14 were found to have similarly high mean scores and modes respectively of 4,37 and 5 (B11), 4,18 and 4 (B12), 4,31 and 5 (B13) and 4,22 and 4 (B14) suggesting that most the respondents agreed or strongly agreed with the particular statements, thus being 'My household believes that household waste management should be convenient', 'My household will participate in household recycling only if it is not too expensive (cost-effective)', ' My household will participate in household recycling only if waste disposal and recycling sites are easily accessible' and 'My household believes that waste management should not be a time consuming activity'.

Additionally, Statement B15, thus being 'My household is willing to take recyclables to collection points (e.g. drop-off or recycling centres)', indicates a low mean (3.25) with a standard deviation of 1.48 and a mode of 3, indicating that most of the respondents were neutral to this statement. This result is significant as in 2016 the first drop-off site for recyclables next to the Kragga Kamma Road opened to the public. Its main purpose is to provide a drop-off facility to the surrounding residents for the disposal of certain household waste categories such as cardboard, cans, plastic, paper and glass. For statements B11-B15 only 4 respondents strongly disagreed or disagreed and all 4 of these respondents had low general perceptions regarding environmental sustainability (Section A) as their average mean scores were below 3. It was found that 2 of these respondents were students and the remaining 2 were unable to work.

Furthermore, statement B11 corresponds to the literature by Strydom (2012:2) which states that a recycling and solid waste collection systems must be designed to meet the needs of all the individuals in the community for whom it is intended. The reason for this is that a convenient way of recycling household waste for some people may not be equally as convenient for others whom may face different circumstances.

Additionally, statement B17 delivered a mean score (4.01) with a standard deviation of 0.93 and a mode of 4 suggesting most respondents agreed with the statement, thus being 'My household believes that it is each individual's responsibility to engage in recycling activities'. Alternatively, statement B16 delivered a mean score of 2.58 with a relatively high standard deviation of 1.33 and a mode of 2, indicating that most respondents disagreed with the statement, thus being 'My household believes that household waste disposal is the sole responsibility of the local authorities'. Interestingly, African respondents scored slightly higher mean scores (2.89) compared to the average mean mentioned above for statement B16 and slightly lower mean scores (3.5) compared to the average mean for statement B17. These results are significant as the separation of waste at a household level is implied for the implementation of the South African Waste Act. Therefore, individuals taking personal responsibility for recycling activities are vital for the successful implementation of this Waste Act (Strydom 2012:1).

4.4.4 PERCEPTIONS REGARDING HOUSEHOLD WASTE PRACTICES (SECTION C)

The following section (Section C), relating to the general perceptions regarding household waste management practices, will now be analysed in the form of a table which will further be explained.

4.4.4.1 Descriptive statistics relating to general perceptions regarding household waste management practices

Table 4.4 illustrates descriptive statistics relating to the general perceptions regarding household waste management practices, indicating the mean, mode, median and standard deviation. With regards to the standard deviation, low scores, thus being scores below one, indicate that the data points tend to be close to the mean of the set, and high scores, thus being scores above one, indicate that the data points are spread out over a wider range of values.

Table 4.10 Descriptive statistics relating to general perceptions regarding household waste management practices

Question	Mean	Mode	Median	Standard deviation
C1	3,616667	4	4	1,109041022
C2	3,533333	4	4	1,122222684
C3	3,641667	4	4	1,051576115
C4	3,333333	4	4	1,285558658
C5	3,483333	4	4	1,195111424
C6	3,166667	3	3	1,190532212
C7	4,133333	4	4	1,003634851
C8	3,941667	4	4	1,031404634
C9	4,408333	5	4	0,679790296
C10	3,941667	5	4	1,055564155
C11	2,383333	1	2	1,244708689
C12	3,366667	3	3	1,107145116
C13	2,041667	1	1	1,404649143
C14	2,033333	1	1	1,437395715
C15	2,066667	1	1	1,459442355
Overall	3,272778	4	4	1,158518471

For the purpose of this study and data analysis the following statements in Section C have been grouped in order to be analysed in a more effective way. Statements C1-C6 deal with the household reducing waste, statements C7-C10 deal with the household reusing products, and statements C11-C15 deal with the act of the household recycling.

4.4.4.2 Reduce

The overall average mean (3.46) and the standard deviation (1.16) for statements C1-C6 was calculated for the subsection reduce. Below is a table summarising the descriptive statistics of these statements.

Table 4.11 Consumer perceptions regarding reducing

REDUCE							
MEAN	3,46	**STEDV**	1,16	**MODE**	4	**MEDIAN**	4

The majority of the statements delivered different individual means compared to the average mean mentioned above. Statement C3, thus being ‘In my household we engage in opportunities to operate our home more efficiently (e.g. using rechargeable batteries and/or buying local products to reduce the negative environmental impacts from transportation)’, obtained the highest mean (3.64). 68% of those who lived in informal houses agreed or strongly agreed to this statement. Furthermore, only 21 respondents disagreed or strongly disagreed with this statement. This supports the literature in that the concept behind waste reduction is that you should limit the number of purchases you make, by buying only what you need in the correct amounts, in order to simply create 'less' waste (Waste management 2017). Statement C6, thus being ‘In my household we make the effort to purchase products made from recycled materials’, illustrates the lowest mean (3.17). 92% of the individuals with their highest qualification being Grade 12 disagreed or strongly disagreed with this statement, and 100% of individuals that were unemployed disagreed or strongly disagreed with this statement. We believe that the reason many individuals don’t purchase products made from recycled materials is due to the fact that such products may be more expensive, therefore, individuals aren’t willing to make a monetary sacrifice.

These findings are significant as literature from Engeldow (2005) states that if it is possible to reduce the amount of waste generated initially, then it would be less of a problem to dispose of it. Furthermore, Medina (2010), states that the highest priority in an integrated waste management system is given to waste prevention.

Respondents with positive attitudes (mean score > 4) regarding household waste management (Section B) indicated that they engage in reducing practices whereas the respondents with negative attitudes (mean score < 3) regarding household waste management (Section B) indicated that they are neutral towards reducing. This was shown by the respondents that had a mean score of above 4 for Section B having a mean score of 3.8 for reducing practices, whereas those respondents that had a mean score below 3 for Section B had a mean score of 3.2 for reducing practices. These findings correspond with the literature from Yusof (2004:54), that states that a persons’ attitudes toward and knowledge about recycling play a major role in determining whether they recycle or not, therefore, a positive attitude towards and efficient knowledge about recycling is essential for the successful implementation of an effective solid waste management system.

4.4.4.3 Reuse

The overall average mean (4.11) and the standard deviation (0.90) for statements C7-C10 was calculated for the subsection of reuse. Below is a table summarising the descriptive statistics of these statements.

Table 4.12 Consumer perceptions regarding reusing

REUSE							
MEAN	4,11	**STEDV**	0,90	**MODE**	4	**MEDIAN**	4

Most of the statements delivered approximately the same individual values as the average mean mentioned above. The mode regarding statements C7-C10 was 4, therefore, indicating that majority of the respondents agreed to these statements. Furthermore, statement C9, thus being 'In my household we reuse materials through various methods (e.g. reusing shopping bags and donating old items to charities', was found to have the highest mean (4.11). 96% of the respondents who were unemployed, part time employed, retired or a student either agreed or strongly agreed to this statement. Both statement C8, thus being 'In my household we view used materials as a resource rather than refuse' and C10, thus being 'In my household we use washable rags, towels, and/or napkins instead of disposable napkins and towels', indicate the lowest means (3.94). The standard deviation score of 0.90 indicates that the average mean score for reuse does not vary much from the mean score and that the respondents generally responded the same for the statements regarding the reusing.

Lastly, looking at statement C7-C10 as a whole, 71% of individuals between the ages of 16 and 30, 73% of individuals between the ages of 31 and 60 and 69% of individuals over the age of 61 reused materials. 73% of individuals whose highest qualification was either a diploma or national certificate proved to reuse materials, and 67% of individuals who had a degree indicated that they reused materials. Furthermore, 69% of individuals who were either employed full time or self-employed reused materials, whereas 95% of individuals who were either unemployed, a student, retired, unable to work or employed part time reused materials. Additionally, 86% of Africans individuals, 66% of Caucasian individuals, 81% of Coloured individuals, and 72% of Indian individuals reused materials. Lastly, 97% of individuals who lived in an informal dwelling proved to reuse materials, 68% of individuals who lived in a house reused materials and 79% of individuals who lived in either a townhouse or an apartment reused materials. Ultimately, it can, therefore, be concluded that an individuals' age and highest

qualification had no effect as to whether they reused materials, however, their employment status, ethnicity and type of dwelling did.

These results correlate with research done by Abdul-Rahman (2014:2) stating that the process of reusing begins with the assumption that used materials can be a resource rather than refuse and that individuals can reuse materials at household level through various methods, such as reusing shopping bags, donating old items to charities etc. Additionally the findings that employment status and type of dwelling had a significant impact on whether respondents reused also supports the literature that states that reusing preserves resources and potentially saves money.

4.4.4.4 Recycle

The overall average mean (2.38) and the standard deviation (1.33) for statements C11-C15 was calculated for the subsection of recycle. Below is a table summarising the descriptive statistics of these statements.

Table 4.13 Consumer perceptions regarding recycling

RECYCLE							
MEAN	2,38	**STEDV**	1,33	**MODE**	1	**MEDIAN**	1

The majority of the statements delivered different individual means compared to the average mean mentioned above. Statement C12, thus being ‘We believe that various items can be recycled at household level, such as metals, glass, textiles, paper, organics, and plastic’, had the highest mean (3.36). This supports literature from the Nelson Mandela Metropolitan Municipality (2005:30) which states that there is much scope for the separation, composting, recycling, and transformation of approximately 90% of this household waste stream in NMB. Statement C13, thus being ‘In my household we currently sort our recyclables into separate storage containers’ scored a mean of 2.04 and a mode of 1, indicating that most of the respondents strongly disagreed with this statement. 26 respondents agree or strongly agreed to statement C13. 89% of the 26 respondents were found to have some form of tertiary education, whereas the remaining 11% had a grade 12 as their highest qualification. This supports research from the Nelson Mandela Metropolitan Municipality (2005:30) which states that very little waste separation currently occurs in NMB, as most households have very little awareness about recycling and the environment. This is significant as the separation of waste at the source is

vital to the success of recycling initiatives. Waste which is separated at the source is usually "uncontaminated" and therefore ideal for collection and recycling. Furthermore, According to Palm (2012:9) the sorting and separating of recyclable material at the household level is crucial and strongly depends on the public's participation. Statement C14, thus being 'We take recyclables to collection points (e.g. drop-off or recycling centres)', illustrates the lowest mean (2.03). We believe that this low mean has arisen due to the fact that individuals are unable to take part in such an activity and due to the high sense of unawareness. This is evident as 96% of individuals whose highest qualification was a grade 12 either disagreed or strongly disagreed to this statement. Only 9 respondents agreed or strongly agreed to statement C14, and 89% of them lived in a house, 78% of them were white, and 67% of them were either employed full time or part time. This result is significant as in 2016 the first drop-off site for recyclables next to the Kragga Kamma Road opened to the public. Its main purpose is to provide a drop-off facility to the surrounding residents for the disposal of certain household waste categories such as cardboard, cans, plastic, paper and glass.

Respondents with positive attitudes (mean score > 4) regarding household waste management (Section B) indicated that they engage in recycling practices whereas the respondents with negative attitudes (mean score < 3) regarding household waste management (Section B) indicated that they that they do not partake in recycling. This was shown by the respondents that had a mean score of above 4 for Section B having a mean score of 4.3 for recycling practices, whereas those respondents that had a mean score below 3 for Section B had a mean score of 1.5 for recycling practices. These results strongly correlate with the research done by Yusof (2004:54), that a persons' attitudes toward and knowledge about recycling play a major role in determining whether they recycle or not, and therefore, a positive attitude towards and efficient knowledge about recycling is essential for the successful implementation of an effective solid waste management system.

4.1 SUMMARY

In this chapter, the results of the empirical investigation were discussed, starting with the biographical information (Section D) of the questionnaire. Thereafter, the general perceptions regarding environmental sustainability (Section A) were discussed. This section was followed by a discussion of the consumer attitudes regarding household waste management (Section B). Furthermore the perceptions regarding household waste management practices (Section C) were discussed.

Chapter Five provides the overall summary, conclusions and recommendations of this research study.

CHAPTER 5
SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

5.1 INTRODUCTION

The primary objective of this study is to investigate the attitudes and practices of NMB households towards the recycling of household waste.

The investigation was undertaken through sampling 120 (one hundred and twenty) selected respondents in NMB. Chapter 4 of this study presents the finding of the empirical investigation.

This chapter (Chapter 5) provides a summarised overview of the main findings of the study, as presented in the preceding chapters (Chapter One to Chapter Four). This includes a summary of the purpose and objectives of the study and the main findings from the literature review. Furthermore, the main concepts discussed in the research design and methodology sections will be concluded and lastly, the main findings from the empirical investigation will be provided. Specific reference will be made, in Section 5.5.5, to any differences or similarities found between the theoretical findings (Literature review) and the findings from the empirical investigation. Furthermore, the main conclusions will be drawn, followed by recommendations.

In addition, the shortcomings of the research, along with future research proposals will be presented and the chapter and the study will conclude with a self-reflection section, whereby the researchers indicate what they have learnt from the study.

5.2 RESEARCH OBJECTIVES OF THE STUDY

The primary objective of this study is, as indicated in Chapter One, was to investigate the attitudes and practices of NMB households towards the recycling of household waste.

To give effect to the primary objective of this study, the following secondary objectives have been formulated:

- To conduct a literature study regarding household waste management
- To develop a measuring instrument to assess household perceptions and attitudes toward recycling of waste
- To empirically assess levels of awareness and practices of individuals toward recycling household waste in NMB

- To provide households and local municipality with effective guidelines regarding waste management

5.3 SUMMARY OF CHAPTERS

The structure of the research was divided into five chapters, below is a brief summary of each of these chapters:

Chapter one provided an introduction and background to the study. In addition, reference was made to the problem statement, and the primary and secondary research objectives. Following this, a list of detailed research questions, clarity of key concepts and a brief literature overview were provided. Furthermore, the research methodology consisting of the research paradigm, research approach, population, sampling, data collection, questionnaire design, and data analysis, was provided. Following the research methodology, the validity and reliability of the measuring instruments were stated. Finally, the demarcation of the study, the division of the chapters, and the time frame of the study were provided.

Chapter two consisted of a literature study regarding the effect of an individuals' attitudes toward recycling household waste, household waste in NMB, the importance of recycling household waste, recycling and waste management laws in South Africa, and the practices available for consumers i.e. recycle, reuse and reduce.

Chapter three focused on the research design and methodology that was used in this study and the rationale behind the selected methodology, by elaborating on the sample and sampling techniques, the measuring instrument used, and the primary data collection method that was utilised. The chapter concluded with the statistical techniques used.

Chapter four began with a discussion on the reliability and validity of the study, followed by a section which includes preliminary data analysis, consisting of the descriptive statistics used for data inspection (such as measures of central tendency and the measures of variability) and the variables of the study. Subsequently, the results of the empirical investigation were discussed. Furthermore, a brief summary of the main findings obtained from the empirical results were provided, consisting of the biographical information, the general perceptions regarding environmental sustainability, consumer attitudes regarding household waste management and perceptions regarding household waste management practices.

Chapter five concludes the study by providing a brief overview of the preceding chapters, together with an abstract of the main findings. Based on the findings of the literature review and the empirical investigation, conclusions were drawn. Furthermore, the contributions and shortcomings of the study have been explained, and recommendations for future research have been proposed.

5.4 RESEARCH DESIGN

5.4.1 RESEARCH PARADIGM

Quantitative research was conducted as the research methodology approach. The quantitative research approach consisted of the attitudes and practices of consumers toward household recycling in NMB.

5.4.2 RESEARCH APPROACH

A descriptive research method was used in this study in order to obtain the relevant data needed which assisted the researchers in determining the attitudes and practices of consumers toward household recycling in NMB.

5.4.3 POPULATION

The research population consists of all consumers in NMB. However, due to the inability of researchers to test all consumers in NMB, a sample was selected.

5.4.4 SAMPLING

Non-probability sampling was used, adopting convenience and judgemental sampling as the techniques. The sample size for this research consisted of 120 NMB consumers.

5.4.5 DATA COLLECTION

In order to successfully address the research objectives of this study, the research is divided into two categories, namely secondary and primary research.

I. Secondary data

In order to achieve the primary objective of this study, the secondary research of this study consists of an extensive literature review in order to identify and describe the attitudes and practices of consumers towards household recycling in NMB. The secondary research of this study was conducted by consulting a variety of relevant textbooks and well known journal articles such as Kumar (2016), Reddy (2011) and Sharholy *et al*. (2008).

In addition, the library facilities available at the Nelson Mandela University (NMU) were used to access National and International databases, such as Emerald, EBSCOhost and Sabinet, which were consulted in order to identify preceding research on the attitudes and practices of household recycling.

II. Primary data

Due to the study being quantitative in nature, a large sample was required, resulting in the researchers using a survey research method, whereby a structured questionnaire was used to collect the data, which was in turn statistically analysed and interpreted. Consumers in NMB were approached by field-workers from NMU, where a self-administered questionnaire was handed out to willing participants and upon completion, the field-workers collected the completed questionnaire from respondents.

5.4.6 QUESTIONNAIRE DESIGN

The items of the measuring instrument were sourced from existing measuring instruments used in similar research, and which have been deemed both, valid and reliable. The respondents were required to complete a structured self-administered questionnaire which was then used as the basis for the data collection. Respondents were required to evaluate their responses using a nominal and ordinary scale, namely the five point Likert scale.

The questionnaire was developed according to the requirements of the study and consists of four sections as follows:

- Section A of the questionnaire focused on the general perceptions regarding environmental sustainability
- Section B of the questionnaire investigates the consumers' attitudes toward recycling of household waste using five-point Likert-type ordinal scale.
- Section C investigates the practices regarding household waste by means of five-point Likert-type ordinal scale.

- Section D of the questionnaire focused on the biographical information of respondents using a nominal scale.

5.4.7 PILOT STUDY

The researchers conduct a pilot study through distributing ten self-administered questionnaires among potential respondents in order to determine whether the questionnaire is understandable and efficient to use among various respondents.

5.4.8 DATA ANALYSIS

The primary data was collected from the research questionnaire and captured in Microsoft Excel 2013. Once the data was cleaned, the statistical programme, known as Statisca, was utilised to analyse the captured data.

Descriptive statistics were utilised to analyse the data collected by the quantitative study. These statistics include measures of mean, mode, median and standard deviations as well frequency distributions. These results were analysed and conclusions and recommendations were then formulated.

5.5 MAIN FINDINGS FROM THE LITERATURE REVIEW

Several topics were discussed in the literature review section of this study, in Chapter 2. Each one of these topics will now be summarised in terms of their main findings within the study.

5.5.1 THE THEORY OF PLANNED BEHAVIOUR

The Theory of Planned Behaviour (TPB) (Ajzen 1985) is a widely used psychological theory for explaining environmental behaviour and has become popular in studies on recycling. The theory of planned behaviour assumes that there is a certain degree of conscious reasoning involved when individuals develop intentions to carry out a certain behaviour, this idea forms the bases of the theory. The intention of an individual to act can be predicted by three specific factors: a) the Attitude towards the behaviour; b) the Subjective Norm; and c) the Perceived Behavioural Control (Du Toit, Wagner and Fletcher 2016:2). The Attitude refers to an individual's general assessment of the disadvantages and advantages of carrying out a particular behaviour. The Subjective Norm assesses an individual's perception of the social pressure from "significant others" to carry out the behaviour, while the Perceived Behavioural Control depends on the perceived difficulty or ease of carrying out an action and relates to self-efficacy.

5.4.2 EFFECT OF INDIVIUALS ATTIDUDES ON RECYLING HOUSEHOLD WASTE

In this section, literature suggests that a persons' attitudes toward and knowledge about recycling can play a major role in determining whether they recycle or not. According to Yusof (2004:54) a positive attitude towards and efficient knowledge about recycling is essential for the successful implementation of an effective solid waste management system. A key finding of research done by Thomas *et al.* (2003:1) on people's attitudes and behaviour towards recycling is the need for and importance of information about recycling, stating that it is one of the main influences on people's attitudes and behaviour towards recycling and a key factor to increasing the rates of recycling. Additionally, Bolaane (2006:731-740) confirms that the success of recycling initiatives is dependent on individuals experience and knowledge about recycling coupled with a change in attitude towards such issues. Furthermore, as South Africa is a developing nation it is important to take into account a number of socio-economic factors when implementing any waste management system (Poswa 2004:1). Previous studies have indicated that there is often a correlation between an individual's attitudes towards recycling and their socio-economic status (Yusof 2004:25).

5.4.3 THE IMPORTANCE OF RECYLING HOUSEHOLD WASTE

Research done by Kamara (2006), indicates that rapid urbanisation, increasing population growth and industrialisation have caused dramatic increases in the amount of waste generated by societies. Increased consumption of food and electricity, as well as changing lifestyles have led to a massive increase in the volume of domestic waste, thus creating a serious problem for both developing and developed countries. Two of the major issues identified are the unsuitable final disposal of wastes and insufficient collection services. Most domestic waste is either burned or disposed of in landfill sites or on vacant land and the insufficient collection of waste has led to significant problems of pollution and risks to human health and the environment (Medina 2010). The recycling of household waste can have a significant effect on reducing these problems and help move societies towards sustainable living. According to The Economist (2007) recycling is one of the most effective ways householders can lessen their impact on the environment. Recycling reduces the need for raw materials and thereby contributes to saving raw materials and lessening humans' impact on the environment (The European Environment 2012:18). Greyson (2007:6) states that the process of recycling, from the reprocessing and sorting of recyclables to kerbside collection of household waste, also

generates more jobs than landfill and incineration. Studies have indicated that roughly 5.9 jobs are created for every tonne of waste recycled (Friends of earth 2008:3-4).

5.4.4 HOUSEHOLD WASTE IN NMB

According to Nelson Mandela Metropolitan Municipality (2005:30), household waste in NMB comprises of approximately 25% of the total waste produced. Furthermore, the Nelson Mandela Metropolitan Municipality (2005:30) states that there is much scope for the separation, composting, recycling, and transformation of approximately 90% of this household waste stream which could ultimately lead to an amount of approximately only 10% of waste being landfilled. They state that very little waste separation currently occurs in NMB, as most households have very little awareness about recycling and the environment. Currently, most waste is disposed of in a single bag or bin. In 2005, the Nelson Mandela Metropolitan Municipality (2005:30) estimated that only 1% of the total waste stream was being recycled. In 2016 the first drop-off site for recyclables next to the Kragga Kamma Road opened to the public. Its main purpose is to provide a drop-off facility to the surrounding residents for the disposal of certain household waste categories such as cardboard, cans, plastic, paper and glass. The waste will not be removed by the normal kerb side collection service and will instead be diverted away from disposal at the current landfill sites for recycling. It is hoped this will encourage waste separation at source and to provide accessible facilities for the drop-off of recyclable household waste material (News24 2016).

5.4.5 WASTE MANAGEMENT LAWS AND RECYCLING PROGRAMMES IN SA

In this section, mention was made of the National Environmental Management: Waste Act (Act No. 59 of 2008) (Republic of South Africa 2008) which came into effect in 2009. Section 23(2) of the Waste Act stipulates the establishment of "receptacles for the collection of recyclable waste that are accessible to the public" (Republic of South Africa 2008) and according to Section 22(2) recyclable waste is not required to be disposed of in the receptacles for general waste. Therefore, changes in municipal collection services as well as the introduction of waste separation at a household level are implied for the implementation of this Waste Act. Thus, individuals recycling behaviour and attitudes at a household level are vital to the successful implementation of this Waste Act (Strydom 2012:1). Additionally, the separation of waste at the source is strongly encouraged by the National Domestic Waste Collection Standards, as a way of diverting waste away from landfill sites towards recovery and recycling (Republic of South Africa 2011:16). As outlined in Section 4.1 of the Standards, "separation at source must

be encouraged and supported in line with the relevant industry waste management plans", with all domestic waste from secondary and Metropolitan cities being sorted at the household level. Additionally the Standards note that "an enabling environment for households to recycle domestic waste..." which"...could include kerbside collection and/or a well-kept drop-off centre within easy reach" must be provided by the Municipalities (Republic of South Africa 2011:16).

5.4.6 WASTE MANAGEMENT PRACTICES WITH REGARD TO HOUSEHOLDS

According to Medina (2010), the highest priority in an integrated waste management system is given to waste prevention. Medina (2010) adds that it is a preventative action seeking to lessen the amount of waste generated by individuals, businesses and households.

Reuse means passing an item along to another person for continued use or purchasing non-disposable items (Williams 2005). Individuals can reuse materials at household level through various methods, such as reusing shopping bags, donating old items to charities etc. ultimately, reusing preserves resources, saves money, and satisfies the human urge to be creative (Abdul-Rahman 2014:2).

Recycling is a solid waste management strategy that entails the conversion of discarded consumer products, i.e. waste, into useful or environmentally friendly products (Williams 2005:63). Various items can be recycled at household level, such as metals, glass, textiles, paper, organics, plastic etc. (Williams 2005:63). According to Medina (2010) recycling lessens the amount of waste that needs to be gathered, disposed of and transported and further ads to saving money for municipalities and expanding the life of disposal facilities.

5.5 MAIN FINDINGS FROM THE EMPIRICAL INVESTIGATION

5.5.1 GENERAL PERCEPTIONS REGARDING ENVIRONMENTAL SUSTAINABILTY (SECTION A)

The statements of section A, general perceptions regarding environmental sustainability, were analysed as a whole and the mean results (3.36) indicate that NMB consumers generally have neutral perceptions regarding environmental sustainability, however the most common mode of 2 indicates that most respondents tended to disagree with the statements present in Section B.

Respondents are aware of the fact that the insufficient collection of waste could lead to severe problems and that they need to make sacrifices in order for a greener and sustainable future. This is evident as both these statements (A10 and A12) mean scores were above 4.50. Those that disagreed with either of these statements were not highly educated individuals due to their highest qualification being grade 12. On the other hand, majority of the respondents aren't aware of the numerous complications resulting from improper waste management, however, those that are aware proved to be educated due to their high qualifications. Furthermore, 89% of the respondents do not have enough knowledge regarding the segregation of waste, however, those that do all stated to be full time employed. This is a major cause for concern as the sorting and separating of waste is a crucial stage in the recycling process.

For the purpose of this study and data analysis the following statements in Section A have been grouped in order to be analysed in a more effective way. Statements A1-A7 represent the concern for the environment, A8-A11 consist of the knowledge of effects and A12-A15 deal with knowledge of practices.

Although most respondents tended to agree with the various statements (A1-A7) testing their concern for the environment, the standard deviation was relatively high, therefore, indicating contrasting opinions among the respondents. It is evident that various factors distinctly affect whether an individual has a concern for the environment or not. Individuals' that live in informal dwellings and/or have large families have little concern for the environment, however, individuals' that can be regarded as highly educated and/or live in houses have a higher level of concern for the environment.

It is evident that respondents have a relatively high knowledge of effects of excessive waste as the mean for the statements testing the knowledge of effects of excessive waste (A8-A11) had a mean of 3.93 and a mode of 5. The low standard deviation of 0.83 is notable as it indicates that majority of the respondents answered this statement in a similar way. Statement A11 had a low mean score of 2.98, whereas all of the other statements relating to the knowledge of effects of excessive waste had a high mean. With regards to statement A11, the majority of the respondents aren't aware of the impact of their daily living on generating/disposing of household waste. However, those that are aware proved to be full time employed and educated due to their high qualifications.

Furthermore, it is clear that the respondents have little knowledge of practices regarding waste as the mean for these statements (A12-A15) was 3.08 and the mode of 2. The relatively high standard deviation of 1.03 indicates contrasting opinions among the respondents.

Therefore, respondents do have some form of concern for the environment and have a good knowledge of the effects of excessive waste, however, they do not have sufficient knowledge or awareness of the various practices that are available to them in order to contribute to a greener, more sustainable future.

5.5.2 CONSUMER ATTITUDES REGARDING HOUSEHOLD WASTE MANAGEMENT (SECTION B)

The statements of section B, consumer attitudes regarding household waste management, were analysed as a whole and the mean results (3.42) indicate that NMB consumers generally have neutral attitudes towards household waste management, however the most common mode of 5 indicates that most respondents tended to agree with the statements present in Section B. Furthermore, results indicate that respondents with good general perceptions regarding environmental sustainability (Section A) proved to have better attitudes regarding household waste management (Section B), whereas the respondents with bad general perceptions regarding environmental sustainability (Section A) had negative attitudes regarding household waste management (Section B). This was evident as the respondents that obtained a mean score of above 3.35 for Section A obtained a mean score of 3.7 for Section B. Contrary to this, the respondents that had a mean score below 3.35 for Section A had a mean score of 3.1 for Section B.

For the purpose of this study and data analysis the following statements in Section B have been grouped in order to be analysed in a more effective way. Statements B1-B6 relate to respondents general beliefs regarding effective waste management and recycling. Statements B7-B10 relate to respondents having knowledge and awareness of recycling and statements B11-20 relate to respondents attitudes on various factors that could influence recycling participation.

Respondents were neutral towards statements relating to general beliefs regarding effective waste management, this was shown by a mean of 3.34 for statements B1-B6, however a relatively high standard deviation (1.12) indicates that that the there is a great deal of variation among the results. Furthermore, analyses reveals that the respondents do believe that the non-collection of waste could lead to dumping in public open spaces/vacant land or the burning of

waste. Interestingly, only 3 respondents disagreed with this statement, all of whom were aged 21-30 and lived in informal residences. Similarly, respondents do believe that improper waste disposal is a threat to our environment. Additionally, results indicate that NMB households do not believe that their local municipality is serious about effective waste management. This was illustrated by a low mean (1.93) and a mode of 1. Interestingly, no respondents agreed or strongly agreed to this statement. This can be seen as a demoralising factor for those who may be otherwise want to engage in recycling activities.

Respondents proved to have very little knowledge and awareness of recycling, this was shown by an overall mean of 2.65 and a mode of 1 for statements B7-B10. However, a relatively high standard deviation of 1.30 indicates variation among the results, subsequently it was found that the 22 respondents who agreed or strongly agreed to statements B7-B10, scored a mean score of 4.45 for consumer attitudes regarding household waste management (Section B), indicating that respondents with greater knowledge and awareness have better attitudes towards household waste management. Furthermore, analyses indicated that respondents lack sufficient knowledge about household waste management, have low levels of awareness about recycling issues, lack knowledge of how a recycling scheme works (e.g. how to sort recyclables and where to recycle waste) and generally do not know and/or adhere to all regulations and laws regarding waste management. Additionally, it was found that the respondents' level of education has a strong influence on their knowledge and awareness of recycling.

The following factors have been identified as having a strong influence on households' willingness to participate in recycling activities namely; household waste management should be convenient, household recycling should be cost-effective for individuals, waste disposal and recycling sites should be easily accessible, household waste management should not be a time consuming activity and incentives would encourage individuals to recycle. Interestingly the 4 respondents who disagreed with one or more of these factors all had negative perceptions regarding environmental sustainability (Section A) as their average mean scores were below 3. Furthermore, socio-economic factors (e.g. illiteracy, poverty, and irresponsible waste management) have been identified to potentially impact an individuals' waste management attitudes and are a barrier for recycling participation. Additionally, results indicate that NMB consumers were neutral towards the idea of having to take recyclables to collection points (e.g. drop-off or recycling centres). It is possible that this mixed response is due to the perceived lack of the factors mentioned above in combination with socio-economic factors. Respondents also do not believe that the current facilities in place encourage their households to recycle,

this is potentially a major barrier to recycling participation for those with strong attitudes regarding household waste management. Additionally, most households do believe that it is each individual's responsibility to engage in recycling activities, whereas most disagreed that household waste disposal is the sole responsibility of the local authorities. This is important as finding the successful implementation of any recycling programme will strongly depend on households' commitment to participating in such programmes.

5.5.3 PERCEPTIONS REGARDING HOUSEHOLD WASTE MANAGEMENT PRACTICES (SECTION C)

For the purpose of this study and data analysis the following statements in Section C have been grouped in order to be analysed in a more effective way. Statements C1-C6 deal with the household reducing waste, statements C7-C10 deal with the household reusing products, and statements C11-C15 deal with the act of the household recycling.

Although the mean for reducing was 3.46, most respondents tended to agree with the statements (C1-C6) as the mode was 4. The standard deviation was relatively high, therefore, indicating contrasting opinions among the respondents. It was found that the majority of the respondents agreed to engage in opportunities to operate their home more efficiently, with only 21 out of 120 respondents disagreeing with this statement. On the other hand, respondents indicated that they do not make the effort to purchase products made from recycled materials. Almost 100% of respondents with their highest qualification being Grade 12 disagreed or strongly disagreed with this statement and 100% of individuals that were unemployed disagreed or strongly disagreed with this statement. We believe that the reason many individuals don't purchase products made from recycled materials is due to the fact that such products may be more expensive, therefore, individuals aren't willing to make a monetary sacrifice.

Furthermore it was found that respondents with positive attitudes regarding household waste management (Section B) indicated that they engage in reducing practices whereas the respondents with negative attitudes regarding household waste management (Section B) indicated that they are neutral towards reducing.

The standard deviation score of 0.90 for statements C7-C10 indicates that the average mean score of 4.11 for reuse does not vary much from the mean score and that the respondents generally responded the same for the statements regarding the reusing. The mode regarding these statements was 4, therefore, indicating that majority of the respondents were making use of reusing as a recycling practice. The most common reusing practice that respondents were

engaging in was using materials through various methods (e.g. reusing shopping bags and donating old items to charities). It was found that respondents who reuse the most are African individuals between the ages of 31 and 60, living in an informal dwelling, who were either unemployed, a student, retired, unable to work or employed part time and have a highest qualification of either a diploma or national certificate.

For the statements C11-C15 the results indicate that most the respondents are not engaging recycling practices, this is shown by a relatively low mean of 2.38 and a mode of 1. Specifically, analysis reveals that the majority households are not sorting recyclables into separate containers nor are households taking their recyclables to collection points (e.g. drop-off or recycling centres). Interestingly, it was found that those respondents who do engage in these recycling practices generally have tertiary education and are employed. Additionally, it is important to note that those respondents with positive attitudes (mean score > 4) regarding household waste management (Section B) indicated that they engage in recycling practices whereas the respondents with negative attitudes (mean score < 3) regarding household waste management (Section B) indicated that they that they do not partake in recycling. This was shown by the respondents that had a mean score of above 4 for Section B having a mean score of 4.3 for recycling practices, whereas those respondents that had a mean score below 3 for Section B had a mean score of 1.5 for recycling practices. Furthermore, the majority of respondents were neutral towards the idea that various items can be recycled at household level, such as metals, glass, textiles, paper, organics, and plastic.

5.5.4 BIOGRAPHCAL INFORMATION (SECTION D)

The empirical investigation from Chapter Four, included the biographical information (Section D in Chapter Four). The subsections of the biographical information included the respondents' gender, ethnic classification, highest qualification, position in the household, age, size of the family, type of dwelling and current employment status.

In this study the majority of the respondents (62%) were female, while male respondents accounted for (38%) of the sample. Most of the respondents were between the ages 31-40 years (22%). Most of the respondents were white (65%), followed by black (15%) and coloured (15%). The majority of the respondents lived in a house (56%) and had a family size of between three to four members (47%). Most of the respondents had a diploma or national certificate (29%), followed by a grade 12 (27%). The majority of the respondents held the position as a mother/father (68%) in the household and were full time employed (42%).

5.5.5 THE LINK BETWEEN THE THEORETICAL FINDINGS AND THE EMPIRICAL INVESTIGATION

The following section will indicate whether any differences or similarities were found from the theoretical findings (Literature review) and the empirical investigation, compiled through the use of a questionnaire. The various sections are discussed according to the questionnaire.

- Section 2.8 in Chapter Two and questionnaire items B4, dealt with belief that non-collection of waste could lead to dumping in public open spaces/vacant land or the burning of waste. The empirical result corresponds to the literature which states that currently most domestic waste is either burned or disposed of in landfill sites or on vacant land (Medina 2010).
- Section 2.7 and questionnaire items B7-B10 dealt with the influence of knowledge/awareness about recycling on attitudes towards household waste management. Results indicated that respondents with greater knowledge and awareness have better attitudes towards household waste management. This corresponds to the literature research by Strydom (2012:2) which recognises three main areas affecting people's attitudes and behaviours towards recycling namely knowledge, convenience and barriers to recycling. Bolaane (2006:731-740) confirms that the success of recycling initiatives is dependent on individuals experience and knowledge about recycling coupled with a change in attitude towards such issues.
- Section 2.7 in Chapter Two and questionnaire item B8 dealt with households' perceived level of awareness about recycling issues. The results indicated a low level of awareness which corresponds with the literature research by Kumar (2016:35) which found that in developing countries, lack of awareness and interest in waste management negatively impacted recycling attitudes and behaviours. Furthermore, these results correspond to the research by Nelson Mandela Metropolitan Municipality (2005:30) which states that very little waste separation currently occurs in NMB, as most households have very little awareness about recycling and the environment.
- Section 2.7 in Chapter Two and questionnaire item B11 relates to the belief that waste management should be convenient. The results correspond to the literature by Strydom (2012:2) which states that a recycling and solid waste collection systems must be designed to meet the needs of all the individuals in the community for whom it is intended. The reason for this is that a convenient way of recycling household waste for

some people may not be equally as convenient for others whom may face different circumstances.

- Section 2.7 in Chapter Two and questionnaire item B18 dealt with the belief that socio-economic factors (e.g. illiteracy, poverty, and irresponsible waste management) have the potential to impact an individuals' waste management attitudes. The results corresponds with literature research by Kumar (2016:35) which found that in developing countries, socio-economic factors, such as illiteracy, poverty, and irresponsible waste management so negatively impacted recycling attitudes and behaviours.
- Section 2.10 in Chapter Two and questionnaire item B19 deal with whether the current facilities provided encourage their household to recycle. Respondents overwhelmingly disagreed, this is significant as outlined in Section 4.1 of the National Domestic Waste Collection Standards, municipalities need to provide an enabling environment for households to recycle domestic waste which could include kerbside collection and/or a well-kept drop-off centre within easy reach (Republic of South Africa 2011:16). Furthermore, co-operation between the recycling sector and municipalities is encouraged to promote the establishment of facilities for household recycling (Republic of South Africa 2011:16).

5.6 CONCLUSIONS

The rapid increase in waste production is a major environmental problem affecting environmental quality and the quality of life of people. Recycling is considered to be one of the solutions to this problem. The aim of the current study was to investigate the attitudes and practices of NMB households towards the recycling of household waste. Findings revealed that there is a gap between consumer's attitudes toward recycling and their actual behaviour and practices, however, those individuals who do engage in recycling practices had positive attitudes towards household waste management. The results indicated that the majority of NMB consumers currently engage in reduce and reuse practices, thus being engaging in opportunities to operate their home more efficiently (e.g. using rechargeable batteries and/or buying local products to reduce the negative environmental impacts from transportation) and the reusing of materials through various methods (e.g. reusing shopping bags and donating old items to charities). Results indicate that the main influencing factors for better attitudes and increased recycling participation is that household waste management should be convenient, cost-effective and not time consuming, waste disposal and recycling sites should be easily accessible

and incentives would encourage individuals to recycle. Additionally, the socio-economic factors and the current facilities provided are preventing individuals from recycling household waste.

Results of the current study also indicate that the message of recycling is not reaching some sections of the society. In order to create a culture for sustainability and a society that considers recycling to be one of its daily practices, three aspects are essential: education, public awareness and reducing socio economic barriers. These three aspects are essential for any recycling scheme to succeed. Results of the current study show that there is a lack of awareness on domestic waste recycling in NMB. This lack of awareness needs to be addressed when trying to improve domestic waste recycling behaviour and practices of consumers through well planned and executed continuous public awareness campaigns. This is a big challenge in countries like South Africa given the diversity of nationalities that live in South Africa and the languages spoken. Therefore, government and non-governmental agencies are recommended to intensify their recycling awareness campaigns taking into consideration this diversity in languages spoken.

Results of the current study suggest that only a small percentage of people recycle household waste. This happens despite respondents being aware of the deterioration in environmental quality and that recycling preserves resources and protects the environment.

For any recycling program to be effective, positive perceptions of consumers (i.e., the general public) towards recycling should be translated to a positive recycling behaviour. Respondents of this study in general have a neutral attitude towards recycling and the majority of them reported that they do not recycle. However, those respondents with positive perceptions and attitudes towards recycling where found to have a high level of participation in recycling. Therefore showing a strong correlation between positive attitudes towards household waste management and participation in recycling practices.

5.7 RECOMMENDATIONS

5.7.1 PERCEPTIONS REGARDING ENVIRONMENTAL SUSTAINABLILITY

Given the findings of this study, specific effort needs to be made to educate NMB consumers on the importance of considering the environment when buying a product or service. Additionally, households' should make a greater effort to discuss environmental issues with family and friends, as well as read news articles regarding environmental problems.

Furthermore, findings suggest that NMB consumers require increased knowledge on recycling practices, this can be achieved through public awareness campaigns designed to educate consumers on the principle of waste minimisation, the segregation of waste and the complications of improper waste management.

5.7.2 CONSUMER ATTITUDES REGARDING HOUSEHOLD WASTE MANAGEMENT

Given the findings of this study, there is a need to create more positive attitudes towards household waste management among consumers in NMB, as it was established that there is a direct correction between positive attitudes towards household waste management and participation in recycling practices. Therefore, it is clear that NMB consumers require greater knowledge and awareness of recycling, this can be achieved through public awareness campaigns designed to educate consumers about how a recycling scheme works (e.g. how to sort recyclables and where to recycle waste), as well how to adhere to all regulations and laws regarding waste management.

Additionally, it is recommended that the NMB municipality takes necessary steps in order to change consumer perceptions regarding their degree of seriousness towards effective household waste management. This can be achieved by expanding upon and improving the current recycling facilities in place, as well as implementing a household solid waste recycling scheme, in combination with public awareness campaigns about recycling.

Furthermore, in order for any recycling scheme in NMB to be successful, it is recommended that it should be convenient, cost-effective for individuals and not be a time consuming activity. Recycling sites should also be easily accessible to consumers.

5.7.3 PERCEPTIONS REGARDING HOUSEHOLD WASTE MANAGEMENT PRACTICES

The results of this study indicate that most NMB households are not engaging in recycling practices. Three elements will be essential to bring about changes in consumer attitudes, and therefore participation in recycling practices, namely: education, public awareness and reducing socio economic barriers. Therefore, it is recommended that the NMB municipality should conduct public awareness campaigns designed to educate consumers on how to separate recyclables into separate storage containers and treat their recyclables so that they can be recycled efficiently. Furthermore, the NMB municipality should provide incentives to

encourage recycling participation as well as establish a household solid waste recycling scheme designed to meet the needs of the whole community.

5.7.4 GENERAL RECOMMENDATIONS

The successful implementation of a household solid waste recycling scheme in NMB would rest upon community co-operation and commitment. Judging by respondents' awareness, participation and willingness to participate it can be recommended that the municipality should increase recycling facilities and infrastructure in NMB. Current participation in recycling in NMB primarily involves citizens who recycle voluntarily. The municipality should seek to create a community driven recycling programme and set achievable goals in terms of diversion of waste from the landfill. In order to create such a scheme the municipality should emphasize the importance of recycling as a process to achieve environmental and resource conservation and not as a goal in itself, allocate funds to improve recycling infrastructure and facilities and introduce and enforce the by-laws and regulations which the community should abide by in household solid waste recycling. Until such time, voluntary recycling will continue to be the primary method for diverting waste from disposal. Hence, the NMB municipality should focus on providing all the necessary means and incentives to improve voluntary recycling. Regular monitoring and evaluation of the household solid recycling programme in NMB must take place. Also, it is recommended that municipalities should collect and publish statistics on recycling volumes. Without such statistics, any progress in recycling effort and practices cannot be detected.

Given the findings of this study, the municipality should provide a house-to-house educational campaign about recycling and its importance. Bigger families and tenant households should be targeted specifically to encourage them to participate in household solid waste recycling. As South Africa is a developing country, not everyone has access to the internet, as a result of this other means, like radio/TV channels, posters, newspaper articles and school/university education should not be neglected as they still play an important role in spreading the message of recycling. The household solid waste recycling programme should provide households with both household waste containers, preferably black and blue bags for non-recyclables and recyclables respectively.

Another channel governments can pursue to increase domestic recycling rates is to legislate a surcharge on the price of items when sold in recyclable bottles and containers. This legislation usually involves offering a refund upon returning these items (typically glass, plastic or metal)

to a collection point. Such programs have been reported to be very successful in improving recycling rate of those items for up to 80 percent.

5.8 SHORTCOMINGS OF THE RESEACH

The study was undertaken solely within NMB, situated in the Eastern Cape region of South Africa and is therefore not a reflection of all areas, particularly smaller towns and rural areas in South Africa. Another major shortcoming of this research relates to the collection of primary data. The database from which the sample was randomly selected was not necessarily representative of all households in all residential areas of NMB. Furthermore, several individuals were reluctant to complete the questionnaire and several of the respondents did not complete the questionnaire.

Additionally, this study concentrates on household waste recycling in NMB. More research is needed on consumers' attitude and behaviour towards recycling of other types of waste. Also, results of the current study are based on surveying a limited number of people. Thus, these results should be taken cautiously keeping in mind that no previous published articles exist in this area to do any comparisons.

5.9 FUTURE RESEARCH

Possible solutions to identified shortcomings outlined in Section 5.8 could be obtained by further research, according to the following recommendations, that:

- Other geographic areas in South Africa, particularly smaller towns and rural areas should be explored in order to obtain a more general and holistic insight with regard to the attitudes and practices of households towards the recycling of household waste.
- Further research is needed on consumers' attitude and behaviour towards recycling of other types of waste
- Further research is required on the domestic waste recycling attitude and practices among people in other developing countries as there is currently a lack of published research
- Further research on this topic which is more diversely representative of all the residential areas in NMB is needed in order for decision makers to formulate suitable policies and regulations regarding waste management

5.10 SELF REFLECTION

Upon reflection, knowledge was gained in several categories when this study was conducted. The proposal of a specific research topic was the first lesson learnt and included means of searching for and selecting the appropriate topic for the study. Knowledge was also gained on the several topics that were investigated in the literature review section (chapter two) of this study. Developing a research instrument and choosing the correct sample and sample size, are all skills that the researchers acquired, in order to gather the necessary information that enabled them to draw conclusions of this study. Analysing and interpreting the data by means of statistical programmes were one of the most important skills acquired, as this was necessary to be able to make accurate conclusions about the data.

The researchers' perceptions and information in terms of the attitudes and practices of consumers towards household recycling were changed and enhanced, since the information received from the respondents contradicted their initial views on some of the household waste management topics in this study. The skills and knowledge gained in this study will definitely assist the researchers in any future research or undertaking.

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ANNEXURE A

COPY OF THE COVER LETTER AND QUESTIONNAIRE

NELSON MANDELA
UNIVERSITY

South Campus
Department of Business Management
Tel. +27 (0)41 5042033
Elroy.smith@nmmu.ac.za

July 2018

Dear Sir/Madam

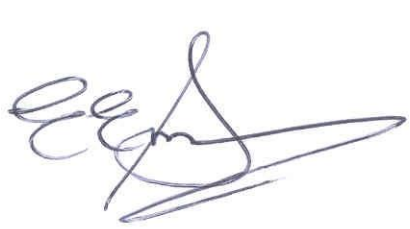
Re: ***HONOURS RESEARCH PROJECT: ATTITUDES AND PRACTICES REGARDING HOUSEHOLD WASTE MANAGEMENT IN NELSON MANDELA BAY***

It is hereby confirmed that Mr J Hancocks and Mr G Dawson are registered honours students in the Department of Business Management at Nelson Mandela Metropolitan University. They are busy conducting a research project, as part of their treatise, investigating perceptions regarding attitudes and practices toward household waste management in Nelson Mandela Bay.

It would be appreciated if you could assist them in the completion of a short questionnaire regarding the afore-mentioned topic. Please note that the information provided will be treated as strictly confidential and will be used for research purposes only.

Your valuable input and cooperation is highly appreciated. We trust that you will find this in order.

Yours faithfully



Prof EE Smith

Research coordinator

Department of Business Management

Mr J Hancocks & G Dawson

Honours Research Students

QUESTIONNAIRE

Please indicate by means of a cross (X) the extent to which you agree or disagree with the statements in the following sections.

(1) Strongly disagree (2) Disagree (3) Neutral (4) Agree (5) Strongly agree

SECTION A

GENERAL PERCEPTIONS REGARDING ENVIRONMENTAL SUSTAINABILITY

	IN MY HOUSEHOLD:	**Strongly disagree**	**Disagree**	**Neutral**	**Agree**	**Strongly agree**
1	There is much concern for environmental issues.	1	2	3	4	5
2	We feel strongly against the fact that mankind is abusing the environment.	1	2	3	4	5
3	We discuss environmental problems with our family and friends.	1	2	3	4	5
4	We make the effort to read news and articles regarding environmental problems.	1	2	3	4	5
5	We are mindful of not harming the environment through household waste disposal.	1	2	3	4	5
6	Responsible waste management is seen as an essential part of our daily life.	1	2	3	4	5
7	We consider the environment when buying a product or service.	1	2	3	4	5
8	We are aware that the burning of waste releases carbon dioxide into the atmosphere.	1	2	3	4	5
9	We are aware that the Greenhouse effect is caused by the release of excessive carbon dioxide into the atmosphere.	1	2	3	4	5
10	We are of the opinion that insufficient collection of waste could lead to significant problems (e.g. pollution and health risks).	1	2	3	4	5
11	We are consciuous about the impact of our daily living with regards to the generating and/or disposing of household wastes.	1	2	3	4	5
12	We believe that we need to make sacrifices in order for a greener future.	1	2	3	4	5
13	We know the principle of waste minimisation.	1	2	3	4	5
14	We are aware of the segregation of waste.	1	2	3	4	5
15	We know the complications of improper waste management.	1	2	3	4	5

SECTION B

CONSUMER ATTITUDES REGARDING HOUSEHOLD WASTE MANAGEMENT

	MY HOUSEHOLD:	**Strongly disagree**	**Disagree**	**Neutral**	**Agree**	**Strongly agree**
1	Strives to recycle, reduce and reuse as much as possible.	1	2	3	4	5
2	Recognises recycling as a positive and efficient solution to the ongoing environmental issues we face.	1	2	3	4	5
3	Feels mentally and emotionally rewarded through the act of recycling.	1	2	3	4	5
4	Believes that non-collection of waste could lead to dumping in public open spaces/vacant land or the burning of waste.	1	2	3	4	5
5	Believes that improper waste disposal is a threat to our environment.	1	2	3	4	5
6	Is of the opinion that our local municipality is serious about effective household waste management.	1	2	3	4	5
7	Has sufficient knowledge about household waste management.	1	2	3	4	5
8	Has a high level of awareness about recycling issues.	1	2	3	4	5
9	Has knowledge of how a recycling scheme works (e.g. how to sort recyclables and where to recycle waste).	1	2	3	4	5
10	Knows and adheres to all regulations and laws regarding waste management.	1	2	3	4	5
11	Believes that household waste management should be convenient.	1	2	3	4	5
12	Will participate in household recycling only if it is not too expensive (cost-effective).	1	2	3	4	5
13	Will participate in household recycling only if waste disposal and recycling sites are easily accessible.	1	2	3	4	5
14	Believes that waste management should not be a time consuming activity.	1	2	3	4	5
15	Is willing to take recyclables to collection points (e.g. drop-off or recycling centres).	1	2	3	4	5
16	Believes that household waste disposal is the sole responsibility of the local authorities.	1	2	3	4	5
17	Believes that it is each individuals' responsibility to engage in recycling activities.	1	2	3	4	5
18	Believes that socio-economic factors (e.g. illiteracy, poverty, and irresponsible waste management) have the potential to impact an individuals' waste management attitudes.	1	2	3	4	5
19	Believes that the current facilities provided encourage our household to recycle.	1	2	3	4	5
20	Believes incentives would encourage individuals to recycle.	1	2	3	4	5

SECTION C

PERCEPTIONS REGARDING HOUSEHOLD WASTE MANAGEMENT PRACTICES

	IN MY HOUSEHOLD:	**Strongly disagree**	**Disagree**	**Neutral**	**Agree**	**Strongly agree**
1	We limit the number of purchases we make by buying only what we need in the correct amounts.	1	2	3	4	5
2	We buy items in bulk or as refills in order to reduce packaging waste.	1	2	3	4	5
3	We engage in opportunities to operate our home more efficiently (e.g. using rechargeable batteries and/or buying local products to reduce the negative environmental impacts from transportation).	1	2	3	4	5
4	We make the effort to read news, books etc. online instead of on printed out material.	1	2	3	4	5
5	We strive to purchase reusable products.	1	2	3	4	5
6	We make the effort to purchase products made from recycled materials.	1	2	3	4	5
7	We pass items along to another person for continued use.	1	2	3	4	5
8	We view used materials as a resource rather than refuse.	1	2	3	4	5
9	We reuse materials through various methods (e.g. reusing shopping bags and donating old items to charities).	1	2	3	4	5
10	We use washable rags, towels, and/or napkins instead of disposable napkins and towels.	1	2	3	4	5
11	We use a solid waste management strategy that entails the conversion of discarded consumer products, such as waste, into useful and/or environmentally friendly products.	1	2	3	4	5
12	We believe that various items can be recycled at household level, such as metals, glass, textiles, paper, organics, and plastic.	1	2	3	4	5
13	We currently sort our recyclables into separate storage containers.	1	2	3	4	5
14	We take recyclables to collection points (e.g. drop-off or recycling centres).	1	2	3	4	5
15	We ensure our recyclables are treated correctly so that they can be recycled efficiently.	1	2	3	4	5

SECTION D

BIOGRAPHICAL INFORMATION

Please indicate your response by ticking the relevant number.

1. Gender

Male	1	Female	2

2. Ethnic classification

Group	African	Coloured	Indian	White	Other
	1	2	3	4	5

3. Highest qualification

Grade 11 and lower	1
Grade 12	2
Diploma or National certificate	3
Bachelor's degree	4
Postgraduate degree/diploma (e.g. Honours/Masters)	5
Other (please specify)	6

4. Position in the household

Mother/Father	1
Child	2
Family member	3
Friend	4
Other (Please specify):	5

5. Age in years

16-20 year	1	51-60 year	5
21-30 year	2	61-70 year	6
31-40 year	3	71-80 year	7
41-50 year	4	81 and older	8

6. Size of the family

Small (1-2 members)	1
Medium (3-4 members)	2
Large (5 or more members)	3

7. Type of dwelling

House	1
Flat	2
Townhouse	3
Informal	4
Other (please specify)	5

8. Current employment status

Employed full time	1
Employed part time	2
Unemployed	3
Student	4
Retired	5
Self-employed	6
Unable to work	7
Other	8

Thank you for completing this questionnaire.

ANNEXURE B

ETHICS CLEARANCE

Nelson Mandela Metropolitan University
for tomorrow

FORM E

ETHICS CLEARANCE FOR TREATISES/DISSERTATIONS/THESES

Please type or complete in black ink

FACULTY: Business and Economic Sciences

SCHOOL/DEPARTMENT: Department of Business Management

I, Prof EE Smith the supervisor for Mr G Dawson (215104331) and Mr J Hancocks (215149548) candidates for the degree of Business Management Honours with a treatise entitled: **Attitudes and practices of consumers towards recycling of household waste in Nelson Mandela Bay**, considered the following ethics criteria *(please tick the appropriate block):*

	YES	NO
1. Is there any risk of harm, embarrassment of offence, however slight or temporary, to the participant, third parties or to the communities at large?		X
2. Is the study based on a research population defined as 'vulnerable' in terms of age, physical characteristics and/or disease status?		X
2.1 Are subjects/participants/respondents of your study:		
(a) Children under the age of 18?		X
(b) NMMU staff?		X
(c) NMMU students?		X
(d) The elderly/persons over the age of 60?		X
(e) A sample from an institution (e.g. hospital/school)?		X
(f) Handicapped (e.g. mentally or physically)?		X
3. Does the data that will be collected require consent of an institutional authority for this study? (An institutional authority refers to an organisation that is established by government to protect vulnerable people)		X
3.1 Are you intending to access participant data from an existing, stored repository (e.g. school, institutional or university records)?		X
4. Will the participant's privacy, anonymity or confidentiality be compromised?		X
4.1 Are you administering a questionnaire/survey that:		
(a) Collects sensitive/identifiable data from participants?		X
(b) Does not guarantee the anonymity of the participant?		X

(c) Does not guarantee the confidentiality of the participant and the data?		X
(d) Will offer an incentive to respondents to participate, i.e. a lucky draw or any other prize?		X
(e) Will create doubt whether sample control measures are in place?		X
(f) Will be distributed electronically via email (and requesting an email response)? Note: • If your questionnaire **DOES NOT** request respondents' identification, is distributed electronically and you request respondents to return it *manually* (print out and deliver/mail); **AND** respondent anonymity can be guaranteed, your answer will be NO. • If your questionnaire **DOES NOT** request respondents' identification, is *distributed via an email link and works through a web response system (e.g. the university survey system);* ***AND*** respondent anonymity can be guaranteed, your answer will be NO.		X

*Please note that if **ANY** of the questions above have been answered in the affirmative **(YES)** the student will need to complete the full ethics clearance form (REC-H application) and submit it with the relevant documentation to the Faculty RECH (Ethics) representative.*

and hereby certify that the student has given his/her research ethical consideration and full ethics approval is not required.

23 October 2018

SUPERVISOR(S) **DATE**

23 October 2018

HEAD OF DEPARTMENT **DATE**

STUDENT(S) **DATE**

Please ensure that the research methodology section from the proposal is attached to this form.

Please note that by following this Proforma ethics route, the study will NOT be allocated an ethics clearance number.