

UNIVERSITY OF KWAZULU-NATAL

**Perceptions on the Environmental Responsibility of South
African Paper Producers**

By

Kugen Moodley

Student Number: 9042465

A dissertation submitted in partial fulfillment of the requirements for the
degree of
Master of Business Administration

**Graduate School of Business & Leadership
College of Law and Management Studies**

Supervisor: Mr. Siphon Steven Msomi

2013

DECLARATION

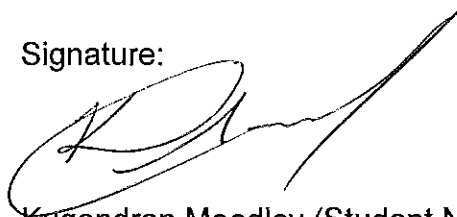
I Kugendran Moodley declare that:

- (i) The research reported in this dissertation/thesis, except where otherwise indicated, is my original research.
- (ii) This dissertation/thesis has not been submitted for any degree or examination at any other university.
- (iii) This dissertation/thesis does not contain other persons' data, pictures, graphs or other information, unless specifically acknowledged as being sourced from other persons.
- (iv) This dissertation/thesis does not contain other persons' writing, unless specifically acknowledged as being sourced from other researchers.

Where other written sources have been quoted, then:

- a) their words have been re-written but the general information attributed to them has been referenced:
 - b) where their exact words have been used, their writing has been placed inside quotation marks, and referenced.
- (v) This dissertation/thesis does not contain text, graphics or tables copied and pasted from the Internet, unless specifically acknowledged, and the source being detailed in the dissertation/thesis and in the References sections.

Signature:



Kugendran Moodley (Student Number: 9042465)

ACKNOWLEDGEMENTS

I wish to express my sincere appreciation and gratitude to the following individuals, without whose assistance, this study would not have been possible:

- Firstly and most importantly my wife Vimla and children Rezél and Sayshan who supported and encouraged me throughout this process. Thank you for your understanding while I was absent due to my studies.
- Mr Siphon Steven Msomi, my supervisor, for your guidance with the research and for the support during my studies.
- To my friends who I have met on the MBA program who have added value along the way. I trust that we will continue to hold a strong bond.
- Wendy Clarke, who has been a guiding light through the MBA programme. I wish you all of the best in your retirement.
- To my Boss, Mr. Reven Naidoo, for supporting my efforts for the duration of the study, and for believing in me.
- To Mpact Limited for the time off allowed during the studies.
- All the business executives who took time to participate in this study. I thank you all.

ABSTRACT

“Perceptions on the Environmental Responsibility of South African Paper Producers”, is a research topic that has been developed to understand if individuals consider the paper industry to have a positive or negative impact on the environment and natural resources. This follows from the increasing global focus that is placed on industry with regards to their impact on the environment and their contribution to climate change. The study aims to confirm if individuals associate the paper industry with deforestation, as a contributor to climate change, and as a sustainable industry. The study population was business executives in the Durban, KwaZulu Natal region, and a samples group chosen on a non-probability basis, from the database of the Durban Chamber of Commerce & Industry was selected, using the Krejcie and Morgan Model (1970). Questionnaires were submitted electronically, via Questionpro, to the selected targeted sample. One hundred and twelve respondents completed the survey with the data being suitable for further statistical analysis. The results were analysed in context of the objectives of the study that have been outlined. The outcome of the research highlighted that individuals do confirm paper to be an important commodity, but are of the perception that the South African paper producers are a major contributor to the degradation of the environment by both their impact on forestry as well as their contribution to climate change. Digital technology is also rated to be more environmentally friendly than paper, while paper recycling is considered as essential. The results also identified that the public are uninformed on the practices and initiatives of the industry and consider this to be due to poor communication from the industry. Recommendations that have risen from this study include the industry’s communication methods with the general public on its activities and sustainability practices, together with involvement with the public to improve on the recovery of paper waste. There have been some limitations to the study, such as the availability of data, from previous studies, on the topic as well as the slow rate of responses for data collection purposes, but none have obstructed the purpose or process of the research.

TABLE OF CONTENTS

| | |
|---|-------------|
| TITLE PAGE | i |
| DECLARATION | ii |
| ACKNOWLEDGEMENTS | iii |
| ABSTRACT | iv |
| TABLE OF CONTENTS | v |
| LIST OF FIGURES | viii |
| LIST OF TABLES | ix |
| 1. Chapter One - Introduction | 1 |
| 1.1. Introduction..... | 1 |
| 1.2. Motivations for the Study..... | 1 |
| 1.3. Focus of the Study | 2 |
| 1.4. Problem Statement | 2 |
| 1.5. Objectives | 3 |
| 1.6. Limitations of the Study | 3 |
| 1.7. Outline of the Study | 4 |
| 1.8. Summary | 5 |
| 2. Chapter Two - Literature Review | 6 |
| 2.1. Introduction..... | 6 |
| 2.2. A Paperless Environment..... | 6 |
| 2.2.1. Myths versus reality | 9 |
| 2.3. Environmental Impact..... | 11 |
| 2.3.1. Global Warming and Climate Change..... | 11 |
| 2.3.2. Greenhouse gases..... | 12 |
| 2.3.3. The “greenhouse” effect..... | 13 |
| 2.3.4. Carbon Footprint..... | 14 |
| 2.4. Forestry..... | 15 |
| 2.4.1. Forestry Management..... | 15 |
| 2.4.2. Deforestation | 16 |
| 2.5. Paper..... | 17 |
| 2.5.1. Paper Production & Consumption | 18 |
| 2.5.2. Paper Recycling | 20 |

| | | |
|-----------|---|-----------|
| 2.6. | What the major SA Paper producers say | 23 |
| 2.6.1. | Mondi Limited..... | 23 |
| 2.6.2. | Mpact Limited..... | 24 |
| 2.6.3. | Sappi Limited | 26 |
| 2.7. | Reducing the impact on climate change..... | 28 |
| 2.8. | Conference of Parties [COP]..... | 29 |
| 2.9. | Summary | 30 |
| 3. | Chapter Three - Research Methodology..... | 32 |
| 3.1. | Introduction..... | 32 |
| 3.2. | Research Methodology | 32 |
| 3.3. | Aim and Objectives of Study | 33 |
| 3.3.1. | Aim..... | 33 |
| 3.3.2. | Objectives..... | 33 |
| 3.4. | Participants and Location of the Study / Sampling | 33 |
| 3.5. | Data Collection strategies | 34 |
| 3.5.1. | Sampling..... | 35 |
| 3.5.2. | Population..... | 35 |
| 3.5.3. | Sample size..... | 36 |
| 3.5.4. | Sampling Design | 36 |
| 3.6. | Research Design and Methods..... | 38 |
| 3.6.1. | Description and Purpose..... | 38 |
| 3.6.2. | Construction of the Instrument | 38 |
| 3.7. | Pretesting and Validation | 42 |
| 3.7.1. | Pretesting of the questionnaire | 42 |
| 3.7.2. | Validation of the questionnaire..... | 44 |
| 3.7.3. | Reliability | 45 |
| 3.8. | Administration of the Questionnaire | 45 |
| 3.9. | Analysis of the Data..... | 46 |
| 3.10. | Summary | 46 |
| 4. | Chapter Four - Presentation and Discussion of Results..... | 48 |
| 4.1. | Introduction..... | 48 |
| 4.2. | Demographics..... | 48 |
| 4.3. | Objectives of the study | 51 |
| 4.3.1. | Objective 1: Paperless Environment..... | 51 |

| | | |
|-----------|---|-----------|
| 4.3.2. | Objective 2: SA Paper Producers and the Environment | 55 |
| 4.3.3. | Objective 3: Sustainability and Renewable Resources | 60 |
| 4.3.4. | Objective 4: Paper Recycling | 62 |
| 4.3.5. | Objective 5: Awareness on Paper Producer Activities | 68 |
| 4.4. | Summary | 73 |
| 5. | Chapter Five - Conclusions, Limitations and Recommendations | 75 |
| 5.1. | Introduction..... | 75 |
| 5.2. | Discussion | 75 |
| 5.2.1. | A Paperless environment..... | 75 |
| 5.2.2. | SA Paper Producers and the Environment | 76 |
| 5.2.3. | Sustainability and Renewable Resources | 76 |
| 5.2.4. | Paper Recycling | 76 |
| 5.2.5. | Awareness on Paper Producer Activities | 77 |
| 5.3. | Recommendations arising from this study | 77 |
| 5.4. | Limitations of the study..... | 78 |
| 5.5. | Recommendations for further research | 79 |
| 5.6. | Summary | 81 |
| | References | 82 |
| | Annexure 1 - Questionnaire | 86 |
| | Annexure Two - Ethical clearance | 94 |
| | Annexure Three - Turnitin Report – Originality Report & Similarity Index | 95 |

LIST OF FIGURES

| | |
|---|----|
| Figure 2.1 - Greenhouse gas emission ratio | 13 |
| Figure 2.2- Global Paper Production Ratio by Region | 18 |
| Figure 2.3 - South African Paper Consumption..... | 19 |
| Figure 2.4 - Paper Consumption Per Individual Per Year | 20 |
| Figure 2.5 - Recycled Paper in South Africa | 22 |
| Figure 2.6 - Sustainable Procurement of Wood and Paper-Based Products | 29 |
| Figure 4.1 - Respondents Knowledge of the Paper Manufacturing Industry | 50 |
| Figure 4.2 - Importance of Paper..... | 51 |
| Figure 4.3 - Possibility of a Paperless Environment | 52 |
| Figure 4.4 - Office Greening Project | 51 |
| Figure 4.5 - Targeting a Paperless Office | 53 |
| Figure 4.6 - Digital Technology vs Paper | 54 |
| Figure 4.7 - Deforestation as a concern in SA | 55 |
| Figure 4.8 - Paper Industry Influence on Deforestation in SA..... | 56 |
| Figure 4.9 - Paper Industry's Impact on the Environment | 57 |
| Figure 4.10 - Environmental Unfriendliness of the Paper Industry..... | 58 |
| Figure 4.11 - Paper Industry as a Contributor to Climate Change | 59 |
| Figure 4.12 - Knowledge on Forestry Management..... | 60 |
| Figure 4.13 - Forestry as a Regulated Industry..... | 61 |
| Figure 4.14 - Paper Industry is a Sustainable Industry | 62 |
| Figure 4.15 - Paper Recycling Saves Trees | 63 |
| Figure 4.16 - Familiar with Recycling Initiatives | 63 |
| Figure 4.17 - Paper Recycling is an Effective Process | 64 |
| Figure 4.18 - Community effectiveness on Paper Recycling..... | 65 |
| Figure 4.19 - My Organisation is Active in Paper Recycling | 66 |
| Figure 4.20 - I am Active in Recycling | 64 |
| Figure 4.21 - I Pass Knowledge on Paper Recycling..... | 67 |
| Figure 4.22 - Familiarity with SA Paper Producers..... | 68 |
| Figure 4.23 - The Paper Industry is Reducing its Environmental Impact | 69 |
| Figure 4.24 - Government Regulating Industries..... | 70 |
| Figure 4.25 - Should the Paper Industry be more vocal..... | 70 |

LIST OF TABLES

| | |
|---|-----------|
| Table 2.1 - Advantages and disadvantages of a paperless environment..... | 7 |
| Table 2.2 - Myths & Realities on the Environmental Issues related to Paper... | 10 |
| Table 2.3 - Sustainability performance against target..... | 28 |
| Table 3.1- Advantages & Disadvantages of Questionnaires..... | 39 |
| Table 4.2- Demographic Profile of Respondents..... | 49 |
| Table 4.3- Communication Medium from Selection List..... | 71 |
| Table 4.4 - Communication Medium from Respondents Suggestions..... | 72 |

1. Chapter One - Introduction

1.1. Introduction

From visual to written media there is consistent focus on the issues affecting the environment and there is ongoing communication suggesting methods to help improve environmental conditions that is anticipated to contribute to the sustainability of our planet.

This study is linked to an aspect of these concerns and focuses on the perceptions that individuals hold on the environmental responsibility of the South African Paper producers.

This study is aimed to determine if KZN business executives have a positive or negative perception of the paper manufacturing industry on the South African environment, to determine if the paper industry has a need to embark on processes and practices to reaffirm its sustainability practices, to ensure that it functions within acceptable levels that have been defined by stakeholders.

The study will be used to identify if individuals do in fact have an opinion, and to determine the extent of their opinions on the factors that influence the environment and to determine if individuals understand that each of them can contribute towards the sustainability of the environment.

1.2. Motivations for the Study

Focus on environmental responsibility is increasing globally, and industry is being scrutinised to ensure that their impact is low or being reduced. The paper industry is included in the cluster of industries that are under focus and South African paper producers inadvertently become a focal point.

South Africa accounts for just one (1) % of the world paper production, and paper producers within South Africa report that they conform to legislation and manage the processes from forestry to recycling in a responsible manner. There are reports that raise negative aspects on forestry and the paper industry globally. There is no direct study that has been identified that highlights the perceptions of individuals on the environmental responsibility of paper producers, and thus the purpose of this study is to form a base.

The study is to form an understanding of the perception of individuals with regards to the impact of the paper industry on the environment but is anticipated to lead onto other studies that can contribute towards aiding industry's obtain an understanding as to how they are viewed by the general public. The results can be useful to both industries and the public, to commence efforts from both parties that will strive toward the development of a sustainable environment for future generation to prosper from.

1.3. Focus of the Study

The focus of this study was limited to business executives located in Durban, KwaZulu Natal only, based on the duration allocated to the research. The respondents were accessed via the database of the Durban Chamber of Commerce and Industry. The database contained 2,800 members and thus using the Krejcie and Morgan (1970) model as cited by (Sekran & Bougie, 2010) every tenth member was selected to receive the questionnaire electronically.

The survey examined the participant's perceptions via their responses towards the research study. The study focused on understanding how individuals viewed South African paper industries with regards to their environmental impact.

1.4. Problem Statement

Internationally the focus on the climate and the environment conservation is increasing. Bodies such as 17th Conference of the Parties [COP17], World Wide Fund for Nature [WWF] and recently even The Group of Twenty Finance Ministers

and Central Bank Governors [G20] continue to raise awareness on environmental conservation and in the process focus on the practices of industry are increasing. The South African paper industries manage resources sustainably while meeting the paper requirements of society, as stipulated in the reports of the South African paper producers, but are being tainted by international practices. This study will attempt to highlight the perceptions that the respondents hold on South African paper producers.

1.5. Objectives

The below listed objectives were the basis of the research. These objectives covered all key aspects of the study.

- To determine the respondents perception on the possibility of striving towards a “Paperless environment”
- To carry out an assessment to determine the perception that business executives in Durban, KZN, have on how the S.A paper manufacturing industries impacts on the environment.
- To determine the respondents understanding of the sustainability of the paper industry and their use of renewable resources.
- To determine the respondents awareness on the importance of paper recycling and to identify the respondents contribution towards this process.
- To reveal if there are areas in which the S.A. paper manufacturers need to increase public awareness with regards to their operational activities and business practices.

1.6. Limitations of the Study

The study focused on the perceptions of individuals on the impact of the paper manufacturing industry on the environment. The study was conducted over a period of five months and thus limited the extent of the research.

The questionnaire was designed using rating scales to facilitate the feedback. In an extended time frame feedback that could have been prompted could have requested for more elaborate responses.

This study is also limited to research the responses of South Africans. It would prove beneficial to research the impact of international paper manufacturers on the environment and to correlate the findings of this research with that of other countries. This will also allow the researcher to understand the level of focus that South African individuals place on the preservation of our environment in comparison to individuals across the globe.

1.7. Outline of the Study

The layout of this study was set to achieve a logical flow from the processes administered. This study constitutes five chapters that are structured as follows:

- Chapter One is an introduction that confirms the motivation for this study research, the research problem, the focus of this study and the objectives of this study. The limitations that have been encountered are also listed.
- Chapter Two is the literature review comprising of literature from both local and international sources that focus on forestry and the paper industry together with related environmental aspects.
- Chapter Three focuses on the methodology of this research while confirming the rationale for the methods that have been selected.
- Chapter Four is a presentation and interpretation of the results that have been collected from the survey. Discussion of these resulted have also been included into this chapter and are presented to correspond with the objectives that outline this study.
- Chapter Five is the concluding chapter of this study. In this chapter the conclusions are drawn and recommendations relevant to this study are

presented. The limitations listed in chapter one is discussed in more detail and recommendations for further research on the subject are offered.

1.8. Summary

The global environmental concern forms the basis for this research. This chapter introduced the format of this study and discussed the research topic and confirmed the motivation for this study together with the objectives that the study intends to meet. The nature of the research was outlined and the intended direction of the study was outlined in an overview of the chapters that followed. The next chapter focuses on the literature review, which formed the basis for the empirical study.

2. Chapter Two - Literature Review

2.1. Introduction

The concern of industries impacting on the Environment is rapidly increasing. As the activities of the industrialised countries gain opulence the earth's natural resources are being depleted and habitats are being destroyed. One such industry that is included is the paper industry. The topic of forestry, deforestation and its contribution to climate change and global warming is on every agenda of every environmental forum (GLICA, 2008).

The discussion on a "paperless environment" is often raised, and many individuals are of the understanding that a digital environment is more eco-friendly than a paper manufacturing environment (Garvey, 2011).

This chapter assesses the environmental issues related to the paper industry and also identifies the practices by the South African paper producers, assessing their actions and contribution towards sustainable practices.

Paperonline (2013) highlights the "myths" that hover around the paper industry and highlights the reality. Paper recycling initiatives in South Africa are also analysed together with the contribution of South Africans in the recycling processes by (PRASA, 2013).

2.2. A Paperless Environment

According to Journal of Extension (2011), an article published in "Business Week" in 1975 titled "The Office of the Future" anticipated that by 1990 there will be "paperless offices". Decades later the debate around this integration continues. Journal of Extension (2011) highlights that to go "paperless" an extremely large quantity of documents will have to be scanned into a "document management system" the transition has also been highlighted to have its own set of advantages and disadvantages, as per the table below.

Table 2.1 - Advantages and disadvantages of a paperless environment

| Advantages | Disadvantages |
|--|---|
| Streamlined workflow | Resistance from the older generation |
| More consistent work product | The process of planning and progressive transition is long. |
| Simultaneous access to documents by multiple users | Initial financial investment will be high |
| Customised templates for frequently used documents | Printing for review and clarification will continue for a long while still. |

Adapted from Journal of Extension (2011), available at www.joe.org

According to York (2006) contrary to the belief that computers, e-mail and the World Wide Web were to result in a reduction in paper consumption, paper consumption has actually increased. According to Sellen and Harper (2002), as cited by York (2006), the introduction of e-mail into organisations has resulted in a 40% increase in paper consumption.

Carr (2005) made reference to the improvements that are being noted in technology to the extent that “it is beginning to look and feel like paper”. This refers to the smaller screen sizes and the longer lasting batteries of digital devices. Carr (2005) conducted a survey, by use of a questionnaire; to determine if respondents are willing to move to a “paperless office”. The findings did yield interest from the respondents and some of the benefits of the transition that have been highlighted are cost, time and space saving, easier retrieval of information, a positive environmental impact and reduction of dust in offices. However, despite the “intuitive appeal” that a paperless system may have, the reality of this process has been highlighted by Carr (2005) and issues that have been highlighted are that of security [viruses, hacking and document tampering], the cost and time of transferring from paper to an electronic format, power failures, lost or poor back-up of files, slow response times and computer illiteracy. Carr (2005) points out that the objective should not be to get rid of paper in totality but rather to use technology to assist, as an association to paper and to reduce clutter where possible.

SustainCommWorld LLC, an entity that is focused on educating corporations, institutions and government agencies on how to develop sustainable green workflows and supply chains together with the Institute for Sustainable Communication have conducted research to ascertain consumers' perceptions of paper against digital media. The common view of consumers was that "going digital means going green and saving trees". Consumers' understanding of the unsustainable energy consumption required to power devices such as computers, eReaders and cellular phones , together with the mining and refining of the mineral required to produce these electronic devices, appeared limited (ZDNet,2010).

Paper Cutz 4 Planet Ark (2009), highlight that historically pulp and paper production has been ranked among the most "resource-intensive" manufacturing industries. Concerns on the environmental impact post paper use have been raised as a serious concern highlighting the potential toxic releases when discarded to landfill. Paper Cutz 4 Planet Ark (2009) highlights the drive to improve the impact that the pulp and paper industry has on the environment through focus on aspects such as forest management, removal of harmful chemicals and technological advancements.

According to Hujala & Hilmola (2009) historically the economic growth has been the key element in the growth of paper demand. Hujala & Hilmola (2009) highlight that this has slowed in developed economies as the consumption of technology increased. According to Devezas et al (2005) as cited by Hujala & Hilmola (2009) the rate of use of technology in developing countries is still unknown, but the demand for paper continues to grow.

Garvey (2011) made reference to the approach that individuals have to be "going green". As the impact on climate change is largely influenced by countries and its actions, individuals are faced with the perception that their bit cannot possibly matter as their choices and decisions cannot be sufficient to affect processes such as the production of SUV's or reduce the number of flights administered daily or the amount of fossil fuel that is spent around the world. Garvey (2011) did indicate that despite it being a "moral choice" and with all other factors indicating the need to be conscious in the decisions we choose, individuals choose to appear unconvinced that their individual efforts can lead to a global impact, or are we in fact deliberately choosing

to ignore the need for the change. “Going Green” involves environmentally friendly choices which can result in aspects such as limiting the number of flights taken or down scaling the vehicle that is driven, but also the decision to recycle. As society strives to prosper in their hierarchy, cutting back on the material aspects is becoming difficult and is possibly being viewed as a weakness.

There are advantages and disadvantages to a paperless office but in all practicality achieving this concept is highly unlikely. Digital technology is increasing in popularity and will replace some written media, but there are generations and individuals that will not aspire to a total substitution. There is also the aspect of producing and running digital technology and this process is contrary to the “going green” model. These are concepts that individuals need to assess and consider with regards to sustainability.

2.2.1. Myths versus reality

According to Paperonline (2013) paper is an integral part of daily lives and is constantly innovating to meet the changing needs of mankind. Paperonline (2013) highlighted that all individuals are in contact with paper, in one form or another, throughout their day. Paper meets our needs as a print medium for communication and knowledge, as a packaging material, for the purpose of hygiene, for banknotes, medical filters and a host of other applications. Paperonline (2013) indicates that as paper is a product of wood it is recyclable, but also goes on to highlight that despite the period that paper has been available for, people are still ignorant about its sustainability and renewability. Paperonline (2013) raises the concern on the “misconceptions and untruths” on the environmental issues related to paper, and the below table draws comparison to findings of this research.

Table 2.2- Myths & Realities on the Environmental Issues related to Paper

| Myth | Reality |
|---|--|
| Using less paper saves the worlds forests | The paper industry contributes to keep up forests, practise sustainable forest management, and is not responsible for the depletion of tropical forests. |
| Paper is bad for the environment | Paper is one of few sustainable products. Paper prodcuts store CO2. |
| Paper production is bad for the climate | The Eurpoean Council recognises wood products as climate friendly. Sustainable forest management helps reduce worldwide CO2 emmissions |
| Paper production consumes too much energy | The paper industry has nad continues to reduce its enegy requirements. |
| Information technologies are better than paper | Online activities are contributing to global warming. E-waste is an increasing environmental problem. Paper is produced from renewable raw materials. Paer is an indispensable part of civilisation. |
| The paper industry is old fashioned, and soon to be a thing of the past | paper is innovative. The paper sector is a modern industry. The youth still value paper. |
| Paper production consumes excessive amounts of water | paper production reuses the water it takes in. Water usage in the industry is being steadiliy reduced. The paper indsutry uses high end water purification systems. |
| We should only use and produce recycled paper. | To keep the recycling process ongoing fresh fibre is required. |
| We use too much too much paper packaging | paper packaging is the consumers first choice. It protects goods, avoids damage and reduces waste. |
| Hand dryers are more hygenic that paper towels | Hand dryers are not effective in removing bacteria in comparison to paper towels. They in fact increasae the number of bacteria on hands. |

Adapted from Paperonline (2013), available at www.paperonline.org

Table 2.2. draws a comparison between myth and reality and links to the objectives of this study as the intention is to assess the perception of individuals, while determining their understanding of the paper manufacturing industry. Should the findings of this study be in line with the myths listed, it will raise a flag to the South African paper producers highlighting that efforts have to be made to communicate their practices to the general public.

2.3.Environmental Impact

Global warming, climate change, greenhouse gases, the greenhouse effect and carbon footprint are discussed below highlighting articles that discuss these environmental issues in the context of forestry and the paper industry.

2.3.1. Global Warming and Climate Change

According to Strategic Direction (2008), global warming has become a marketing tool for businesses by means of advertising what they are doing to prevent global warming. Being environmentally conscious has become good business practice and this is largely influenced by the pressures that are being exerted by environmental “watchdogs”, such as environmental bodies, government and activists.

According to Schnider (2011), global warming is a reality posing challenges that we are uncertain on how to deal with, yet we need to find the appropriate responses to ensure long term sustainability of our planet. According to Haddow (2009) as cited by Schnider (2011), making immediate changes to the way we impact the environment will not yield results immediately, as the process has commenced and greenhouse gas emissions will be on-going for at least the next few decades. Schneider (2011) cited Broeker and Kunzig (2008) to have indicated that the 2007 report issued by the “Intergovernmental panel on Climate Change” has highlighted that 600 scientists from 40 countries agreed that man had a direct role in climate change.

According to Wenxin Shi (2010) “climate change and global warming have become more and more remarkable global problems.” Wenxin Shi (2010) raises the fact that both natural events and human activities have an impact on the increasing global temperature. Wenxin Shi (2010) make reference to the increased concentrations of Carbon Dioxide [CO₂], Methane [CH₄] and Nitrous Oxide [N₂O], indicating the cause to be human activities, and the effect to be a rise in sea level due a restoration of the balance in radiation, that will threaten life. Wenxin Shi (2010) makes reference to the Union of Concerned Scientists [UCS], who highlights that to protect current and future generations, people need to “reduce emissions of heat trapping gases,

such as CO₂ and CH₄". The UCS urges the use of the technology and information that is already available to aid in the reduction of these emissions.

2.3.2. Greenhouse gases

According to Shah (2012) Global warming and Climate change refer to "an increase in global temperatures". Shah (2012) has highlighted his belief that both natural events and human activities are factors that contribute to these changes, primarily resulting from an increase in "greenhouse" gases. The "six main greenhouse gasses" are Carbon Dioxide [CO₂], Methane [CH₄], Nitrous Oxide [N₂O], Hydrofluorocarbons [HFCs], Perfluorocarbons [PFCs] and Sulphur Hexfluoride [SF₆].

According to United States Environmental Protection Agency [EPA] (2013) Greenhouse gases [GHG's] identify contributors to each of the gases that are emitted, as follows:

- Carbon dioxide (CO₂) –The primary source is Fossil fuels with land use also being a contributor, especially when it involves deforestation. According to EPA (2013), land can also remove CO₂ from the atmosphere through "reforestation, improvement of soils, and other activities."
- Methane (CH₄) emissions are attributed to agricultural activities, waste management, and energy use.
- Nitrous oxide (N₂O) - Agricultural activities, such as fertilizer use, is the primary source.
- Fluorinated gases (F-gases) - Industrial processes, refrigeration, and the use of a variety of consumer products contribute to emissions of F-gases, which include Hydrofluorocarbons (HFCs), Perfluorocarbons (PFCs), and sulfur hexafluoride (SF₆).

The below table identifies the split of the greenhouse gasses together with the contributors.

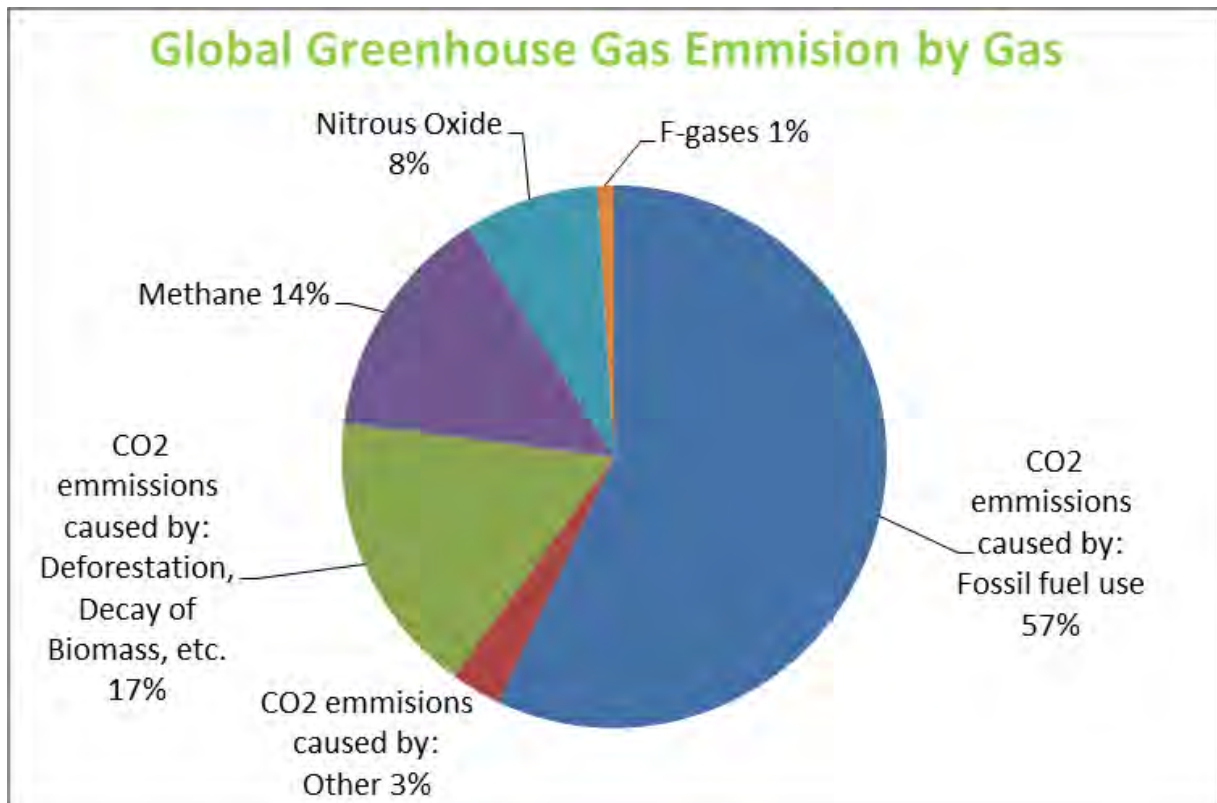


Figure 2.1 - Greenhouse gas emission ratio

Adapted from the intergovernmental panel on climate change IPCC: climate change (2007): synthesis report, available online at www.ipcc.ch

The above listed gases, when released in abundance, results in what is referred to as the “greenhouse’ effect.

2.3.3. The “greenhouse” effect

Shah (2012) explains the process of “greenhouse effect” as:

- “The suns energy drives the earths weather and climate, heating the surface
- Some atmospheric gases trap some of the outgoing energy, retaining heat.
- These gases are known as greenhouse gases
- The “greenhouse effect” is the rise in the temperature on earth, resulting from the trapped energy”.

Shah (2012) does highlight the debate that the Greenhouse Effect is natural, as its purpose is to enable the earth’s average temperature from becoming a lot colder, but also points out that the retention of more heat than required will render the earth

uninhabitable for humans, plants and animals. Excessive releases of the above gases contribute to a global warming and climate change (Natural Gas, 2011).

2.3.4. Carbon Footprint

The World Business Council for Sustainable Development's [WBCSD] (2012), highlights that most goods, through their life cycle will leave an "environmental and carbon footprint". This is generally contributed to via the manufacturing and distribution processes, but also through consumption and disposal.

According to WBCSD (2012) products produced from forest products are from a renewable raw material requiring a lower fossil fuel inputs in comparison on non-wood products. These products are also extensively recyclable and also store carbon.

According to Chestney (2013), global CO₂ emissions rose by 1.4% to 31.6 billion tons, in 2012. Although China has been recorded as the largest contributor with an increased 300 million tons in 2012, efforts to adopt renewable resources and to improve energy efficiency have been noted. The US has made the change from coal to gas in power generation which has as a result reduced emissions by 200 million tons. Chestney (2013) further pointed out the warning from scientists that the average global temperature rise needs to be < 2° (less than 2°) Celsius to prevent climate change effects such as crop failure and melting glaciers. This is only a possibility if emission levels are kept to less than 44 billion CO₂ equivalent by 2020.

Global warming and its impact on the environment is a topic that we are all faced with regularly. Whether we fully understand the concepts is questionable, but we all have the ability to make difference in one way or another, even if it's just by completing a survey.

2.4. Forestry

Forestry management and deforestation are discussed below from related articles. Forestry and its impact on the environment is a global concern thus sustainability is a focal point across the world, with regulatory bodies implementing process to address the issue of deforestation.

2.4.1. Forestry Management

According to Rushton (2009), the global economic crisis merely shifted the focus off environmental sustainability but the greening issues will emerge with even more force. In an exclusive interview with Pulp and Paper International (PPI), Ambassador Alan Oxley, the head of the World Growth Organisation, whose primary function is to address poverty in third world countries, confirmed that “forestry management could be one of the key factors in reducing both climate change emissions and poverty” (Rushton, 2009). Rushton (2009) quoted Oxley to have highlighted that forestry sustainability is possible, if measured and controlled by relevant bodies in the sector such as “Forest Stewardship Council” (FSC) and “The Programme for the Endorsement of Forest Certification” (PEFC), but added that these systems may not necessarily be applied into third world countries as they are more adaptable in advanced economies. Oxley (2009) also highlighted that larger companies in the third world countries, with international exposure, may be able to support the system.

According to Fry (2008) the concept of Sustainable management of forests (SMF) has different meanings to different people, but ostensibly it refers to “the management of forests in such a way that ensures on-going productivity of the forest”. “If applied in the context of REDD [Reducing Emissions from Deforestation and forest Degradation], it would mean the practice of ensuring that any logging operation was carried out in such a manner to allow the forest to recover from the logging activity” (Fry, 2008).

According to The South African Forestry Industry (2012), South Africa has an area in excess of 1.5 million hectares for their tree plantation, but this is just 1.2% of the land area in comparison to the USA and Japan who consume 30% and 67% respectively.

The South African Forestry Industry (2012) confirms that the plantation of forests in South Africa consumes just 3% of the total water resources, and is reliant predominantly on rainfall. The industry contributes 8.7% of the gross value of the country's agricultural output.

Two types of trees are grown for the purpose of paper manufacture, namely Pine and Eucalyptus. These are sustainably managed forest plantations that in addition to its key function as a fibre source for pulp production, serves as a supply as timber and also as a tranquil visitor destination (The South African Forestry Industry ,2012).

2.4.2. Deforestation

According to Kim (2010) the source of emissions of carbon dioxide in developed, developing, and under developed countries vary significantly. According to the World Resources Institute, CO₂ emissions of developed countries are mainly a result of the burning of fossil fuels, whereas those of the developing and under developed countries are mostly impacted by "land-use and land-cover change". Rainforests, which are mostly found in developing and under developed countries, are important in sequestering Greenhouse Gases (GHGs), such as carbon dioxide, and thus deforestation results in the release of this GHGs.

According to Fry (2008) deforestation of tropical forests is responsible for nearly 10–20% of global greenhouse gas emissions. The causes of deforestation and forest degradation are immense and considered complex. Fry (2008) cited Geist and Lambin (2002), who suggest that "deforestation is driven by identifiable regional patterns of causal factors, of which the most prominent are economic factors, institutions, national policies and remote influences driving agricultural expansion, wood extraction and infrastructure extension." Infrastructure for overland transport infrastructure, wood extraction for commercial purposes, agriculture and cattle farming, are highlighted as the principle reasons of deforestation. Fry (2008) also points out that several other attributes are also highlighted as contributors to deforestation and some are population densities, market access, soil quality, land use for large-scale agriculture fires and illegal logging for self-enrichment.

According to Codjoe & Dzanku (2009) there are several motives for the increase in the depletion of forests, more so in the tropics. Codjoe & Dzanku (2009) cited Awung (1998) who categorised the causes of deforestation as “population pressure, poverty, slash and burn system of agriculture, unsustainable logging practices, and an increasing demand for fuel wood, poorly defined property rights and inappropriate government policies.”

Codjoe & Dzanku (2009) cited Liu *et al.* (1993) who confidently highlighted that many initiatives to preserve forests have achieved little success mainly due to the strategies being focused on the immediate causes of deforestation and not on the underlying causes. “The underlying causes are sometimes related to major international economic phenomena, such as macroeconomic strategies, which provide a strong incentive for short-term profit making instead of long-term sustainability.”

South Africa practices responsible forestry management and deforestation is thus not a serious concern in South Africa as in other countries. The concept of deforestation, in my opinion, is misunderstood in South Africa due to the negative global issues and the objective of this study is to determine to what extent South African individuals understand these concepts. The findings of this study will inform the South African paper manufactures if there is a requirement for them to improve their communication on their responsible practices to the general public.

2.5. Paper

Paper is a commodity consumed daily, globally. Statistics on paper production and consumption globally are identified graphically below in figure 2.2, together with literature on paper recycling and the collection rate in South Africa. This section also addresses the environmental and sustainability factors that the South African paper producers publish in their annual reports.

2.5.1. Paper Production & Consumption

According to Forest ethics (2013) the overall paper consumption is on the rise and 40% of the world's industrial logging is for paper manufacture and this number is increasing. Paper recovery is reported to be increasing yet it is still the biggest component to solid waste in landfills.

According Magnaghi (2011) global paper production for 2010 was 393,909,000 tons, and had an increase of 6% year on year, from 2009. The global paper production data, as depicted below in figure 2.2, highlights Africa to be a minority in comparison to Asia, Europe and America.

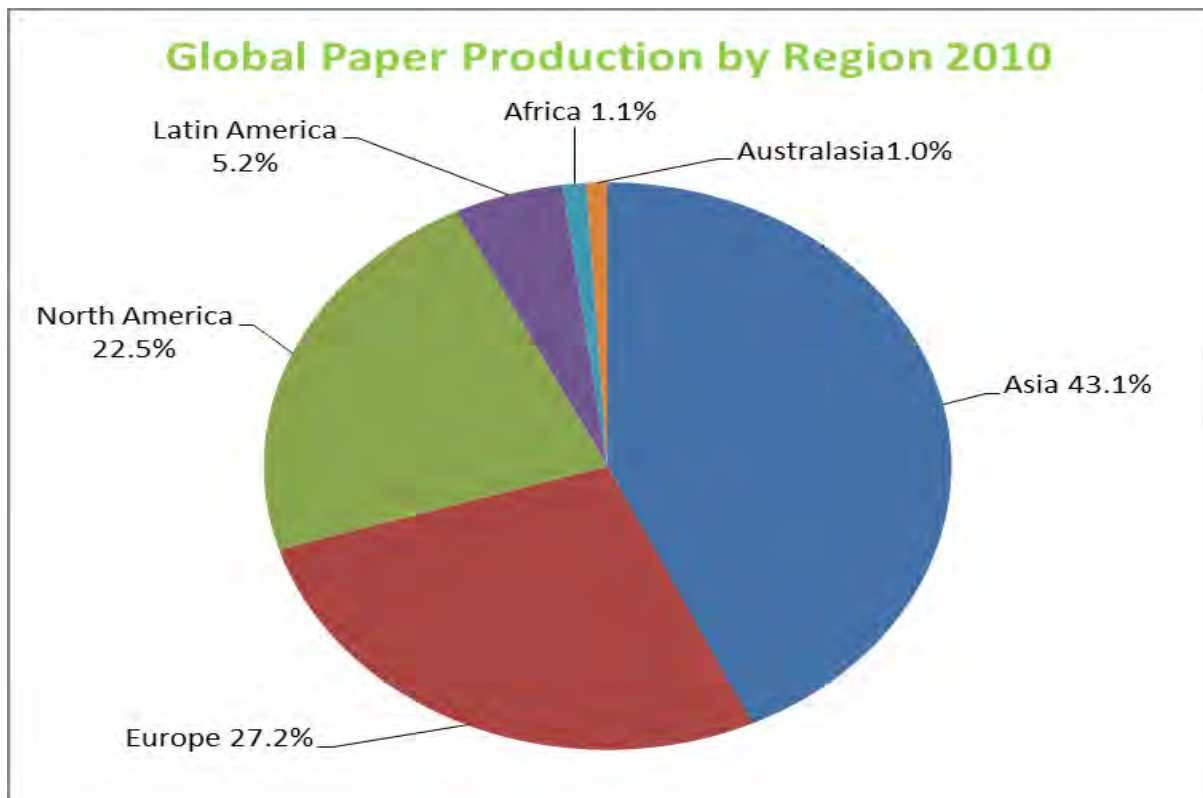


Figure 2.2- Global Paper Production Ratio by Region

Adapted from Magnaghi Report 2010: Recovered Paper Market 2010, available online at www.bir.org

According to the Paper Recycling Association of South Africa [PRASA] (2013) the total paper consumption in South Africa for 2012 was 2,689,994 tons. PRASA (2013)

uses custom and excise figures together with BMI statistics to confirm the volume of paper that is imported and exported, both in its natural or converted state.

Paper consumption in South Africa has increased by 14% from 2008 to 2012 (PRASA, 2013), as depicted in the below graph.



Figure 2.3 - South African Paper Consumption

Adapted from PRASA (2013), available online at www.prasa.co.za

The below graph is an indication of the average paper consumption per individual, across the world. Africa is the lowest consumer of paper globally (Magnaghi Report, 2010)

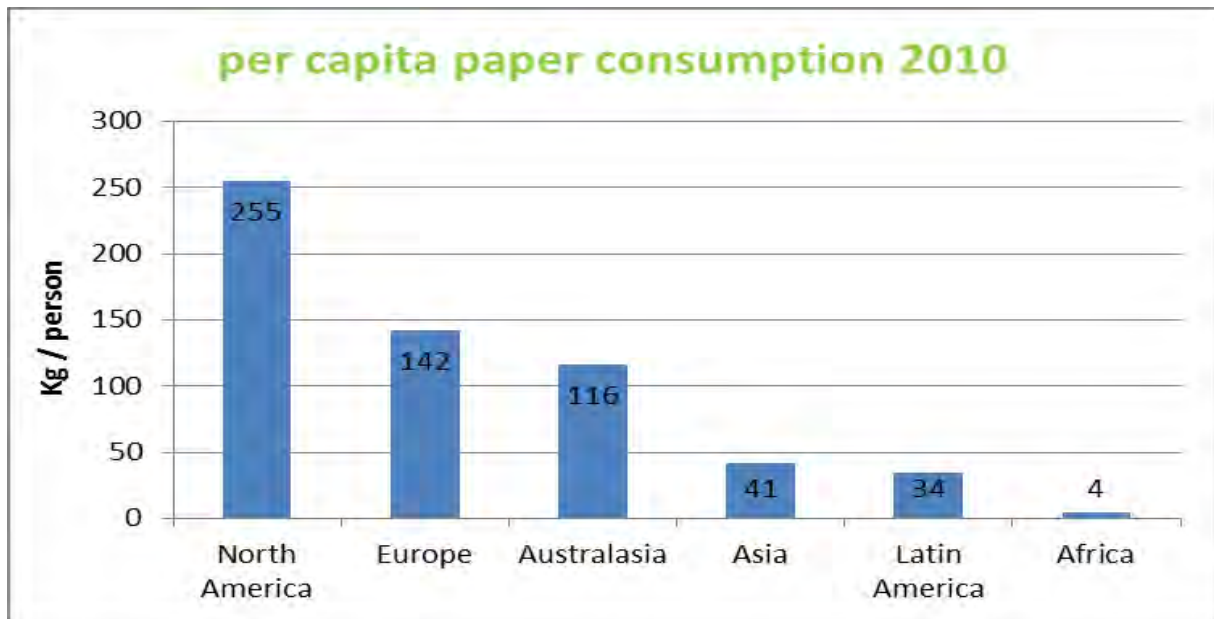


Figure 2.4 - Paper Consumption per Individual per Year

Adapted from Magnaghi Report 2010: Recovered Paper Market 2010, available online at www.bir.org

2.5.2. Paper Recycling

According to Cabalova, Kacik, Geffert and Kacikova (2011) paper manufacturing industries are infamous for their effect on the environment. Cabalova, et.al (2011) highlights that there are technological advancements that are able to assist govern these negative impacts. One key process is that of recycling to which the consumption of recovered waste is confirmed to be on the increase. The higher the use of recovered fibre, the lower the demand for virgin fibre, hence trees. Cabalova, et.al (2011) stated that recycling is a “necessity of this civilisation”.

According to Field & Sroufe (2007) the recovery of used products, including post-consumer waste [PWC], has become compulsory as concerns on production processes and product disposal continues to increase. There is however concern related to the recovery of used material such as its availability and the cost involved in converting the recovered material versus the cost of consuming virgin material.

According to Forest Ethics (2013) when paper is decomposed in landfill, it releases Methane (CH₄), which is a greenhouse gas [GHG], 23 times more potent than Carbon Dioxide (CO₂).

According to O'Connell (2011), "Municipal Solid Waste [MSW] presents environmental, social and economic problems." O'Connell cited Uiterkamp et al. (2010) who stated that the increase in income levels globally impacts directly on consumption levels which in turn leads to an increase in the quantity of waste disposed of in landfill. O'Connell (2011) highlights that government and other organisations should focus on "increasing the diversion of waste from disposal and reduce the amount of material considered waste."

According to Hutchinson (2008) as cited by, O'Connell (2011), harmful substances are released into the soil, water and air resulting from the current method of waste disposal. Babcock (2009), as cited by O'Connell (2011), points out that pro environmental behaviour will only result once people start to understand the impact of their behaviour on the environment.

According to Miranda, et al (2011), over past decades the recovery and use of recovered paper has increased globally and this growth is attributed to economic, environmental and social issues. R. Miranda et al. (2011) highlighted that the growth in paper recycling has resulted due to the economic benefit of recovered fibre when compared to virgin fibre. According to Schmidt et al. (2007) and Villanueva and Wenzel (2007) as cited by Ruben Miranda et al. (2011), recovered paper consumes less water and energy when processed, and this is a reason for the increased collection in addition to its replacement for wood fibre and landfill reduction. R. Miranda et al. (2011) cited De Feo and De Gisi (2010) who added that the social issues have an influence on the collection and use of recovered fibre, as environmental awareness, legislation and regulation and the strategies of organisations change.

In a study conducted by Tyskeng & Finnveden (2010) waste incineration of various types of materials were assessed, inclusive of paper. From the study, it was confirmed that the energy consumption required to incinerate paper was higher than that used in the process of recycling paper.

PRASA (2013) highlights that of the total paper consumption for 2012, 679,136 ton or 25% was deemed irrecoverable. This included paper grades such as toilet paper, tissue, sanitary paper and diapers.

According to PRASA (2013) paper consumption in South Africa has increased in volume by 14% since 2008. The below graph depicts trends of recovered paper in, South Africa, for a five year period.

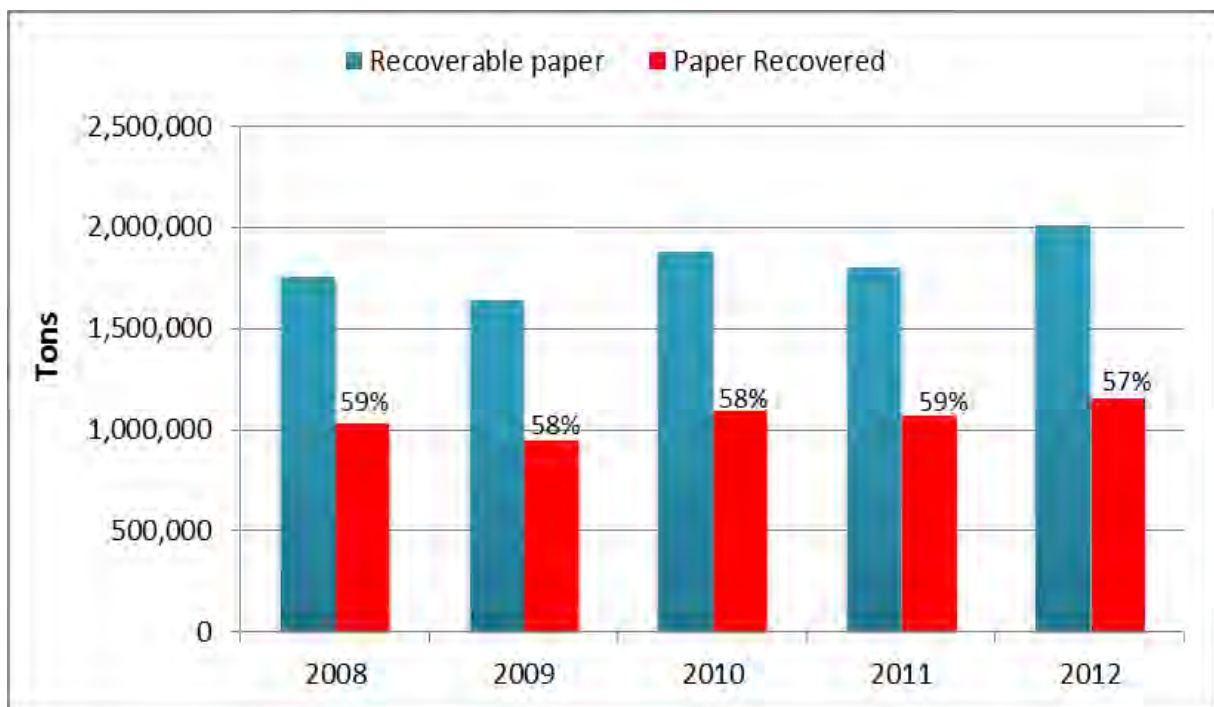


Figure 2.5 - Recycled Paper in South Africa

Adapted from PRASA (2013), available online at www.prasa.co.za

Paper production is increasing globally to meet the required demand of a growing population. South Africa's consumption has also increased as depicted in figure 2.3 above, but the concern lies with the recovery of paper for the purpose of recycling. Although there are efforts in place to collect the latest collection rate as per figure 2.5 is only at 57%. Individual involvement is required to increase this number and thus an objective of this study is to determine the respondent's awareness of importance of paper recycling together with their involvement in the process. It is also questionable if the collectors of waste are reaching their intended target market.

2.6. What the major SA Paper producers say

Reports from the three major South African paper producers, Mondi Limited, Mpact Limited and Sappi Limited, all clearly highlight the issue of sustainability and their efforts to reduce their impact on the environment.

2.6.1. Mondi Limited

According to Mondi Limited (2012) Mondi is a member of the World Business Council for Sustainable Development (WBCSD) and a supporter of its vision 2050, “which is for nine billion people to live well and within the limits of the planet.” Mondi Limited indicates, in their 2012 annual report, that a set of “must haves” need to be in place by 2020, and this is included into their goals. Mondi Limited (2012) indicates the critical areas to be:

- Development needs (education, economic empowerment: particularly woman, co-efficient solutions, lifestyle and behaviour)
- Cost of Externalities (Carbon, ecosystem services and water)
- Halting deforestation and increasing yield
- Halving carbon emissions (based on 2005 levels), by 2050
- Improved use of resources and materials

Mondi Limited (2012) confirms that carbon stocks are increasing, but raised concern that the net forest area continues to decline. Only 7% of the world’s forests are planted forests, with 36% as natural forests and the balance classified as other naturally generated forests. Planted forest areas are more productive than natural forests to meet the fibre demand.

According to Mondi Limited (2012) the organisation strives to procure over 60 % of wood, virgin fibre and biomass products from credible certified sources. The balance will be sourced as defined in the FSC Controlled Wood Standard of PEFC mandatory Guide. Sixty five (65) % of timber sourced in 2012 conformed, and is an improvement of 8% from 2010.

According to Mondi Limited (2012) forests and forest products store carbon and reduce societal emissions of GHG's. Mondi Limited Group recorded that their GHG emissions for 2012 constituted 4.2 million tonnes of CO₂ of direct emissions and 2 million tonnes of indirect emissions (raw material transportation, employee commuting, business travel, etc.) Carbon sequestration of the South African plantations resulted in the avoidance of 4.1 million tons of CO₂, in 2012.

Mondi Limited (2012) confirmed that energy requirement is increasing in the operation, and 2012 resulted in a total electrical usage of 5.5 million Megawatts per hour (MWh) for producing pulp and paper. Of this requirement 93% of the electricity has been generated by their own power plants, using 63.2 million Gigajoules (GJ) of fossil fuels and 79.8 million GJ of biomass.

Mondi Limited (2012) acknowledges that water is a scarce resource and that demand is exceeding supply by as much as 40%. Mondi limited continues to consume and treat water responsibly, and has acknowledged that despite a reduction in usage 2012 versus 2011, more effort is required to reduce consumption further.

2.6.2. Mpact Limited

According to Mpact Limited (2012), the key challenges in the paper manufacture industry are:

- Economic [BEE, Cost of raw materials]
- Resources [Forestry management, Recycling, National Environmental Waste Management Bill]
- People [Corporate Social Investment(CSI), Skills development, Safety, health &HIV]

According to Mpact Limited (2012) their organisation is the largest paper recycler in South Africa, recovering paper from both pre- and post-consumer. Mpact's paper manufacturing divisions produce recycled based packaging and industrial paper grades. Mpact is not owners of forests but ensure that the timber suppliers are FSC accredited or operate in accordance to COC (chain of custody).

According to Mpact Limited (2012), Mpact manages its environmental “obligations” through regular audits both internally and externally. This is a result of some industry’s’ generating hazardous and non-hazardous waste as well as air and water emissions. The Mpact Limited 2012 Annual report states that Mpact Limited operations have an environmental management system in place, and all of Mpact Limited’s manufacturing operations are ISO 14001 accredited. Mpact Limited has made and continues to make substantial capital resources investments into certifying environmental compliance together with monitoring the Group’s impact on the environment, (Mpact, 2012).

2.6.2.1. Water

Mpact (2012) identifies water as a scarce resource and has confirmed their paper mills are high users of water. Two of their three paper mills have recorded water reductions of 49% and 12%, and although the third did not yield any significant change in direct water usage, their waste water is consumed in the forest by a process of “drip irrigation” and holding dams.

2.6.2.2. Air Emissions

According to Mpact (2012) the main source of atmospheric emissions is from their boilers. Mpact operates in terms of the Air Pollution Prevention Act, 1965, and has valid process certificates, which authorise the emissions from the operations. Mpact (2012) highlights that amendments to the Air Quality Act, 2004, is to be implemented and that they have thus commenced the process of converting their certificates into Atmospheric Emission licences in terms of the new requirements of the “Air Quality Act”.

2.6.2.3. Solid Waste

According to Mpact (2012), the National Environmental management; Waste Act (2008), focuses on reduction, reuse and recycling, as well as on energy and landfill hierarchy. According to Mpact (2012) the Group has made significant progress

regards to their residual materials reporting an average recycling rate of approximately 77%. This was achieved by the use of organic material for compost and ash for concrete block making, removing them from landfill while further contributing to the sustainability of the local communities.

2.6.2.4. Energy

Mpact (2012) confirms that their main source of energy is fossil fuel in the form of coal usage and electricity, purchased from the national grid. Some heavy fuel oil and gas is also consumed. Mpact (2012) confirmed a total energy usage in 2012 of 9,153 Terajoules (TJ). This resulted in CO₂ emissions of 791,265 tonnes. Of this total 399,852 tonnes of CO₂ resulted from electricity usage. According to Mpact (2012) energy efficiency projects are on-going and various interventions are in place for electrical energy reduction and boiler efficiency improvements. By upgrading the mill's turbine system this has led to a reduction of 5% of imported power. The mill is also participating in Eskom's Short Term Power Purchase Proposal (STPPP) Programme, selling power to the national grid (Mpact, 2012)

2.6.3. Sappi Limited

Sappi Limited, in their 2012 annual report, highlighted that their sustainability approach is framed by the 3p's principle; Prosperity, People and Planet. Their business is built on resources that are both sustainable and renewable. "The growing and harvesting of wood fibre contribute to local employment as well as many small businesses, individual farmers, contractors and rural communities" (Sappi, 2012). Sappi also has a tree improvement program to mitigate the risk of climate change, and 60% improvement in eucalyptus plantation yield has been recorded, over the past 15 years, and an 8% improvement in the yield of Pine, since 1950. This has been influenced by the focus on producing "Hybrids" which also contribute to a reduction in the use of chemicals such as pesticides and fungicides.

Sappi Limited (2012) confirms that in response to the increasing global concerns on the deforestation of endangered tropical forests; globally 70.2% and in Southern Africa 87% of the fibre consumed by them is certified according to international

standards for forestry certification, viz. FSC, PEFC and SFI [Sustainable Forestry Initiative] certification. A constraint highlighted is that the smaller growers are impacted on by the cost of the certification.

Sappi Limited (2012) highlighted that their plantations in Southern Africa are biological systems that are based on biodiversity. Sappi's plantations consume a maximum of 65% of their land with approximately 30% of the land being managed for conservation of the natural habitats, including indigenous forest.

According to Sappi Limited (2012) their paper and pulp mills are situated mostly in peri-urban areas supporting the local economy while also contributing to the health and welfare services, education and other community services.

Sappi Limited (2012) acknowledges that the industry is energy intensive and thus indicates their mitigation to reduce specific purchased energy, improve the energy efficiency of the mills and increase their use of renewable energy and selling of surplus energy. Energy is indicated at approximately 11% of cost of sales and in South Africa the cost of coal has increased by 13.3% per GJ and electricity generated by Eskom by 19.6% per kilowatt-hour (kWh).

Although South Africa only constitutes 1.1% of the global greenhouse gases (GHG), South Africa is the largest CO₂ emitter in Africa (Sappi Limited, 2012). Sappi is part of the pledge to reduce emissions by 34% by 2020 and by 43% by 2025, as stated at the COP15 in Copenhagen in December 2012. Sappi also highlighted that their plantations absorb 13 million tons per annum (tpa) of CO₂ whilst giving off 8 million tpa of Oxygen.

Sappi Limited (2012) recognises the water issue as a serious sustainability challenge. Sappi highlights that forestry consumes below 3% of South Africa's available water compared to the 62% usage by the agricultural sector. It acknowledges that the production operation is highly dependent on water, but this water is recycled in the process and treated prior to its return into the environment.

According to Sappi Limited (2012) their global energy consumption has been reduced by 19.6% and fossil-based CO2 emissions by 19.8%, over the past 5 years.

Table 2.3 - Sustainability performance against target

| Planet improvement criteria | 2012 target | 2012 performance | 2013 target |
|---|-------------|------------------|-------------|
| Reduce specific purchase fossil fuel energy | ↓ 6.00% | ↓ 13.50% | ↓ 14.00% |
| Reduce specific purchased water usage | ↓ 7.50% | ↓ 2.80% | ↓ 4% |
| Recovery of fibre put into the market | 25% | 27% | 26% |

**Specific purchased – purchased by the mill and excludes ‘recovery or production by the mill’.
Adapted from Sappi Limited (2012), sustainability report (p15)*

The three major South African paper producers highlight the need to operate responsibly and are active in reducing their environmental impact. The study will identify if the respondents are aware of the practices by the S.A paper industry or if there is a need for the industry to communicate their practices to the general public.

2.7.Reducing the impact on climate change

According to Kolk and Pinkse (2006), as cited by Strategic Direction (2008), there are sustainability challenges such as corporate responses to climate change. Business operations have been examined with regards to its impact on the environment. The overall finding was that worldwide the trend is that the responsibility of businesses to reduce its impact on the environment is being accepted. Stakeholder involvement has been identified as a major contributor towards this social responsibility.

The World Business Council for Sustainable Development & World Resource Institute (2007) has compiled a guide “for business executives who are significant users and purchasers of pulp, paper, packaging, timber and wood-based products”, following the realisation that forest and forestry expertise is lacking in the general business communities.

According to Bjorn Stigson and Jonathan Lash (2007), The presidents of the two organisations, respectively, the Guide “represents a significant step forward in helping organisations of all sizes and types find their place in ensuring the sustainability of the earth’s forest-based products.” It is based on the long term impact that current decisions could have.

“The guide is designed as an information and decision support tool”. Ten key issues that are split into three categories as follows:

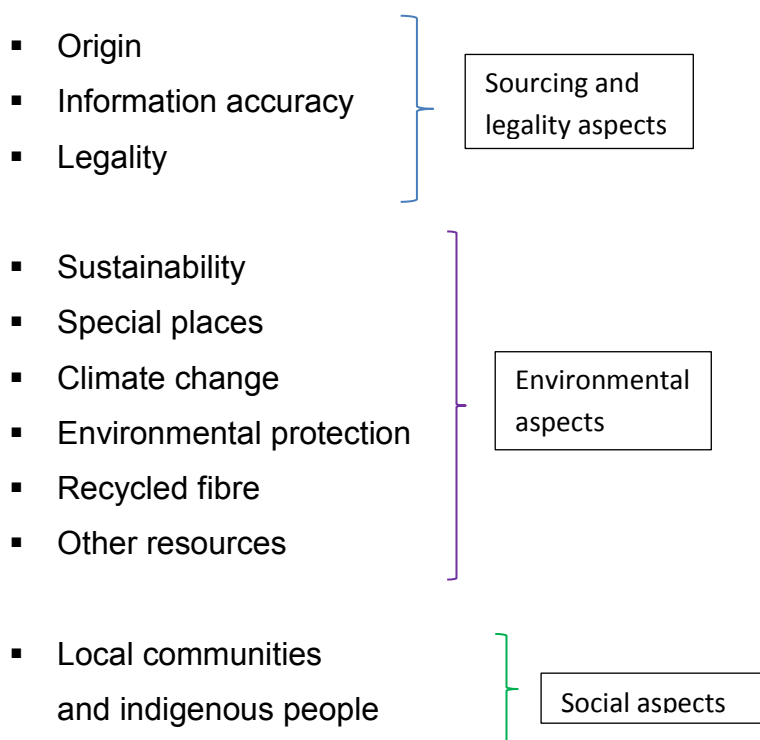


Figure 2.6 - Sustainable Procurement of Wood and Paper-Based Products

Adapted from The World Business council for sustainable development & World resource institute (2007), available online at www.sustainableprocurement.net

The “guide” is a useful tool for businesses and can be used as a check list that will immediately indicate if the practices are operating within responsible criteria. It is a simple tool but is a step towards sustainability.

2.8. Conference of Parties [COP]

According to Castillo & Gurney (2013) the 2010 COP16/CMP61 negotiations in Cancun reached an agreement that “Deforestation remains at the forefront of climate policy”. At COP the parties set methods and incentives for “Reducing Emissions from Deforestation and forest Degradation (REDD), conservation, sustainable management of forests, and enhancement of forest carbon stocks in developing countries”.

According to Shah (2012) COP17, Durban did not yield significant results. The West was highlighted to not be effectively making the required changes to their practices and blame has been passed to the East, i.e. India and China for their impact on the climate. Shah (2012) highlighted that the 193 nations that participated in the “United Nations climate talks” did agree to what is known as the “Durban Platform” which defines a green climate fund and new market mechanisms. Concern has been raised though, that the financial investments that has to be made now to reduce a crisis in the future is still lagging.

Climate change issues cannot be rectified in the short term and will require the input of the population to move in the right direction.

2.9. Summary

Global warming and climate change is a reality that affects us all. The paper industry does rank highly in comparison to other industries with regards to its impact on the environment. The option of moving to a paperless society has been assessed, but is not a reality in lieu of the requirements that paper and paper products meet.

The deforestation and greenhouse gas release are the two major concern of society that results from the industry, and sustainability of the industry is being addressed globally and more evidently in South Africa.

Environmental bodies place focus on the issue and impact of industries on the environment but society has to ensure that they contribute, where possible, to

ensuring that the targets are achievable. Individual contribution that can minimise the impact of paper manufacture on the environment involve efforts such as recycling, purchasing products that comply to legislation and being actively involved in the processes and the impact of local industries.

This chapter identified several aspects pertaining to the paper industry as well as the environment and the impact of external factors on the environment. This literature has been used to draft the questionnaire and the responses obtained will link into the objectives that have been identified in chapter one.

Chapter three structures the research methodology that has been undertaken for this study.

3. Chapter Three - Research Methodology

3.1. Introduction

The literature review has highlighted environmental aspects that are related to the paper manufacturing industry, and although the research has identified both positive and negative connotations on the environmental responsibility of paper manufacturers the perceptions on how individuals perceive these processes is not adequately understood. This chapter focuses on the research design and methodology that will assist to obtain an understanding or assessment of the perception that individuals have on the Environmental responsibility of Paper producers.

3.2. Research Methodology

According to Rangahau (2013) “Research methodology refers to the theory of the research and the reasons for the way the research has been designed.” Methodology explains the research question and why the question is important. It explains the starting point of the research, the directions of the research and the possible implications of the research when it is completed.

In the “Dictionary of Qualitative Inquiry” (2001), the author Thomas A Schwandt defines methodology as “a theory of how inquiry should proceed. It involves analysis of assumptions, principles, and procedures in a particular approach to inquiry that in turn governs the use of particular methods.”

3.3. Aim and Objectives of Study

3.3.1. Aim

The aim of this study is to determine the perception that individuals have on the environmental responsibility of paper producers in South Africa.

3.3.2. Objectives

- To determine the respondents perception on the possibility of striving towards a “Paperless environment”
- To carry out an assessment to determine the perception that business executives in Durban, KZN, have on how the S.A paper manufacturing industries impacts on the environment.
- To determine the respondents understanding of the sustainability of the paper industry and their use of renewable resources.
- To determine the respondents awareness on the importance of paper recycling and to identify the respondents contribution towards this process.
- To reveal if there are areas in which the S.A. paper manufacturers need to increase public awareness with regards to their operational activities and business practices.

3.4. Participants and Location of the Study / Sampling

This study is generic and thus that target population is vast as it can constitute any individual that is a consumer of paper or paper products.

According to Lunsford & Lunsford (1995), it is essential to define a population that is considered “accessible”. “This generally is a subset of the target population that reflects characteristics with respect to age, gender, diagnosis, etc., and who are accessible for study.”

According to Welman et al. (2002) “usually the population that interests’ human behavioural scientists are so large that, from a practical point of view, it is simply impossible to conduct research on all of them.”

“Even if it were possible to collect data from the entire population, which is generally very large, it would be prohibited in terms of time, cost, and other human resources. Study of samples rather than the entire population is also sometimes likely to produce more reliable results” (Sekaran & Bougie, 2010)

This study has thus been limited to the Durban region of KwaZulu Natal. The research is confined to businesses within the stipulated region and the population group for the research are business executives within this sector.

Business executives are the chosen population group based on their level of interaction within an organisation that will contribute to their cognitive approach to the study that is being researched. The Business Dictionary (2013) defines Business Executives as “a person or group appointed and given the responsibility to manage the affairs of an organisation and the authority to make decisions within specified boundaries.” Business Executives generally have some sort of formal training that can contribute to an expanded approach to the research. Business Executives have an improved knowledge of business in general and are also often included in on aspects that impact businesses, such as environmental issues.

3.5. Data Collection strategies

The survey for this research has been conducted via distribution of a questionnaire. The targeted respondents have been accessed via the database of the Durban Chamber of Commerce and Industry, together with email addresses available and known to the researcher, but specific to business executives within Durban, KwaZulu Natal.

3.5.1. Sampling

Sekaran & Bougie (2010: 263) identify a sample to be a “subset of the population”, i.e. the sample constitutes of only some of the elements of a population.

To obtain accuracy and consistency, data collection from all members of the population would prove to be the most beneficial. However due to the magnitude of the population, sampling will best suit the research (Sekaran & Bougie, 2010)

In practice sampling is used for a number of reasons; it is impractical and uneconomical to involve all the members of the population in the research (Welman et al., 2007) and furthermore sampling saves time and money (Sekaran & Bougie, 2010).

3.5.2. Population

According to Sekaran & Bougie (2010) for sampling to be effective the target population must be clearly defined. The target population must be determined in terms of elements, geographical boundaries and time.

The target population for this research is constituted of Business Executives within Durban, KwaZulu Natal region. These respondents have been selected based on their exposure to the business environment that can offer insight to the field being researched

The actual number of Business Executives in KwaZulu Natal is not defined, but the Durban Chamber of Commerce and Industry currently has two thousand eight hundred (2,800) registered members. A digital register of the members e-mail addresses can be obtained, at a fee, with the guarantee of details of a minimum of 1,000 members (Durban Chamber of Commerce and Industry, 2013).

Of the one hundred and eighty six (186) subjects that viewed the survey, only one hundred and nineteen (119) started the survey and one hundred and twelve (112) respondents completed the survey.

3.5.3. Sample size

Determining how large a sample size should be can be a difficult decision to reach according to Sekaran & Bougie (2010); hence the factors that can assist the decision on sample size have been structured as follows:

- The research objective
- The extent of precision that is desired, i.e. confidence interval.
- The acceptable risk in predicting that level of precision, i.e. confidence level
- The amount of variability in the population itself
- The cost and time constraints
- The size of the population itself.

As the Durban Chamber of Commerce and Industry will be used as the base for access to respondents, their digital directory of members consisting of one thousand (1,000) members will be used for this research.

The Krejcie and Morgan Model (1970) was deemed suitable to determine the sample size for the given population and thus the samples size used was two hundred and seventy eight (278), at a confidence interval of ninety five (95) %

Using the sample size of two hundred and seventy eight (278) the objectives of the research were addressed. The variability in the population, if it does exist, has not been identified as a factor that will add bias to the findings, but would contribute to determining variability in the perceptions that different individuals hold.

3.5.4. Sampling Design

According to (Kothari, 2008) , the following are characteristics of a good sample design:

- result in a truly representative sample.
- minimize sampling error.
- minimize systematic bias.

- The results from the sample should be applied to the population from which it was drawn with a reasonable level of confidence.

According to Sekran & Bougie (2010) there are different types of sampling designs, but the below listed points need to be considered when selecting a sampling design:

- What is the relevant target population of focus to the study?
- What exactly are the parameters we are interested in investigating?
- What kind of sampling frame is available?
- What are the costs attached to the sampling design?
- How much time is available to collect the data from the sample?

Sampling design is split into two main categories, i.e. Probability and Nonprobability sampling.

Probability sampling design is effected when the elements of the population have a known chance of being chosen as subjects of the sample, whereas in nonprobability sampling the elements do not have any probabilities attached that can guarantee their being chosen as sample subjects (Sekaran & Bougie, 2010).

According to Sekaran & Bougie (2010), in unrestricted probability sampling design or simple random sampling every element has an equal chance of inclusion in the sample. Welman et al.(2007) stated that the most common sampling methods used is probability sampling, where each element of the population has an equal or unrestricted chance of being included in the sample.

Probability sampling using systematic sampling was the choice of sample design for this study. As the sampling frame was large but conveniently available in digital format from the Durban Chamber of Commerce and Industry listing, a systematic sampling procedure could be administered that offered the advantage of ease and speed in developing the samples.

Using the Krejcie and Morgan (1970) model as cited by (Sekran & Bougie, 2010) for systematic sampling the below formula was used to determine the samples size for the research.

$n = \frac{N}{S}$, where N = population size and S = sample size

Thus, using a population size of two thousand, eight hundred (2,800):

$$n = \frac{2,800}{278} = 10.07$$

Thus every 10th element will be chosen from a random point in the DCC digital database.

3.6. Research Design and Methods

3.6.1. Description and Purpose

The research was conducted to determine the perception that individuals hold on the environmental responsibility of South African paper producers. By understanding this perception it can be determined if the paper manufacturing industry has a need to conduct additional assessments or research to gather further information on the research topic. It can also be ascertained if the industry has a need to improve or open communication into the general market regarding its practices and environmental responsibilities, while determining the respondents' involvement and knowledge of the paper recycling processes.

3.6.2. Construction of the Instrument

The research instrument used was a questionnaire. According to Sekaran and Bougie (2010:197) "questionnaires are an efficient data collection mechanism when the researcher knows exactly what is required and how to measure the variables of interest." The options of questionnaire distribution can be either personally, via mail or electronic medium.

According to Kara (2013) questionnaires can be administered at a lower cost while reaching a large number of respondents. Kara (2013) also highlighted that individuals have the tendency to respond differently to the same question, based on

their understanding of the question. Based on this data the questionnaire that has been administered has been drafted in a simplistic, straight forward format.

Sekaran and Bougie (2010) pointed out that there are different options on how to administer questionnaires such as personally, by inserting into magazines, periodicals or newspapers, by mailing to respondents or by electronic distribution. The below table 3.1 highlights the advantages and disadvantages of questionnaires.

Table 0.1- Advantages & Disadvantages of Questionnaires

| Mode of data collection | Advantages | Disadvantages |
|---------------------------------------|--|--|
| Personally administered questionnaire | <ul style="list-style-type: none"> • Can establish rapport and motivate respondents • Doubts can be clarified • Less expensive when administered to groups of respondents • Almost 100% response rate ensured • Anonymity of respondents is high • Less expensive when administered to groups of respondents | <ul style="list-style-type: none"> • Organisations may be reluctant to give up company time for the survey with groups of employees assembled for the purpose. |
| Mail questionnaire | <ul style="list-style-type: none"> • Anonymity is high • Wide geographical area can be reached • Token gifts can be enclosed to seek compliance • Respondents can take more time to respond at their convenience. Can be administered electronically is desired. | <ul style="list-style-type: none"> • Cannot clarify questions • Response rate is almost always low. A 30% response rate is quite acceptable • Follow-up procedures for nonresponses are necessary |
| Electronic questionnaire | <ul style="list-style-type: none"> • Easy to administer • Has a global reach • Very inexpensive • Fast delivery • Respondents can answer at their convenience | <ul style="list-style-type: none"> • Computer literacy is a must • Respondents must have access to the facility • Respondents must be willing to complete the survey |

(Adapted from Sekaran and Bougie, 2010, Research Methods for Business, Wiley, West Sussex)

An electronic questionnaire was chosen as the research instrument for this study. This decision resulted based on the intention to reach as many respondents as possible, within an allocated time frame using an easier administration process that will be at a lower administration cost.

The questionnaire was compiled on the web through the aid of “Questionpro”, and distributed to the selected respondents via email.

3.6.2.1. Questionnaire design

Sekaran and Bougie (2010) highlight that sound questionnaire design principles should focus on three areas, viz.

- The wording of the questions
- The planning of issues as to how the variable will be categorised, scaled and coded after receipt of these responses
- General appearance of the questionnaire

According to Sekaran and Bougie (2010) all of the above three are important as they can reduce bias in the research. The questionnaire was structured to obtain the required information from respondents which were relevant to the study while addressing the objectives of the study.

Sekaran and Bougie (2010) highlight the “principles of wording” to assist formulate the questions that are modelled in the questionnaire as follows:

- Content and purpose of the question: the purpose of each question is to be carefully deliberated so that the variables are adequately considered but that no question is redundant or unnecessary.
- Language and wording of the questionnaire: the language of the questionnaire should be appropriate to the level of understanding to the respondents. Choice of words should be determined by the level of education and the culture and frames of reference of the respondents. It must be considered that even if English is the spoken language, culture may render certain words alien to the respondents. This is a fact that is essential in the South African demography.

- Type and form of questions: the type of question refers to whether the question is open-ended or closed and the form refers to whether the question is positively or negatively worded. Open-ended questions allow the respondent to answer as they choose, whereas a closed question asks the respondent to choose from alternatives provided by the researcher. It is also advised that questions should be both positively and negatively worded to prevent the respondent's tendency to answer in a set manner, i.e. to one end of the scale.
- Sequencing of questions: questions in a questionnaire should be sequenced such that the respondent is led from general questions to those that are more specific. Sekaran and Bougie (2010) cited this as the funnel approach, (Festinger and Katz, 1996), "which facilitates the easy and smooth progress of the respondents through the items of the questionnaire."

According to Sekaran and Bougie (2010), principles of measurement are to be followed to ensure that the appropriate data is collected to test our hypotheses. This refers to the scales and scaling techniques that are used in measuring concepts and assessing reliability and validity.

Sekaran and Bougie (2010) define a scale as 'a tool or mechanism by which individuals are distinguished as to how they differ from one another on the variables of interest to our study.'

Scale types consist of Nominal, Ordinal, Interval and ratio. The scales that were selected for this study included Nominal and Interval scales. Nominal scales allow the researcher to assign subjects to categories or groups, while allowing the researcher to qualitatively distinguish groups by categorising them into mutually exclusive and collectively exhaustive sets. An interval scale allows the researcher to perform certain arithmetical operations on the data that is collected from the respondents and allows the researcher to measure the distance between any two points on the scale.

The research questionnaire for this study included the following rating scales:

- Dichotomous scale, which is used to elect a Yes or No answer.

- Category scale, using multiple items to elect a single response.
- Numerical scale which has numbers on a five point scale, with bipolar adjectives at both ends.
- Likert scale, which is designed to examine how strongly the subjects agree or disagree with statements on a five-point scale ranging across, strongly disagree, disagree, neutral, agree or strongly agree.

Sekaran and Bougie (2010), draws attention to the importance of ensuring that the instrument developed to measure a particular concept is indeed accurately measuring the variable and in fact measuring the concept that was intended to be measured. This was achieved by pretesting and validation

3.7. Pretesting and Validation

The purpose of the pre-test survey is to improve the primary questionnaire and ultimately the response rate. Surveys, both postal and electronic, often result in low response rates but can be influenced by misunderstandings and ambiguity. This as a result can induce problems of bias and non-bias responses. Attention to the questionnaire design and its administration can lead to an improved response rate, reliability and validity. Pre-testing with experienced researchers is crucial but it is also important to pre-test on potential respondents. (Faux, 2010)

3.7.1. Pretesting of the questionnaire

To facilitate the research it is important that prior to distribution of the questionnaire to the respondents it is appraised for accuracy and consistency of the response. The accuracy and consistency of the responses can be achieved by pre-testing the questionnaire using a small sample of the respondents with characteristics similar to that of the target population (Hair, Money & Samouel, 2007).

The questionnaire was assessed together with the supervisor and it was identified that minor amendments were essential. The supervisor suggested that for the numerical scale questions the scale be reduced from a ten point scale to a five point

scale. A similarity between two questions was identified and this was subsequently corrected.

The questionnaire was sent to 10 respondents to conduct a pre-test. The following suggestions with regards to amendments were received from the test group:

- Question 1, which is on gender, had the options Male, Female or Other. Respondents suggested that this be contained to just: Male or Female.
- It was suggested that a more conversational tone be introduced to question 15 to 22. Suggested wording was “do you believe / think”.
- A respondent commented that some of the questions seemed repetitive.
- Respondents commented that the questionnaire lacked flow and that the questions were not grouped according to “themes”. It was suggested that headings be used to separate questions into groups.
- Question 29 was reported be vague
- Question 30 is incomplete. Suggestion is that if the response is YES, then respondents should be prompted for their selections on how the paper industry can be more vocal on their environmental responsibilities.

There was positive feedback to the questionnaire as well from the test group. The key comments were the simplicity of the questionnaire and the ease with which it could be addressed and the inclusion of the definitions on concepts where there could be doubt.

The following changes were made to the instrument:

- Question 1 was amended in line with the respondents’ comments.
- The suggestion to use a more conversational tone for questions 15 to 22 was assessed together with the supervisor and it was agreed that as the bulk of these questions are likert scale questions and some as a statement is acceptable.
- The questions were assessed for repetitiveness and wordings were corrected where required.

- With regards to the comments on the flow of the questionnaire, the order of the questions was marginally adjusted as the bulk of the questions were in categories to facilitate responses towards the targeted objectives.
- Question 29 was assessed and following a suggestion from the supervisor was changed from a directive towards the “community” to “government”.
- Question 31 was included into the questionnaire with a logic link to question 30. Following a response of YES to question 30, lists of possible advertising mediums are provided for the respondents’ opinion.

The responses obtained from the pre-test group were beneficial in improving the final questionnaire prior to distribution to the targeted sample group.

3.7.2. Validation of the questionnaire

Sekaran and Bougie (2010) states, “When we ask a set of questions with the hope that we are tapping the concept, how can we be reasonably certain that we are indeed measuring the concept we set out to measure and not something else?” The answer is that this can be determined by applying certain validity tests.

According to Hair et al. (2007) validity of an instrument is the process of determining the extent to which the instrument actually measures what it is supposed to measure.

There are different ways in which the validity of research can be assessed. This research will explore just two, i.e. content validity and construct validity.

- Content validity ensures that the measure includes an adequate and representative set of items that tap the concept of the intended research (Sekaran and Bougie, 2010). Content validity is used to ascertain whether the content of the questionnaire is appropriate and relevant to the study purpose (Parsian and Dunning, 2009). To estimate the content validity of the questionnaire a conceptual framework of the paper manufacturing industry and its environmental impacts and sustainability efforts have been highlighted in a literature review.

- Construct validity, according to Sekaran and Bougie (2010), “testifies to how well the results obtained from the use of the measure fit the theories around which the test is designed.” The two methods of assessment are Convergent and Discriminant validity. Convergent validity “is established when the scores obtained with two different instrument measuring the same concept are highly correlated. Discriminant validity “is established when, based on theory, two variables are predicted to be uncorrelated, and the scores obtained by measuring them are indeed empirically found to be so” (Saharan & Boogie, 2010).

With the feedback received from the supervisor and respondents to the pre-test, the researcher was satisfied that the response to the questionnaire had adequately addressed the objectives of the study, and was therefore confident that the test of “content validity” was met.

3.7.3. Reliability

The reliability of a measure indicates the extent to which it is error free and hence ensures consistent measurement across time and across the various items in the instrument (Saharan and Boogie, 2010). Reliability of a measure is established by testing for consistency and stability.

The stability of a measure is defined as the ability of a measure to remain the same over time, despite the uncontrollable testing conditions or the state of the respondents themselves. Two tests of stability are test-retest reliability and parallel- form reliability (Saharan & Boogie, 2010).

3.8. Administration of the Questionnaire

Online surveys, constitutes two types, i.e. email or web based surveys. In email surveys the questionnaire is embedded in or attached to the email (Dornier and Taguchi 2010). Software based online questionnaires allow the researcher to produce more visually appealing questionnaires, with special features to prevent

problems such as missing data, and easier answer formats while capturing data in real time at a relatively low cost (Deren, 2010)

Web based surveys are more efficient and more effective especially when the target group is at a higher intellectual level and computer literate. For this study the web based online software program hosted by Questionpro was used. "Questionpro is web based software for creating and distributing surveys. The software consists of an intuitive wizard interface for creating survey questions, tools for distributing your survey via email or your website, and tools for analysing and viewing your results" (Questionpro, 2013). The option chosen was to email the URL link to potential respondents. This was done using the respondents email addresses and reminders were sent to their emails.

3.9. Analysis of the Data

The data that has been gathered from the sample is to be analysed in order to test the research hypothesis (Sekaran and Bougie, 2010). Accuracy and suitability of the data must first be confirmed to allow for further analysis (Sekaran and Bougie, 2010). Data coding which involves assigning a number to the participants' responses so that they can be entered into a database is required at the start of the analysis. In this research this process is electronically captured as the questionnaire was created using questionpro, the web based survey. The data will be assessed for irregularities and only data from completed questionnaires will be captured for this research.

3.10. Summary

The research methodology used in this study has been comprehensively explained in this chapter. The different research methods have been discussed and the rationale on the chosen methods for this study has been presented. The details pertaining to the questionnaire has also been discussed together with process on the data analysis.

Chapter four is a combined chapter that deals with the presentation of the data that has been acquired from completed questionnaires together with a discussion of these results.

4. Chapter Four - Presentation and Discussion of Results

4.1. Introduction

The research findings based on data that has been collected from the survey questionnaire are presented in this chapter. For the purpose of this study business executives, as defined by The Business Dictionary (2013), refer to “a person or group appointed and given the responsibility to manage the affairs of an organisation and the authority to make decisions within specified boundaries.” The results obtained were the opinions that the individual respondents have expressed. The aim of the research is to determine the perception that individuals have on the environmental responsibility of paper producers in South Africa. The presentation and interpretation of the results are structured in two sections with the first section discussing the demographic profile of the respondents and the second section the findings of the survey, in relation to the objectives of the study.

4.2. Demographics

The survey was viewed by one hundred and eighty six (186) subjects, but of this number only one hundred and nineteen (119) started the survey and one hundred and twelve (112) respondents completed the survey. This was a completion rate of 94%. Of the five subjects that started and exited the survey, all exited prior to answering any questions and thus there was no data from these questionnaires that was admissible to the analysis. The average time taken by respondents to complete the questionnaire was seven (7) minutes.

The demographic profile assessment of the respondents included gender, race, level of employment, employment in a paper related industry and the respondents environmental conscientiousness. Table 4.2, below, depicts the results obtained from the respondents with regards to the demographic profile.

Table 4.1- Demographic Profile of Respondents

| Demographic profile | | Percentage (%) |
|---|-------------------|----------------|
| Gender | Male | 68.75 |
| | Female | 31.25 |
| Race | Black | 22.32 |
| | Indian | 56.25 |
| | White | 17.85 |
| | Coloured | 0.9 |
| | Other | 2.68 |
| Level of employment | Senior Management | 29.46 |
| | Middle Management | 43.75 |
| | Lower Management | 26.79 |
| Employed in a paper related industry | Yes | 15.18 |
| | No | 84.82 |
| Environmentally conscientious | Yes | 98.21 |
| | No | 1.79 |

The gender split, when rounded, was 69/31 yielding a higher response rate from males. The survey was distributed electronically using the Krejcie and Morgan (1970) model as cited by (Sekran & Bougie, 2010), hence the gender split is merely a reflection of the respondents that have completed the survey.

The majority of the respondents were of the Indian race at 56%, followed by a distant 22% of black respondents and 18% of white respondents. The balance of the respondents constituted of one coloured and three in the “Other” category, which referred to races outside of the four categorised in South Africa.

Of all the respondents 15% was employed in a paper related industry and just one respondent admitted to not being environmentally conscientious. Those employed in a paper related industry will have more knowledge of the industry and their opinions could vary from those outside the industry, but this is acceptable as they are a part of the target population group and the demographics of the location targeted.

To obtain an overview of the understanding that respondents had on the research topic, a question querying the knowledge that respondents had on the paper manufacturing industry was probed.

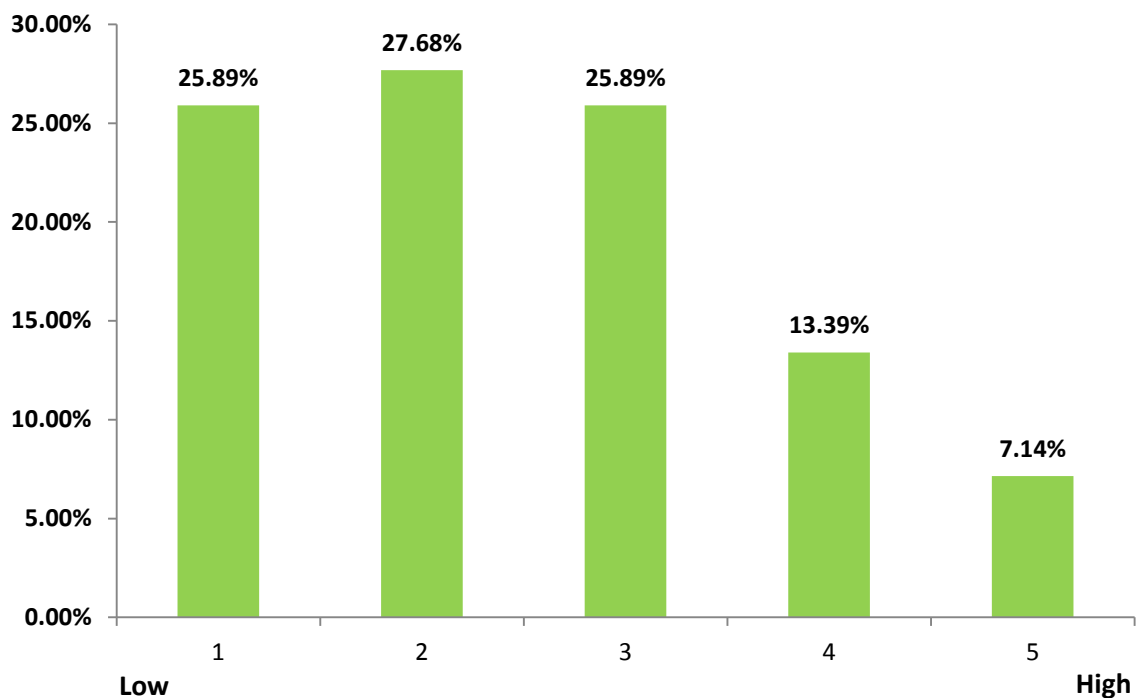


Figure 4.1 - Respondents Knowledge of the Paper Manufacturing Industry

The above depiction, Figure 4.1 yielded a mean of 2.48 confirming that the majority of respondents were not very knowledgeable on the paper industry. Only one fifth of the respondents fell into the range on the higher end of this numerically scaled question.

4.3. Objectives of the study

With the aim of the research being to satisfy the requirements of each objective of the study, to determine if the respondents have a positive or negative perception on the paper industry with regards to their environmental responsibility, the responses to each question were analysed against the set objectives. Comparisons between some data have been made to offer an improved interpretation of the results obtained.

4.3.1. Objective 1: Paperless Environment

Respondents were asked to rate the importance of paper on a five point numerical scale ranging from one(1) being low and five (5) being high. The majority of respondents (51%) rated the importance of paper at five (5) and 21% at four (4), which is deemed high. Just 5% rated its importance as low with 12.5% at three (3). Below, Fig. 4.2 depicts the findings across the spread.

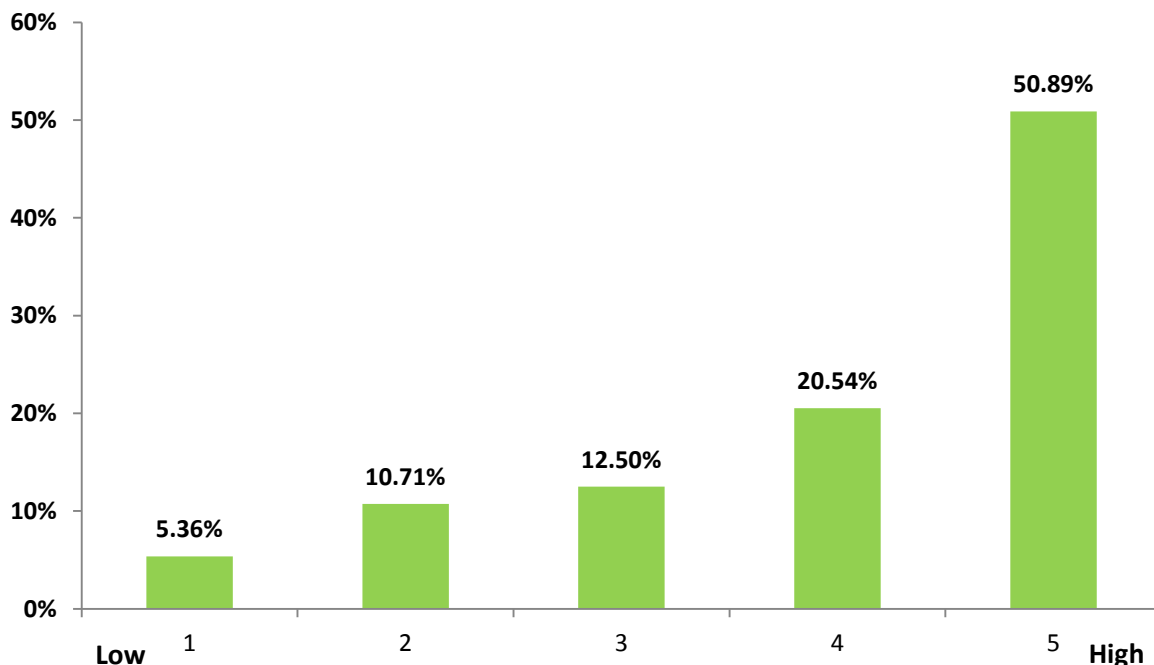


Figure 4.2 - Importance of Paper

The question on the importance of paper was developed following the research conducted, as per the literature in chapter two, yielded varying opinions and also

highlighted several myths on paper. Above 70% of respondents rate the importance of paper as high. The 12.5% that remained neutral together with the balance that rated its importance as low does indicate that there is belief that paper can be replaced.

Figure 4.3, below confirms respondents results to the question “Do you believe that a complete paperless environment is possible?” Just over three quarters of the respondents were not convinced that a paperless environment is possible.

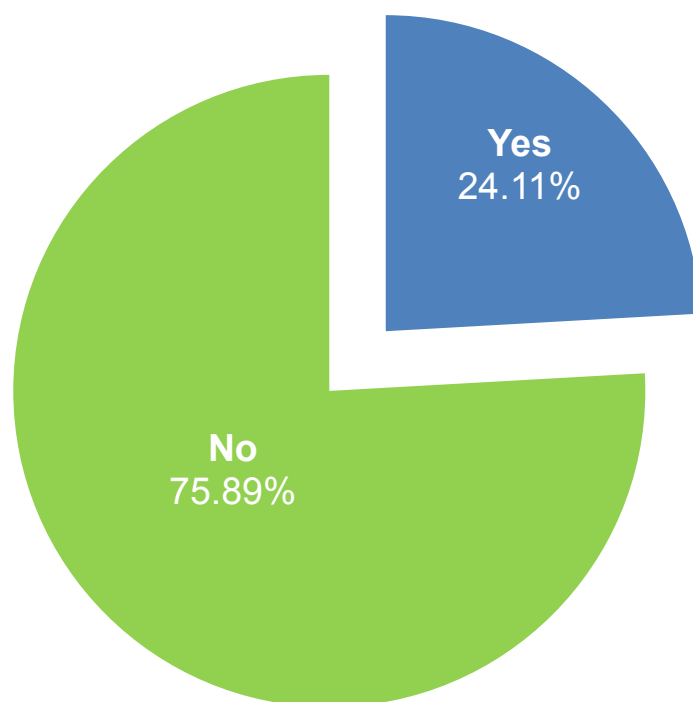


Figure 4.3 - Possibility of a Paperless Environment

The result of this question has a relation to the previous question asked, where just under a quarter of the respondents are of the opinion that a paperless environment is a possibility. This finding is interesting and is an area that needs further probing to determine the respondents’ opinions and suggestions as to how this can become a reality.

As per the below two graphs, Fig 4.4 and Fig 4.5, 64.29% of respondents confirmed that their office environments were embarking on a greening project. The respondents that confirmed that a greening project is being implemented were

directed to a secondary question that asked if the strategy included a paperless office. To this question 66.67% responded No, with the balance confirming that a paperless environment is being targeted.

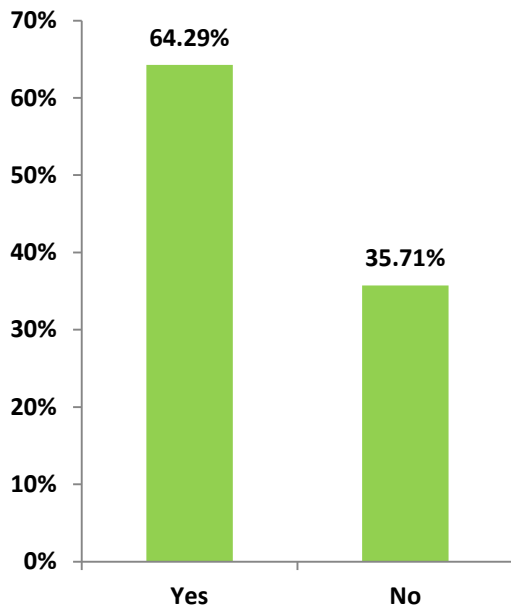


Figure 4.4 - Office Greening Project

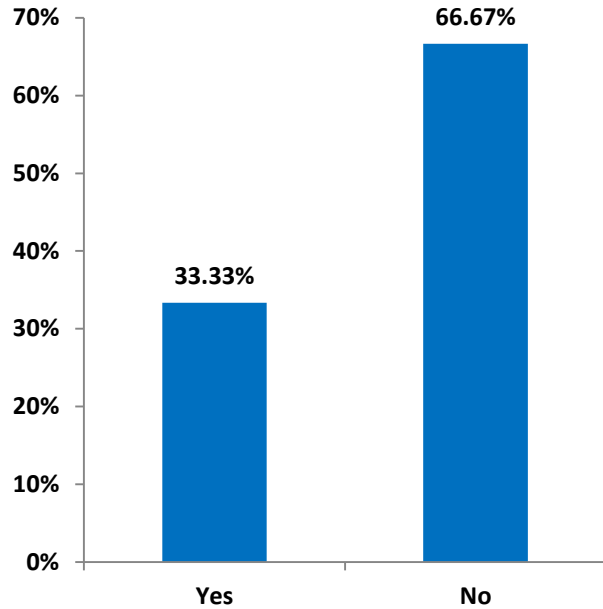


Figure 4.5 - Targeting a Paperless Office

Office greening has been found to be favourable from the responses received, with just a portion of respondents confirming that a paperless office will be targeted. This indicates that the confidence in a paperless office is low.

“Do you consider Digital Technology to be more environmentally friendly than Paper”, was a question raised in the survey and the responses were strongly in the favour of digital technology, as reflected in the below graph, Figure 4.6

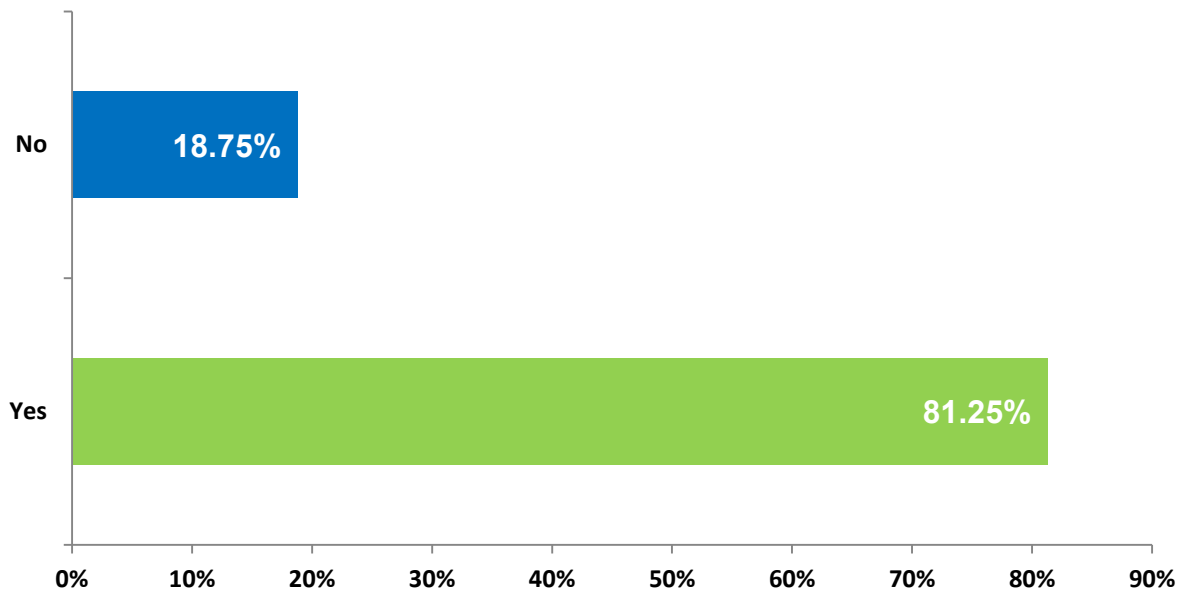


Figure 4.6 - Digital Technology vs. Paper

The responses to this question are concerning as data highlighted in chapter two of this study confirm that to produce digital technology, mining and refining of minerals are required and the energy consumed to power digital technology is unsustainable (ZDNet, 2010). This raises the question as to how informed the respondents are on the environmental impact that digital technology has.

The objective “To determine the respondent’s perception on the reality of striving towards a Paperless environment” was answered in the above series of questions. Over 75% of respondents have confirmed that they are of the opinion that a paperless environment is not possible and paper has been highly rated to be an important commodity. Respondents are involved in office greening projects, but only a small portion is targeting the eradication of paper in their environment.

The responses that don’t rate paper as important and consider a paperless environment to be a possibility is a considerable percentage, and this is data that is important for further assessment. There is also strong support in favour of digital technology with respondents being of the opinion that it is more environmentally friendly than the paper. The questioning on demographics did not include the age category of respondents, and I am of the opinion that the demographic age split could offer some additional insight on the results obtained, with regards to the

number of younger respondents. Nevertheless the aim is to determine perception and this has been achieved.

4.3.2. Objective 2: SA Paper Producers and the Environment

Respondents were asked if deforestation in South Africa is considered to be a serious concern, and if they believed the paper industry to be a major contributor to deforestation in South Africa. The term deforestation was defined via a link in the survey. The former question yielded high responses in the “agree” / “strongly Agree” category, i.e. 43.75% and 24.11% respectively. The number of respondents that remained “Neutral” on this issue was 18.75%. Figure 4.7 below depicts all results obtained.

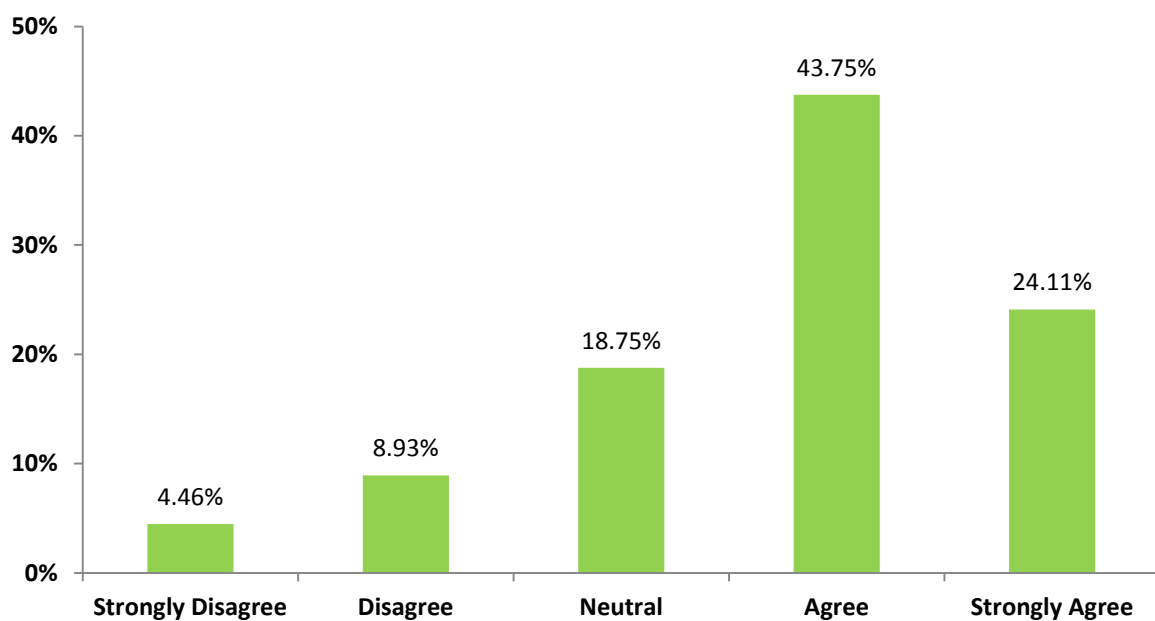


Figure 4.7 - Deforestation as a concern in SA

As confirmed by The South African Forestry Industry (2012), forestry is a regulated industry in South Africa and hence deforestation is not classified as a serious concern. The opinions of respondents however do not support the facts, indicating that there is a stigma that is associated to the forestry industry.

The latter question did identify a connection to the former question where the response rate to “agree” / “strongly agree” remained high. Here again, a high number of respondents remained “Neutral”. Figure 4.8 below depicts the overall responses obtained.

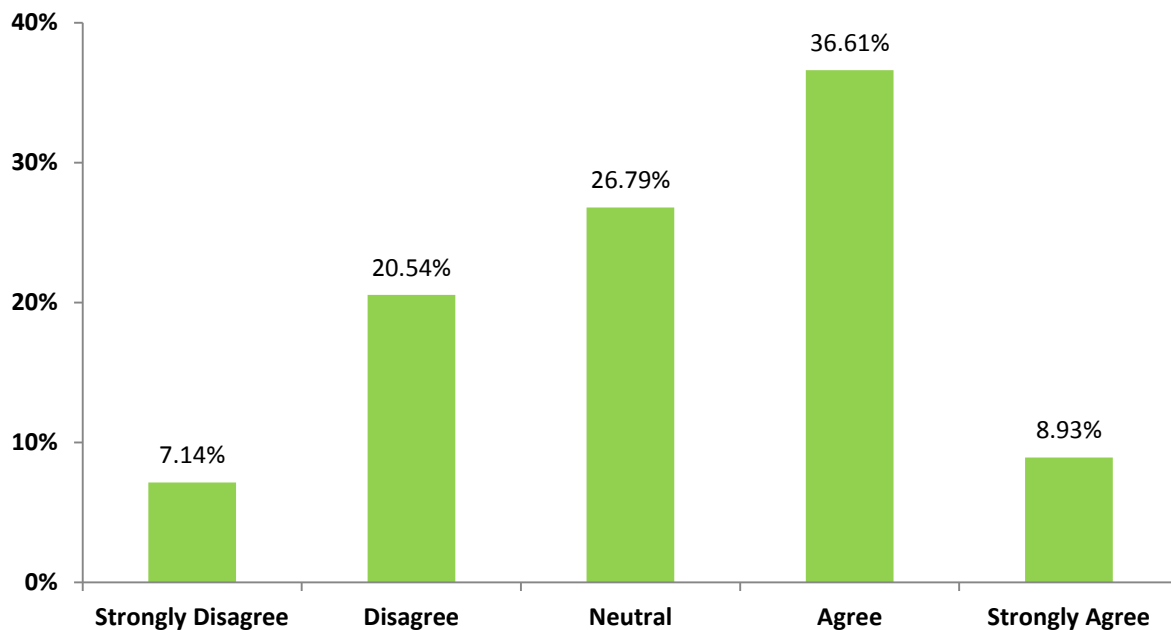


Figure 4.8 - Paper Industry Influence on Deforestation in SA

The high response rate to “agree” / “strongly agree” together with the response rate to the “neutral” category, confirm that respondents are not aware of the sustainability processes and practices that are administered regarding forestry management and paper manufacture in South Africa, as highlighted by Sappi (2012), Mondi (2012) and Mpact (2012).

Figure 4.9 below depicts the responses obtained when asked if the South African paper manufacturing industry impacts negatively on the environment. On a five point likert scales ranging strongly disagree to strongly agree 46.43% agreed and 13.39% strongly agreed with the statement. The number of respondents that remained “Neutral” was high at 25%.

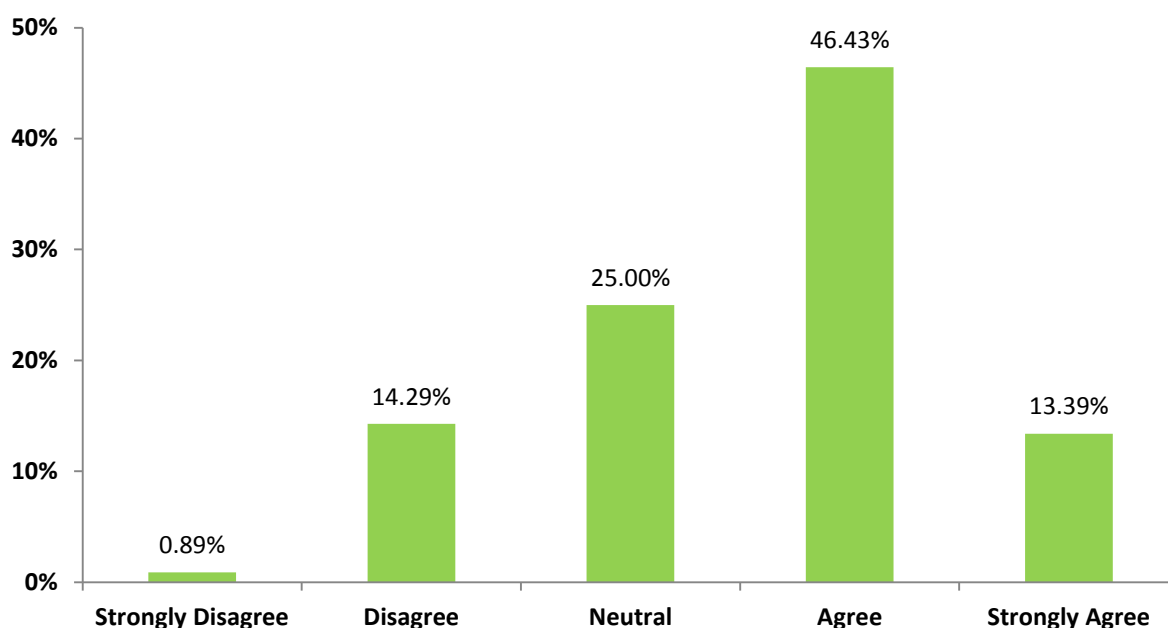


Figure 4.9 - Paper Industry's Impact on the Environment

The high number of respondents that remained Neutral indicates that there is either insufficient information that is reaching the respondent or that the respondent does not have interest or focus on this issue. The 15% of respondents that disagreed with the statement could be those that are employed in paper related industry, as per the demographic profile listed in table 4.2 above.

A follow up question to the previous was if the paper industry in South Africa is considered to be more environmentally unfriendly than other manufacturing industries and the highest number of respondents, i.e. 37.50% remained Neutral on the question. 32.14% disagreed and 7.14% strongly disagreed, leaving just 23.21% who were in favour of the statement.

23.21% is a discerningly high response rate that are of the opinion that of all industries in South Africa the paper manufacturing process is considered to be more environmentally unfriendly. The responses to the question are depicted below in Figure 4.10.

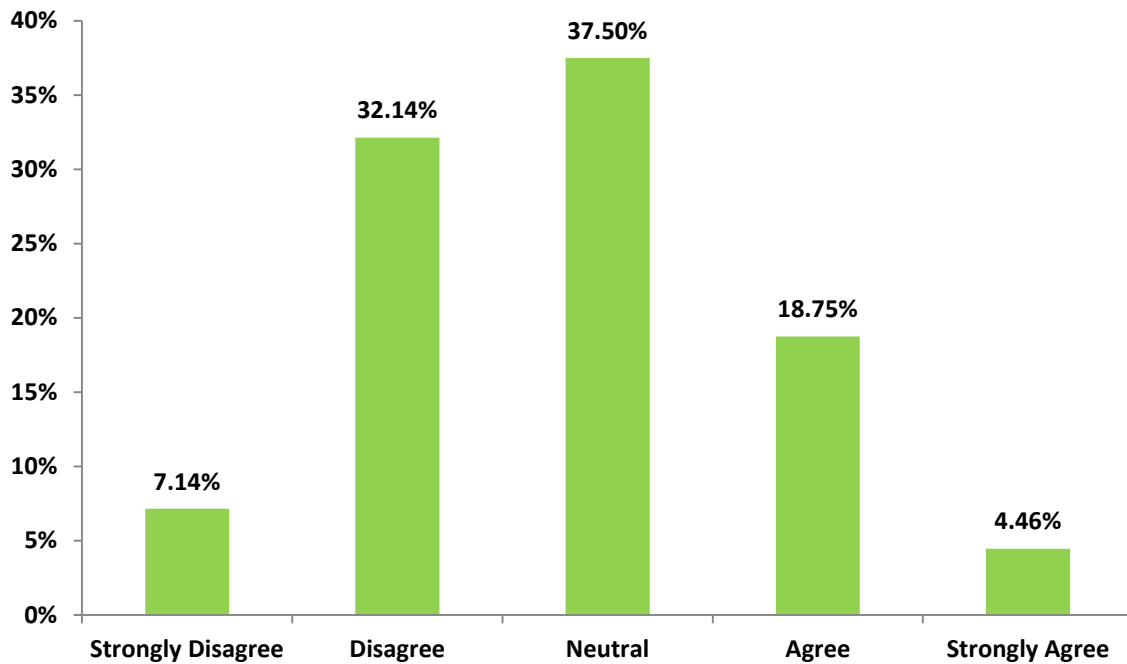


Figure 4.10 - Environmental Unfriendliness of the Paper Industry

Again the high number of respondents who remained Neutral does raise a concern. There is a need to determine the respondents understanding of the environmental issues associated with other industries, but the perception of respondents have been spread across the spectrum. These results will be assessed together with the others linked to the targeted objective.

Continuing with the environmental line of questioning respondents were asked if the paper manufacturing industry in South Africa can be considered to be a major contributor to climate change. 32.11% agreed, 4.59% strongly agreed and 33.94% remained Neutral. Figure 4.11 below highlights the total responses received to this question.

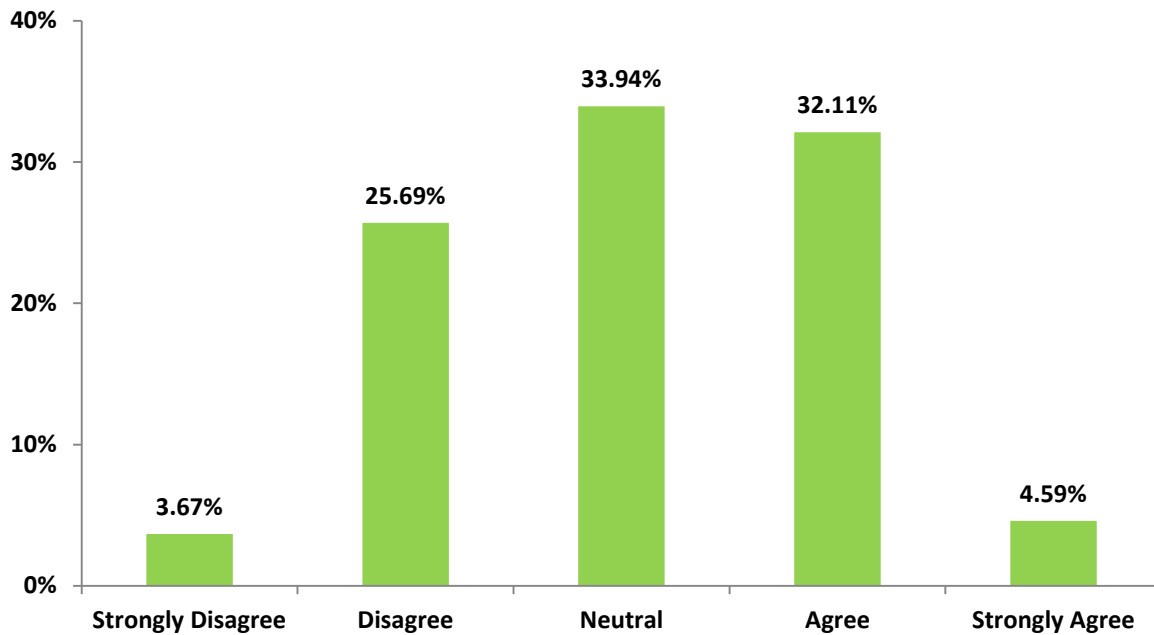


Figure 4.11 - Paper Industry as a Contributor to Climate Change

33.94% is a considerable number of respondents that have confirmed that they are unsure on the paper industry as a contributor to climate change. This result shows doubt from the respondent leaving the respondent susceptible to information, fact or fiction, which can lead to a change in their perception in either direction.

The objective “How do the S.A paper manufacturing industries impacts on the environment” has been addressed in the responses to the above questions. It has been identified that the number of respondents that remained neutral range between 18.75% - 37.5% across the questions indicating that they are uninformed on the issue or the issue is not of interest to them. The responses have revealed that a high number of individuals consider the South African paper manufacturing industry to have a negative impact on the environment. Of the respondents that confirmed that greening projects are being executed within their offices, just a third has confirmed that the eradication of paper is being targeted as part of the process. So in summary, respondents agree that paper is important but have concerns that the process of producing paper is impacting negatively on the environment.

4.3.3. Objective 3: Sustainability and Renewable Resources

A mean of 2.08 resulted from the question on the knowledge that respondents had on Forestry Management in South Africa, as per Figure 4.12 below. A low level of knowledge was in the upper quartile (Xu): 35.715.

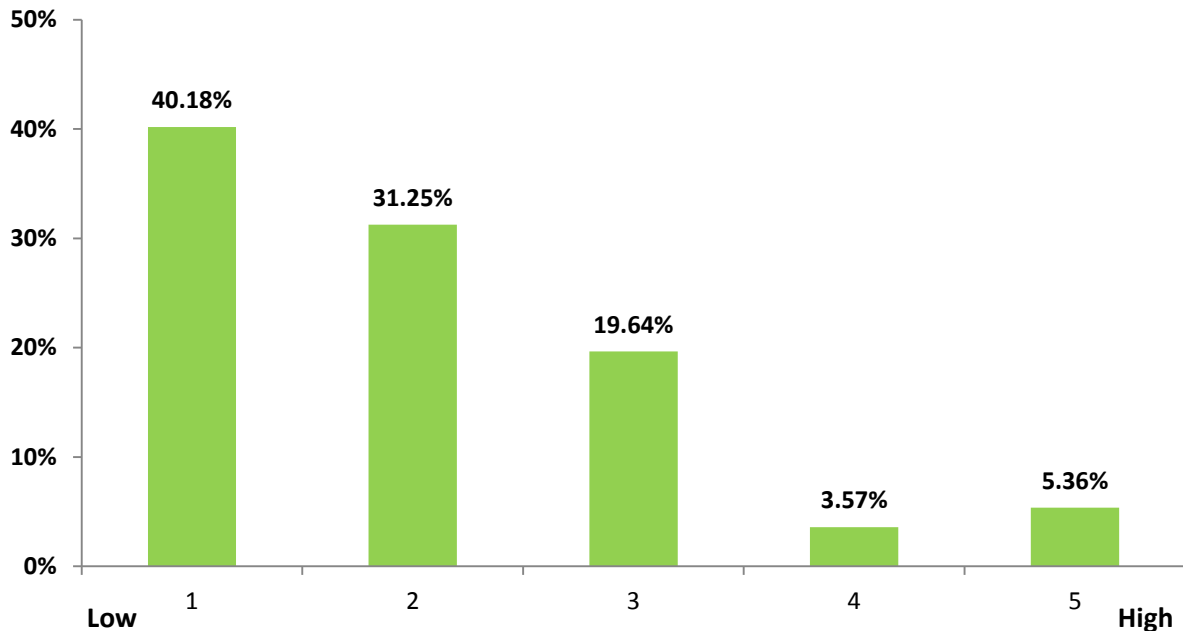


Figure 4.12 - Knowledge on Forestry Management

The responses do confirm that forestry in South Africa is not publicised and this could be a contributing reason as to why individuals often associate paper manufacture with forest degradation and also indicate that printing documents will deplete the volumes of trees.

67.86% responded Yes to a follow up question that asked if they were aware that forestry in South Africa is a regulated industry. 51.79% agreed and 7.14% strongly agreed to the question that asked if the paper manufacturing industry in South Africa can be considered a sustainable industry. 24.11% remained Neutral. Figure 4.13 and 4.14 indicate the results of the responses.

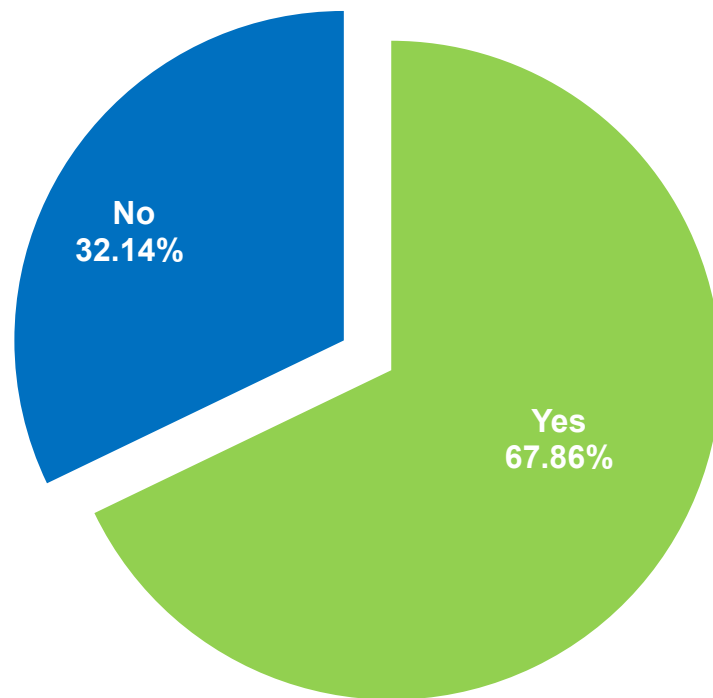


Figure 4.13 - Forestry as a Regulated Industry

The high positive response to this question is contradictory to the previous question, and it is possible that respondents merely made an uninformed selection.

The objective “To determine the respondents understanding of the sustainability of the paper industry and their use of renewable resources” was answered in the responses to the above questions. Over 70% of respondents did confirm that their knowledge of the forestry industry was low. However the majority of respondents were of the opinion that Forestry in South Africa is a regulated industry and almost 59% consider the paper manufacturing industry to be a sustainable industry. There is a need for a more in-depth line of questioning on sustainability and renewable resources of paper producers, but this was not prompted as the questioning would enter a more technical perspective that could deter respondents.

Positive responses to the question that asked if the paper industry is considered sustainable totalled 59%. Again, the response rate to Neutral was high at 24%. Figure 4.14 below indicates the results obtained.

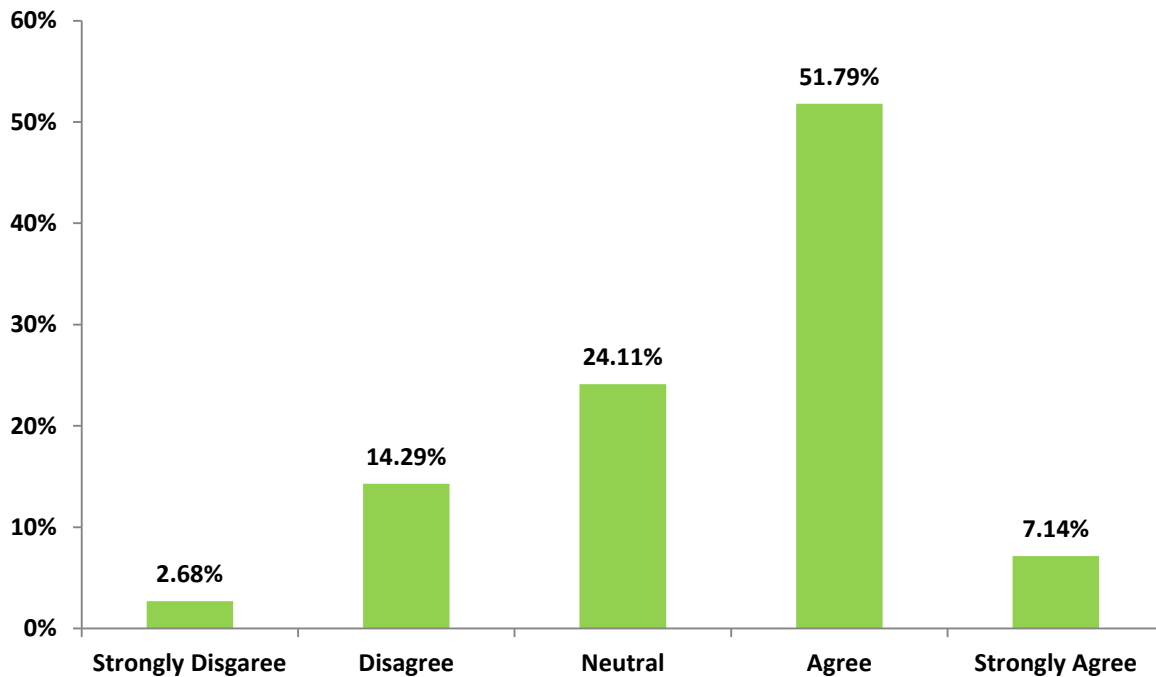


Figure 4.14 - Paper Industry is a Sustainable Industry

Although these results are positive to a large extent, they do contradict the results discussed in objective two, above. This indicates that there is some uncertainty from respondents on the practices of the paper producers and that there is a need for the industry to contribute toward informing the public, should they choose to.

4.3.4. Objective 4: Paper Recycling

Figure 4.15, below depicts the responses to the question “Paper recycling is totally necessary to reduce the volume of trees required to produce paper” On a five point likert scale respondents that strongly agreed totalled 50%, and those that agreed totalled 41.07%%, totalling a positive response of 91.07%.

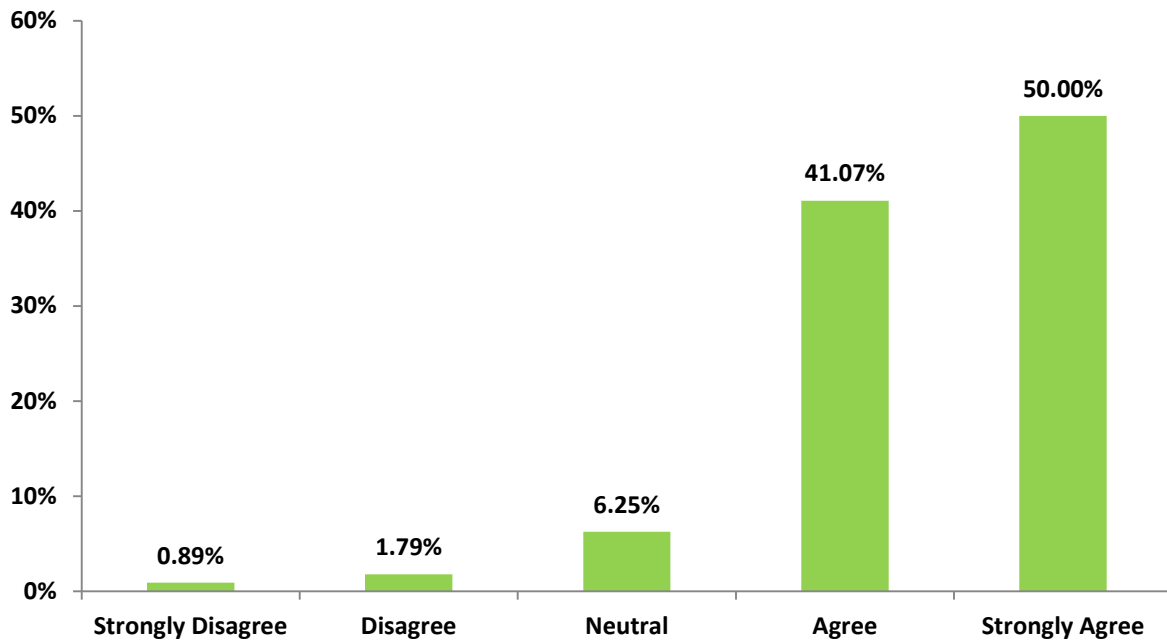


Figure 4.15 - Paper Recycling Saves Trees

These results confirm that respondents do have a strong perception on paper recycling and its importance.

A series of questions followed that related to paper recycling. Figure 4.16 below is the responses to the question “Are you familiar with the paper recycling initiatives in South Africa?”

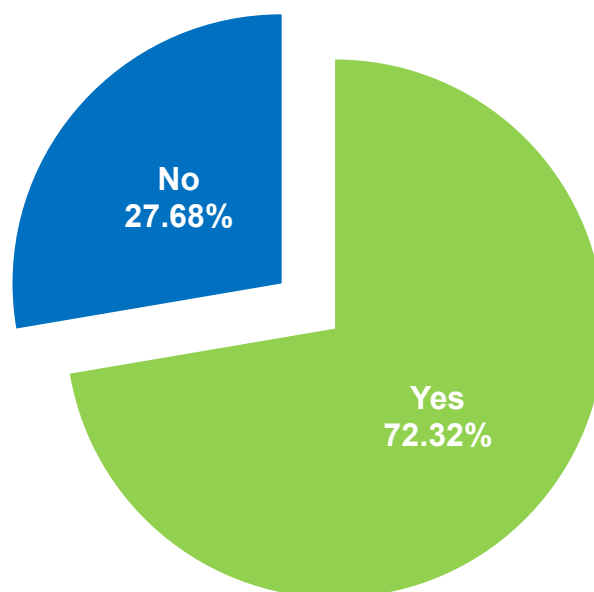


Figure 4.16 - Familiar with Recycling Initiatives

72.32% responded positively when asked if they were familiar with the paper recycling initiatives in South Africa. A linked question directed respondents who have responded positively to the above to a follow up question. This question asked if the respondents considered the paper recycling initiative to be an effective process. 46.91% agreed while 20.99% strongly agreed and 17.28% of respondents remained Neutral on the question, as indicated below in Figure 4.17

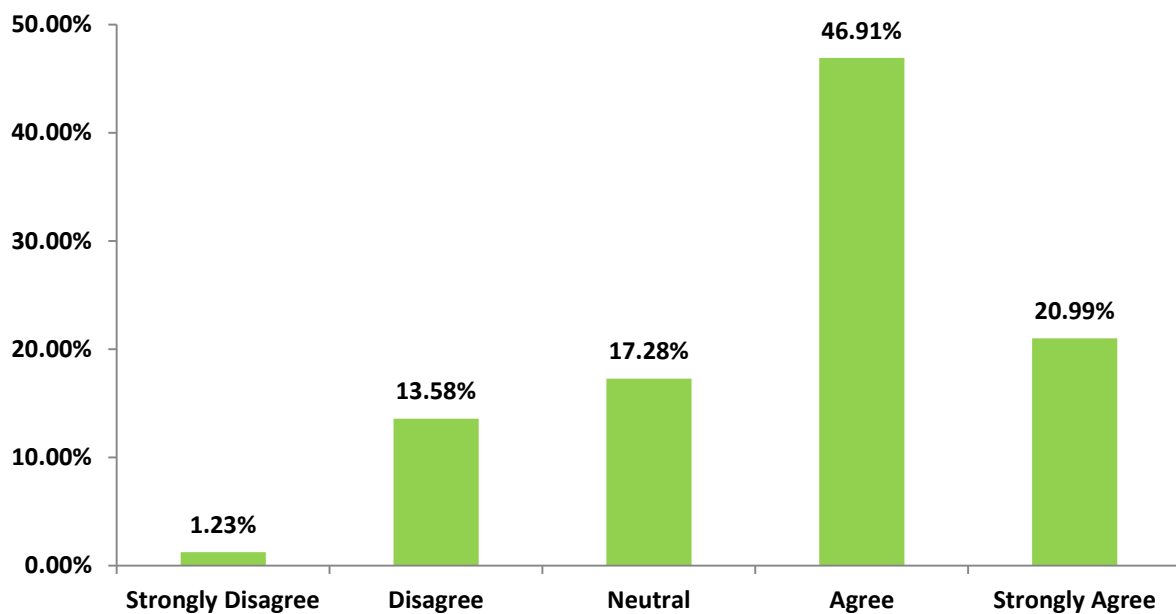


Figure 4.17 - Paper Recycling is an Effective Process

The responses confirmed that recycling initiatives, although favourable, are not impacting positively on over 32% of the respondents.

A resounding 91.07% of respondents disagreed with the statement that “we do enough as a community with regards to paper recycling”, as per Figure 4.18 below.

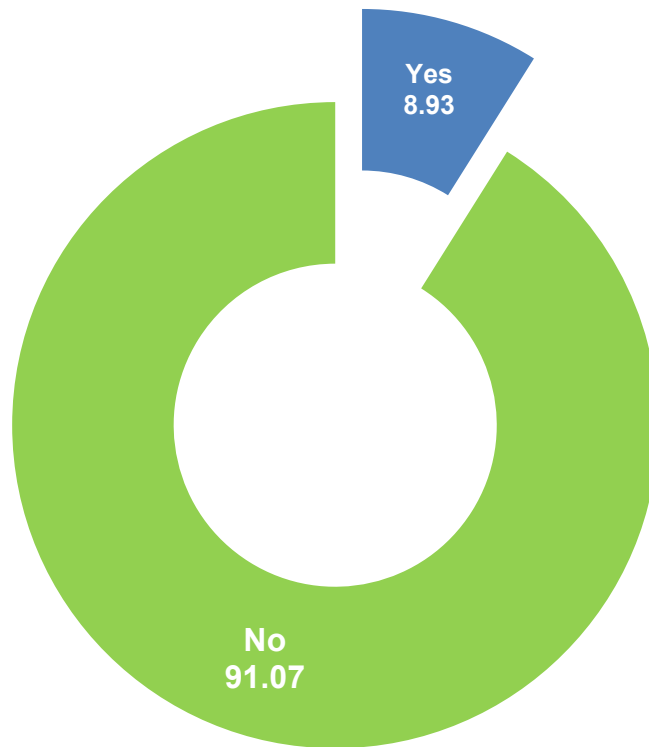


Figure 4.18 - Community effectiveness on Paper Recycling

This confirms that individuals are aware that there are consequences to not recycling paper and agree that communities should be more involved.

As reflected in Figure 4.19 below, 66.07% of respondents confirmed that their organisation is active in paper recycling.

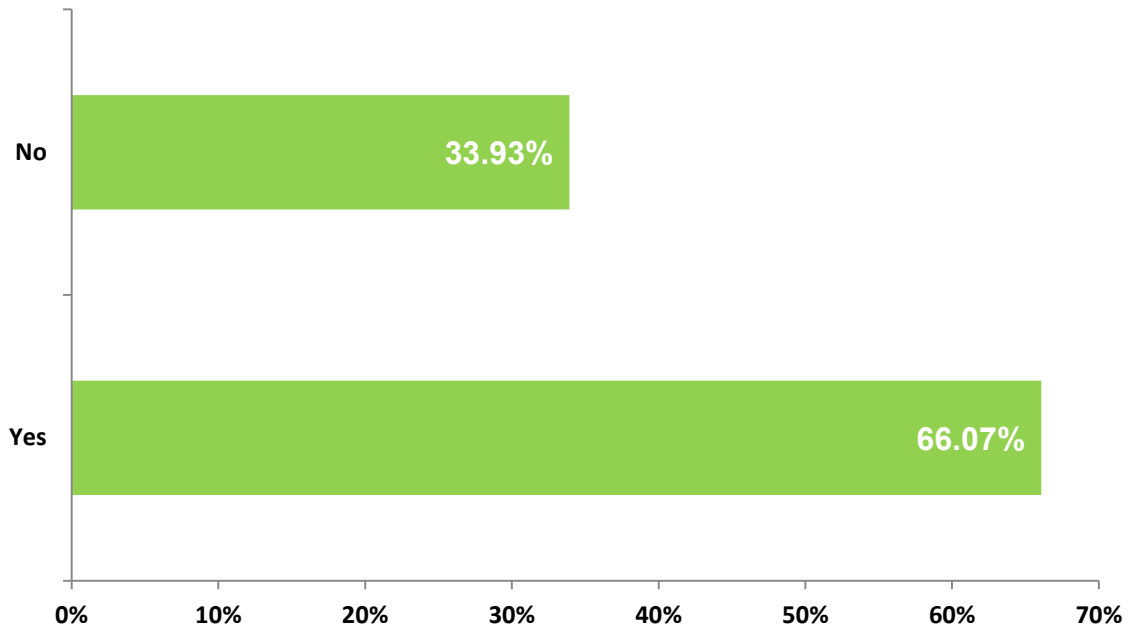


Figure 4.19 - My Organisation is Active in Paper Recycling

A third confirmed that their organisations are not active in paper recycling. This is concerning as every business generates paper waste. There is an opportunity for paper waste collectors to determine why these businesses are not active in paper recycling and strive towards implementing processes to direct them towards paper recycling.

Figure 4.20 and 4.21; below indicate the individual's direct activity in paper recycling together with their efforts to educate others on the importance of recycling, if they are actively involved. 60.71% indicated that they are active in paper recycling, in a personal capacity. These respondents were directed to a question that asked if they passed on their knowledge on the importance of paper recycling. 83.83% responded positively to this.

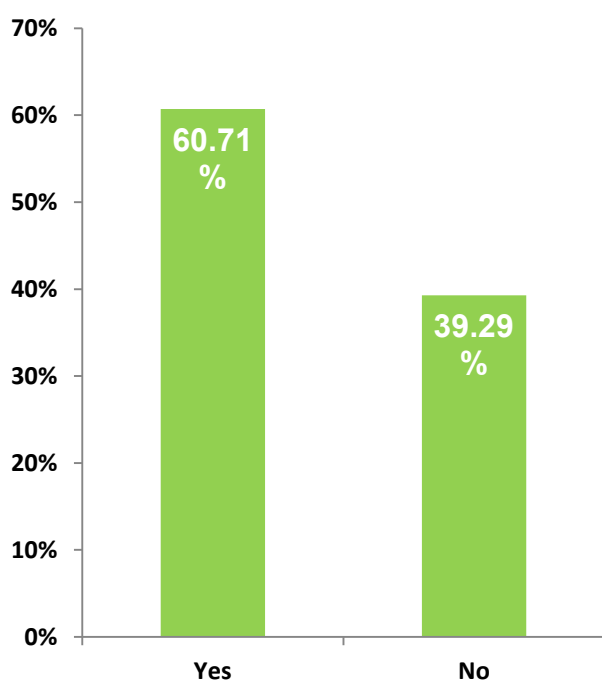


Figure 4.20 - I am Active in Recycling

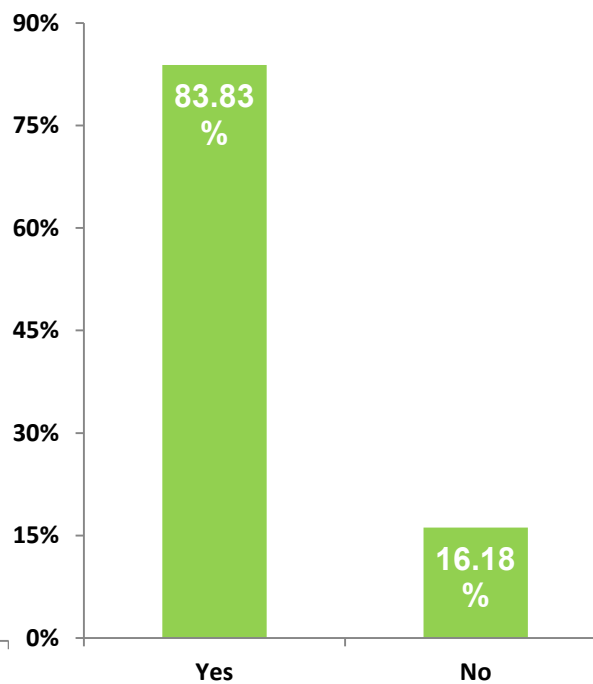


Figure 4.21 - I Pass Knowledge on Paper Recycling

The results confirm a high number of individuals who are not active in recycling. There could be valid reasons for this that can be further probed, in follow up studies.

The objective “To determine the respondent’s awareness on the importance of paper recycling and to identify their contribution towards this process”, was answered in the responses received to the above questions. It is evident that the respondents are aware of the importance of paper recycling but also understand that more has to be done by communities and individuals. 60.71% confirmed that they are active in paper recycling and 83.83% of these respondents attempt to influence others to recycle as well. According to PRASA (2013), only 57% of recoverable paper was recovered in 2012. There are similarities between this fact and the numbers of respondents that have confirmed their activity in paper recycling, clearly outlining that the need for more people to recycle paper is a necessity. The overall perception of the paper recycling is positive.

4.3.5. Objective 5: Awareness on Paper Producer Activities

Figure 4.22 below offers the split on the responses received to the question posed to respondents on their familiarity with all of the South African paper producers.

49.11% responded No and 16.97% confirmed that they were unsure. The selection 'unsure' was included as a choice option as this question was not considered to be totally direct and would possibly get respondents questioning their knowledge on the topic.

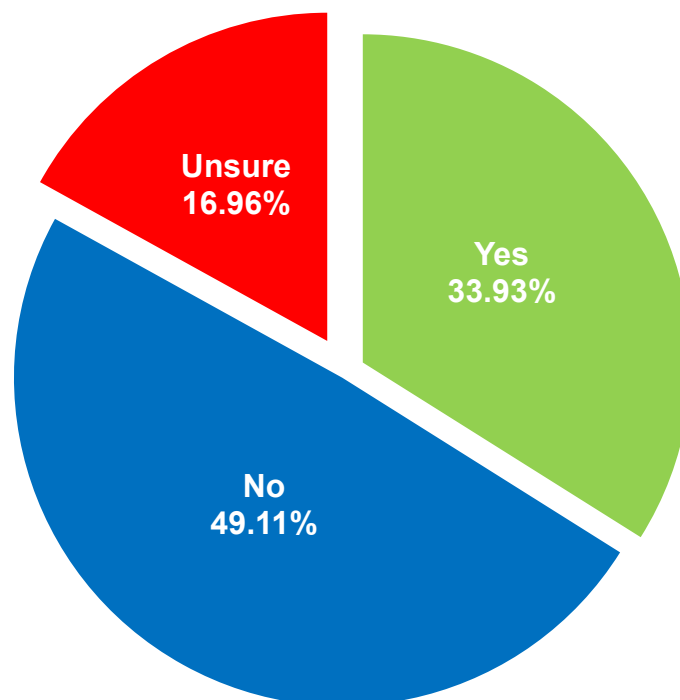


Figure 4.22 - Familiarity with SA Paper Producers

Although almost 34% responded that they are familiar with the South African paper producers, I do have some doubt on the accuracy of these responses, as there are several South African paper producers, some of whom are relatively small. My opinion is that this question should have been structured differently.

Mondi (2012), Mpact (2012) and Sappi (2012) all confirm their efforts in the industry to reduce its impact on the South African Environment, in their annual reports. Public knowledge of this was tested in a statement that read "The paper industry, in South Africa, is working towards reducing its impact on the environment".

The responses were 45.54% Neutral, 37.5% agreed and 7.14% strongly agreed. Below 10% were against the statement, as indicated in Figure 4.23 below.

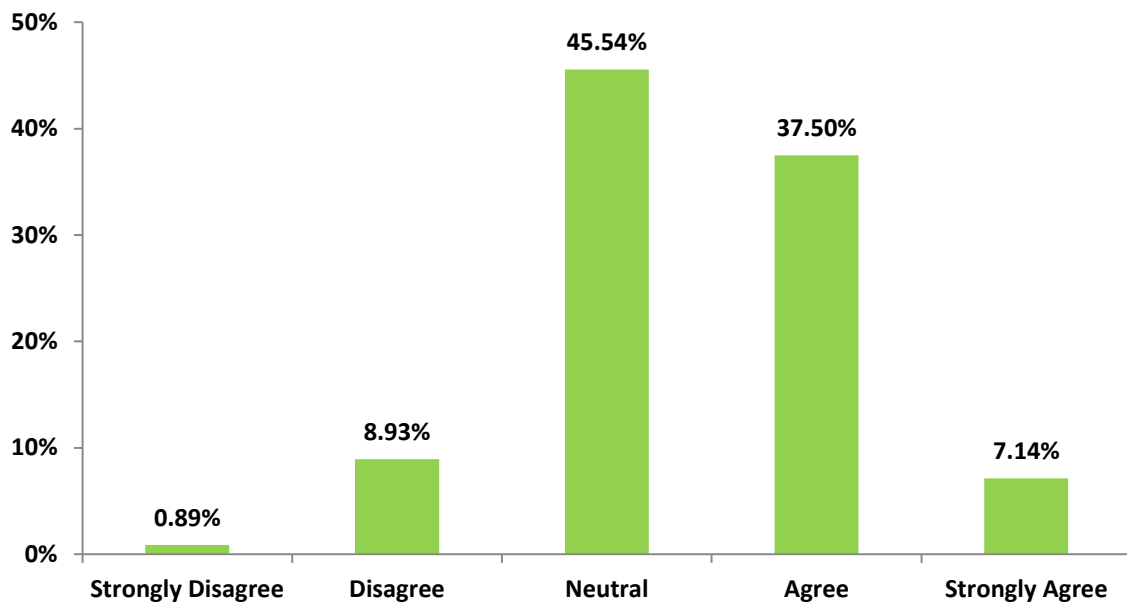


Figure 4.23 - The Paper Industry is reducing its Environmental Impact

The perception of respondents is that the industry is working towards improving their environmental standing, but the Neutral responses confirm that a high number of individuals are uninformed on the topic.

The response rate to the question on Government influence in regulating the actions of industry was high towards the negative confirming that respondents did not have confidence that Government is doing enough to protect the environment from the possible harm caused by industry, or that their initiatives are not being publically communicated. Figure 4.24 below highlights the results obtained.

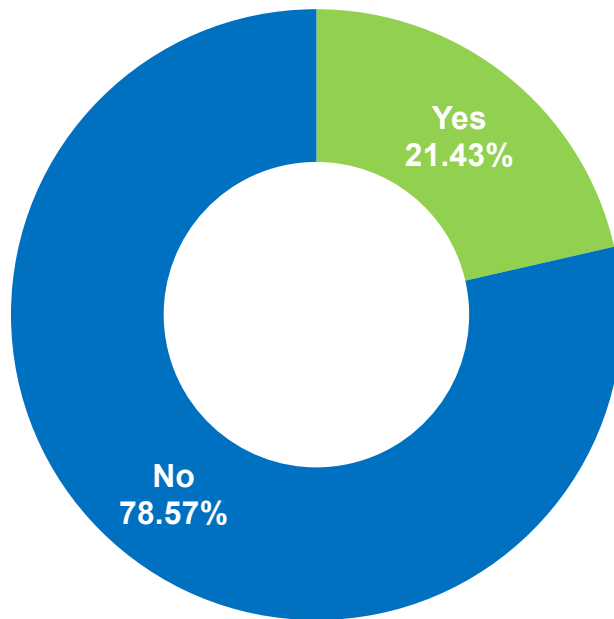


Figure 4.24 - Government Regulating Industries

Perception on government involvement in the actions of industry is that it is low and thus more regulation is required or an improvement in government communicating their involvement is required.

98.21% of respondents, as depicted in Figure 4.25 below, agreed that the paper industry needs to be more vocal on their environmental activities.

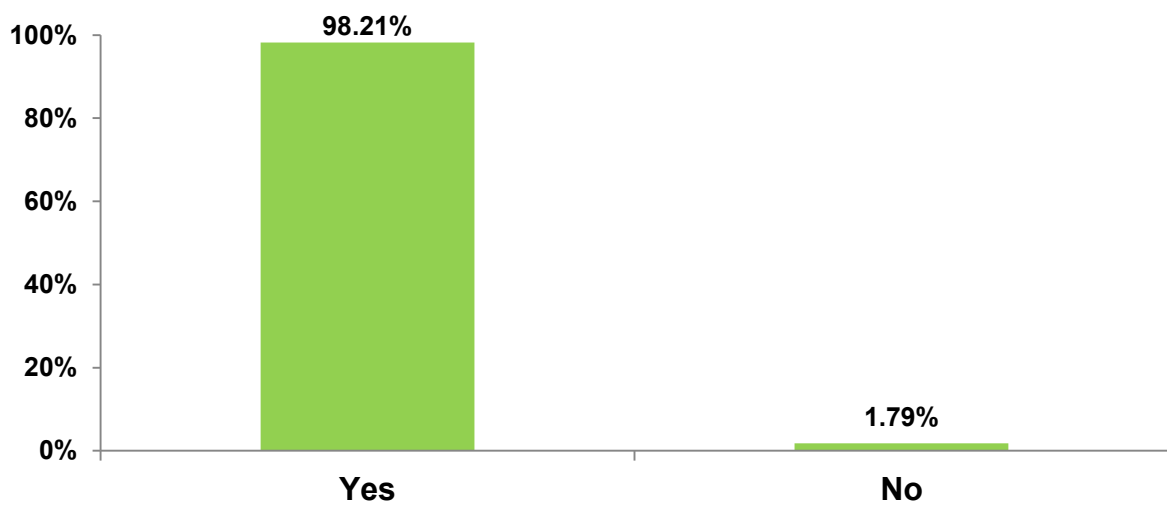


Figure 4.25 - Should the Paper Industry be more vocal?

This result is indicative that even if the industry is in fact communicating their sustainability practices, the mediums that they are using to do this may have to be re-assessed.

A linked question that prompted suggestions to possible communication mediums that the industry could use to inform the general public on their environmental initiatives was proposed in the form of a selection list to respondents that answered Yes to the previous question. Table 4.3 below indicates the responses that have been received.

Table 4.2- Communication Medium from Selection List

| communication medium | Number of responses |
|-------------------------------------|---------------------|
| Advertising in community newspapers | 63 |
| Website | 42 |
| Printing on packaging | 59 |
| Billboards | 62 |
| Leaflets | 13 |
| Social network | 84 |
| Other | 16 |

Social networking has been the most selected medium followed by advertising in community newspapers and then billboards. Other advertising mediums favourability is also reflected in the above table

Respondents were prompted to offer additional suggestions, not included in the selection list, that they believed the industry could effectively use a communication tool. Table 4.4 below lists these suggestions that have been made. This data has been transferred as listed by the respondents.

Table 4.3 - Communication Medium from Respondents Suggestions

| Respondent suggestion on communication medium |
|--|
| All other digital media |
| Media |
| Media, i.e. radio, TV |
| Television adverts |
| Feature Articles in Newspapers |
| Government legislation |
| Every residential area to have one of those large bins to drop off paper |
| Radio, TV, all sorts of media |
| public awareness, through public gatherings and schools |
| Television ads |
| workshops |
| Below your email signature |
| Sponsorships of environmental clean-ups (invasive and litter) |
| tv |
| Radio/Television |

The above list suggested by the respondents proposes various communication methods that they believe will reach the intended target groups. Although the suggestions lean more towards media, there are ideas such as workshops, sponsored environmental clean-up and public awareness through public gatherings and schools, that stand out.

The objective targeted from the above questioning, “To reveal if there are areas in which the paper manufacturers need to increase awareness of their operation to the public and other industries” was answered. It is evident that the general public are not clear on the environmental activities of the paper industry and thus the industry

has to decide on the way forward that will be beneficial to the industry as well as the general public.

4.4. Summary

The results obtained from the analysis of the data have highlighted the perceptions of the individual that have responded. Paper is still rated as important by a large portion of the population but perception is that digital technology is more environmentally friendly than paper manufacturing.

The number of respondents that have remained neutral on many questions indicated that there isn't clarity on the environmental responsibilities and sustainability practices of the paper industry. The paper industry is seen to impact negatively on the environment contributing to climate change. This can also be linked to the perceived lack of communication on the industry practices.

Respondents are in agreement that paper recycling is essential, but most have confirmed that they are not actively involved in the process. Responses also highlight that there are several organisations who are also not involved in paper recycling. These results have confirmed that although paper waste collectors are active in communities and business there is still areas for growth.

It was made evident that the paper industry is operating in isolation from the general community as the respondents are unaware of the responsible practices that are being implemented by the industry. There was a call for the industry to be more vocal and suggestions on initiatives have been made.

Overall perception is that the paper industry is not environmentally responsible but a large portion of the sample group remained neutral on several questions. This indicates that they are uncertain on the practices of the industry and chose not to speculate. The reason for that low knowledge of the subject could be related to poor communication from the industry, but a possibility is that it could also be from a lack of interest from the individual, as this may not be an area of concern to them.

Based on the above findings, some conclusions have been drawn and recommendations have been suggested together with limitations of this study. These are discussed in chapter five together with recommendation for further research.

5. Chapter Five - Conclusions, Limitations and Recommendations

5.1. Introduction

This, the final chapter, offers an overview of the research findings, and discusses the conclusions with reference to the problem statement and objectives that have been outlined in chapter one. Recommendations that could be considered in relation to the findings of the research are provided in this chapter. This chapter will also provide recommendations that can be considered for further study of the topic.

5.2. Discussion

The objectives outlined in chapter one are combined with the findings in chapter four of this study. The objectives of the study were addressed by the corresponding responses extracted from the questionnaires completed by respondents.

5.2.1. A Paperless environment

The findings confirmed that paper is still considered to be important, but there have been indications, although only fractional, that efforts toward achieving a paperless office are on-going. York (2006) and Sellen and Harper (2002) both highlighted that paper consumption has increased following the introduction of e-mail. According to Carr (2005) a complete paperless environment is unlikely but, there will continue to be strides to reduce paper consumption and the clutter that can result.

The findings from the survey were in line with the literature. The concept of a paperless environment, although as environmentally responsible as it may sound, is not a cut and dry process. Reduction, and not elimination, of paper usage is a reality and can only be achieved over time, but this leads into the looming question as to what the alternatives or substitutes to paper will be, and at what cost to the environment will it come at?

5.2.2. SA Paper Producers and the Environment

The perception of the respondents as to how South African paper manufacturers' impact on the environment, has yielded a negative response. The findings have confirmed that the respondents are of the opinion that deforestation in South Africa is a serious concern and that the paper manufacturing industry is a major contributor to this, contrary to the literature on forestry management confirmed by The South African Forestry Industry (2012). Responses have also identified that a large portion of the respondents are not knowledgeable on the paper industry or on forestry management, and thus responses received appear to be based largely on perceptions. There is a stigma that seems to be associated to the paper industry and hence the responses follow along this. From responses received it has been identified that Individuals are uninformed on forestry management and on the processes and practices of the paper industry in South Africa, and this should be considered an area of concern to the industry.

5.2.3. Sustainability and Renewable Resources

The findings did confirm that respondents had limited knowledge of forestry management and of the paper industry but responses did acknowledge that the paper industry is a sustainable industry. A high response rate was in agreement that forestry is a regulated industry in South Africa, despite confirmation that their knowledge of the industry was low. These results did raise a concerns as they somewhat contradict responses received to the questions on deforestation in South Africa, as discussed above. The results have indicated to the researcher that the structure of the questioning is an area that has to be addressed in further studies.

5.2.4. Paper Recycling

Although the bulk of the respondents confirmed their awareness of the paper recycling initiatives in South Africa, in excess of 91% have admitted that more has to be done with regards to paper recycling. This supports PRASA (2013) who confirm that an improvement is waste collection over the past five years, but also highlights that additional community input is required to prevent paper going into landfill.

5.2.5. Awareness on Paper Producer Activities

Mondi (2012), Mpact (2012) and Sappi (2012) all highlight their initiatives and efforts to reduce their impact on the environment, but the findings of the study have confirmed that 41.08% of the community is unaware of these initiatives. The industry, although indicating that their intention is to protect the environment and consume renewable resources where possible, is not reaching the general public. This could be by choice, but I am of the opinion that other than paper recycling initiatives, other practices are not corresponded to the community effectively. It is clear that these practices are communicated to the regulating authorities as the paper mills are accredited environmentally. Respondents have agreed that the industry needs to be more vocal on their activities and suggestions on methods to reach the public have been made. This is a call that should be heeded by the paper manufacturing industry to ensure that sustainability is achieved through the intervention on the public.

5.3. Recommendations arising from this study

This study examines the perceptions on the environmental responsibility of South African paper producers. The data was analysed in order to generate recommendations that could apply to the gaps in literature and practice. There has been no research identified that correspond to the chosen topic and thus the research has been developed around the literature structured in chapter two. The following recommendations are suggested based on the findings of this study:

The South African public are sporadic in their reaction on environmental issues and need to play a more active role in understanding the concerns that are emerging. Digital technology is one such example, from its construction to use of non-renewable energy required to power these products, needs to be understood.

Industry in general have some negative impact on the environment and although there are regulations that monitor these practices, government together with industry should ensure that the general public be informed on the sustainability initiatives that are being implemented. The paper industry should promote their products by confirm

its environmental acceptance while confirming the use of renewable resources, versus alternatives.

The recycling of paper, and other material, is becoming more significant, as we grow in population and demand needs increase. Recycling is essential to ensure that we do not deplete natural resources while servicing this demand. From the finding of this research it has been confirmed that paper waste collectors are actively involved in communities, but there is a need for a more intense involvement to get individuals and businesses to create a mind-set that will impact on future generation.

Although literature is quite abundant on the paper industry and the environmental aspects, in other countries, South Africa seems to be lacking. Academics together with the major industries should research and write or publish more that will inform the public on aspects of the industry, both positive and negative.

The paper industry in South Africa must be more vocal, should the intention be to remove the stigma associated with the industry depleting the forests or increasing carbon emissions, etc. The findings of the study confirm that the general public are not informed on the industry activities and practices and thus create their own assumptions of the industry.

Forestry in South Africa is a regulated industry and trees are a crop. Deforestation is not a problem that South Africa encounters according to the literature discussed in chapter two. This information needs to be communicated and a starting point for the industry can be the schools, tertiary institutes and other public gathering.

5.4. Limitations of the study

As with all research, constraints to the study are inevitable. However the limitations to this study have been only partial and are identified below:

- Limited data from any previous research.
 - The study has not been researched previously or the data has not been made available. This resulted in extensive ground work being done to ascertain an understanding of the approach to be taken.

- Delayed response time from sample population.
 - The survey was electronically distributed to the targeted population, who were members of the Durban Chamber of Commerce and Industry. Several reminders had to be sent out, and the response time from those that have completed the questionnaire was far too long, with most only completing following receipt of the reminders. The duration of this study imposed a limited time frame and hence a cut off period for responses had to be set, and only data received during this time frame has been captured for analysis.

- Data Collection
 - Of the 278 questionnaires distributed, only 40% have responded. This data was considered adequate to obtain a pattern from the responses, the research could have been extended to other data collection methods such as physical interviews. This however is a cost intensive method and was not pursued.

5.5. Recommendations for further research

The recommendations for further research are linked to the limitations of the study that have been discussed above.

Although there is sufficient literature on the aspects that impact on the environment, together with articles on the paper industry, there are not many readily available articles on the South African paper producers. Research similar to the chosen topic has not been located. Hence the “perceptions on the environmental responsibility of South African paper producers” that has been assessed in this research forms a

base on the topic. It is recommended that the South African paper producers assess expanding the research to confirm the findings of this research.

The research has been conducted over a period of five months, and the target population has thus been restricted to Durban, KwaZulu Natal. For a more comprehensive analysis, it is recommended that the research be expanded into other geographical regions of South Africa with initial focus being on the countries other major cities. The research can thereafter be expanded to gain coverage of the entire country, as availability of time and resources allow.

56% of the respondents were of the Indian race as a result of the location of the study. Although the results confirm their perceptions, recommendation is that the research be conducted to incorporate a more demographic split of the country's population. To achieve this mix respondents have to be selected from various demographic regions of the country, and focusing on the countries major cities will offer a more diverse demographic mix for the intended research.

As this study followed on literature, and not previous work, some concerns have been identified in the structure of the questionnaire. Responses have confirmed that further probing into some questions may be required. This may require some open ended questions having to be asked to obtain a more detailed feedback.

The response rate to the initially distributed survey was low and several reminders had to be sent out. Only following the issuing of several reminders did the response rate increase. The electronic survey method is a suitable method for data collection, provided that the duration of the study is over an extended period, and not just five months as with this study. For further research it is recommended that the investment of funds be assessed to aid facilitate additional means of reaching the targeted population, for an improved response rate. A suggestion is personally administered questionnaires. Although this may be both, time consuming and costly, I strongly believe that it will yield a more concise and accurate result. The option of interviews can also prove beneficial, more especially with senior executives, should they allow it.

5.6. Summary

The purpose of this research was to ascertain the perceptions that individuals hold on the environmental responsibility of South African paper procedures. Although there are limitations to the study that have been highlighted above, the objectives of the study has been met.

The study has identified that the South African paper producers, who report that their efforts to protect the environment and practice sustainability, are not engaging with the local communities or, business on a level that will assist create a positive perception of the industry, while forming synergy between the industry and the general public, who are the consumers or end-users of the products.

The recommendations discussed above can have a positive influence on the paper industry and it is also suggested that the research be conducted on a wider scale to confirm the findings of this study, to determine if additional focus is required to improve the way the industry is perceived.

Industry is faced with many challenges, from the supply of resources to the legislations that are imposed onto them. I am of the opinion that if the general public are more aware on the industry practices and sustainability initiatives, the ripple effect on the industry can only be positive.

References

Barker, P., 2007. *African Business Review: Australian paper, changing Industry perceptions*. [Online] Available at: <http://www.africanbusinessreview.co.za> [Accessed 18 October 2013].

Cabalova, I., Kacik, F. & Kacikova, A. G. a. D., 2011. *The Effects of Paper Recycling and its Environmental Impact*. Slovakia: CC BY-NC-SA.

Carr, M. R., 2005. An Analysis of the feasibility of a paperless environment - the case of the Mona School of Business. *Management of Environmental quality: An International Journal*, 16(4), pp. 286-290.

Castillo, C. K. G. & Gurney, K. R., 2013. A Sensitivity Analysis of Surface Biophysical, carbon, and Climate Impacts of Tropical Deforestation rates in CCSM4-CNDV. *Journal of Climate*, Volume 26, pp. 805-821.

Chestney, N., 2013. *Reuters: Global Carbon Emmissions hit a*. [Online] Available at: <http://www.reuters.com>[Accessed 03 August 2013].

Codjoe, S. N. A. & Dzanku, F. M., 2009. Long-term Determinants of Deforestation in Ghana: The role of Structural Adjustment Policies. *African Development review*, 21(3), pp. 558-588.

Deren, R., 2010. *FluidSurveys: Is an online survey right for you?*. [Online] Available at: www.fluidsurveys.com/is-an-online-survey-right-for-you-advantages-and-disadvantages[Accessed 18 November 2013].

Dornyei Z, T. T., 2011. *Questionnaires in second language research*. [Online] Available at: <http://books.google.com>[Accessed 21 November 2013].

EPA - United States Environmental Protection Agency, 2013. *Global Greenhouse Gas Emmission Data*. [Online] Available at: <http://epa.gov>[Accessed 16 June 2013].

Field, J. M. & Sroufe, R. P., 2007. The use of recycled materials in manufacturing: implications for supply chain management and operations strategy. *International Journal of Production Research*, 45(18-19), pp. 4439-4463.

Forest Ethics, 2013. *The facts: Paper consumption and its impacts*. [Online] Available at: <http://forestethics.org>[Accessed 14 April 2013].

Fry, I., 2008. Reducing Emissions from Deforestation and Forest degradation: Opportunities and Pitfalls in Developing a new Legal Regime. *Reciel*, 17(2), pp. 166-182.

Garvey, J., 2011. Climate Change and Causal Inefficacy: Why Go Green When it Makes No Difference?. *Royal Institute of Philosophy*, Issue 69, pp. 157-174.

- GLICA, 2008. *Promoting Sustainable Industry in the Developing World*. [Online] Available at: www.glica.org[Accessed 08 September 2013].
- Hawley, G., Taylor, A. & Dames, J., 2008. *South African Journal of Science*, 104(7-8).
- Hujala, M. & Himola, O.-P., 2009. Forecasting long-term paper demand in emerging markets. *Foresight*, 11(6), pp. 56-73.
- Institute for Digital Research and Education [idre], 2013. *What does Cronbach's alpha mean?*. [Online] Available at: <http://www.ats.ucla.edu>[Accessed 14 November 2013].
- Intergovernmental Panel on Climate Change, 2007. *Intergovernmental Panel on Climate Change: 2007 synthesis report*. [Online] Available at: <http://www.ipcc.ch> [Accessed 20 July 2013].
- Journal Of Extension, 2011. *Extension's progress in the paperless Revolution: Balancing Digital and Paper*. [Online] Available at: www.joe.org [Accessed 02 August 2013].
- Kim, O. S., 2010. An Assessment of Deforestation Models for Reducing Emissions from Deforestation and Forest Degradation (REDD). *Transactions in GIS*, 14(5), pp. 631-654.
- Kothari, C., 2008. *Research Methodology - Methods and Techniques*. New Delhi: New Age International.
- Magnaghi, G., 2011. *Recovered Paper Market in 2010*. [Online] Available at: <http://www.bir.org>[Accessed 02 April 2013].
- Miranda, R., Monte, M. C. & Blanco, A., 2011. Impact of increased collection rates and the use of commingled collection systems on the quality of recovered paper. part 1: Increased collection rates. *Waste Management*, 31(11), pp. 2208 - 2216.
- Mondi Limited, 2012. *Shaping our sustainable future*, s.l.: s.n.
- Mpact Limited, 2012. *Position for Sustainability*, Gauteng: s.n.
- Natural Gas, 2011. *Natural Gas and the Environment*. [Online] Available at: www.naturalgas.org[Accessed 10 September 2013].
- O'Connell, E. J., 2011. Increasing Public Participation in Municipal Solid Waste Reduction. *Geographical Bulletin*, 52(2), pp. 105 -118.
- Paper Cutz 4 Planet Ark, 2009. *The Environmental Impact of Paper Production*. [Online] Available at: <http://papercutz.planetark.org>[Accessed 05 April 2013].

paperonline, 2013. *Myths & Realities*. [Online] Available at: <http://www.paperonline.org>[Accessed 09 August 2013].

PRASA, 2013. *Paper Recycling in South Africa*. [Online] Available at: www.prasa.co.za[Accessed 22 May 2013].

Questionpro, 2013. *Questionpro: How its works*. [Online] Available at: <http://www.questionpro.com/home/howItWorks.html> [Accessed 23 October 2013].

Rushton, M., 2009. Sustainability: Getting the message over. *Pulp & paper International (PPI)*, 51(4), pp. 17-19.

Sappi Limited, 2012. *Sappi Group Sustainability Group*, s.l.: s.n.

Schneider, R. O., 2011. Climate change: An emergency management perspective. *Disaster prevention and Mngement*, 20(1), pp. 53-62.

Shah, A., 2012. *Climate Chane and Global Warming Introduction*. [Online] Available at: <http://globalissues.org>[Accessed 22 April 2013].

Shah, A., 2012. *COP17 - Durban Climate Conference*. [Online] Available at: <http://www.globalissues.org>[Accessed 21 June 2013].

Strategic Direction, 2008. Corporate Sustainability:How stakeholder management in engendering envoronmental consciousness.. *Strategic Direction*, 24(6), pp. 22-24.

The South African Forestry Industry, 2012. *Sabie Forestry*. [Online] Available at: www.sabie.co.za[Accessed 25 January 2013].

The World Business Council for Sustainable Development's (WBCSD), 2012. *The Sustainable forest Products Industry, Carbon and Climate Change*, s.l.: s.n.

Twosides, 2011. *Twosides:Paper is bad for the Environment*. [Online] Available at: <http://www.twosides.info>[Accessed 11 September 2013].

Tyskeng, S. & Finnveden, G., 2010. Comparing energy use and environmental impacts of recycling and waste incineration. *Journal of Environmental Engineering*, 136(8), pp. 744 - 748.

Wenxin Shi, S. W. Q. Y., 2010. Climate change and Global warming. *Reviews in Environmental Science and Bio/Technology*, 9(2), pp. 99-102.

World Business council for sustainable development & World resource institute, 2007. *Sustainable Procurement of Wood and Paper-based Products*. [Online] Available at: www.sustainableprocurement.net[Accessed 29 January 2013].

York, R., 2006. Ecological Paradoxes: William Stanley Jevons and the Paperless office. *Human Ecology Review*, 13(2), pp. 143-147.

ZDNet, 2010. *Which is geener: Paper or digital? The answer may surprise you.*
[Online] Available at: <http://www.zdnet.com>[Accessed 09 February 2013].

Annexure 1 - Questionnaire

Introduction

Hello: I, Kugen Moodley, a MBA student, at the Graduate School of Business and Leadership, of the University of KwaZulu Natal invite you to participate in a research project entitled “Perceptions on the Environmental Responsibility of South African Paper producers. The survey should not take you more than 10 minutes to complete. Through your participation I hope to understand if Business executives, in KZN have a positive or negative perception of the environmental responsibility of the paper industry in South Africa. Your participation in this project is voluntary. You may refuse to participate or withdraw from the project at any time with no negative consequence. There will be no monetary gain from participating in this survey/focus group. Confidentiality and anonymity of records identifying you as a participant will be maintained by the Graduate School of Business and Leadership, UKZN. If you have any questions or concerns about completing the questionnaire or about participating in this study, you may contact me via email at kugmoodley@gmail.com . I hope you will take the time to complete this survey. Regards

Gender?

1. Male
2. Female

Race

1. Black
2. Indian
3. White
4. Coloured
5. Other

Level of employment

- 1. Senior management
- 2. Middle management
- 3. Lower management

Are you employed in a paper related industry?

- 1. Yes
- 2. No

Do you consider yourself to be environmentally conscientious?

- 1. Yes
- 2. No

How would you rate your knowledge of the paper manufacturing industry?

| | 1 | 2 | 3 | 4 | 5 |
|--|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|
| | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

How would you rate the importance of paper?

| | 1 | 2 | 3 | 4 | 5 |
|--|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|
| | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

Do you believe that a complete paperless environment is possible?

- 1. Yes
- 2. No

Is your office embarking on a greening project?

- 1. Yes
- 2. No

Does the strategy include a paperless office?

- 1. Yes
- 2. No

Do you consider digital technology to be more environmentally friendly than paper?

- 1. Yes
- 2. No

How do you rate your knowledge of Forestry management in South Africa?

| | 1 | 2 | 3 | 4 | 5 |
|--|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|
| | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

Are you aware that Forestry in South Africa is a regulated industry?

- 1. Yes
- 2. No

Deforestation is a serious concern in South Africa

| | Strongly Disagree | Disagree | Neutral | Agree | Strongly Agree |
|--|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|
| | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

The paper manufacturing industry in South Africa is a sustainable industry

| | Strongly Disagree | Disagree | Neutral | Agree | Strongly Agree |
|--|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|
| | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

The paper manufacturing industry, in South Africa, does impact negatively on the environment.

| | Strongly Disagree | Disagree | Neutral | Agree | Strongly Agree |
|--|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|
| | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

The paper manufacturing industry, in South Africa, is more environmentally unfriendly than other manufacturing industries.

| | Strongly Disagree | Disagree | Neutral | Agree | Strongly Agree |
|--|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|
| | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

The paper manufacturing industry, in South Africa, is a major contributor to climate change.

| | Strongly Disagree | Disagree | Neutral | Agree | Strongly Agree |
|--|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|
| | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

The paper manufacturing industry, in South Africa, is a major contributor to deforestation.

| | Strongly Disagree | Disagree | Neutral | Agree | Strongly Agree |
|--|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|
| | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

Paper recycling is necessary to reduce the volume of trees that are required to produce paper.

| | Strongly Disagree | Disagree | Neutral | Agree | Strongly Agree |
|--|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|
| | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

Are you familiar with the paper recycling initiatives in South Africa?

1. Yes
2. No

Paper recycling, in South Africa, is an effective initiative.

| | Strongly Disagree | Disagree | Neutral | Agree | Strongly Agree |
|--|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|
| | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

We do enough as a community with regards to paper recycling.

1. Yes
2. No

My organisation is active in paper recycling?

- 1. Yes
- 2. No

I am active in paper recycling on a personal level?

- 1. Yes
- 2. No

I pass on my knowledge of the importance of paper recycling

- 1. Yes
- 2. No

Are you familiar with all of the South African paper producers?

- 1. Yes
- 2. No
- 3. Unsure

The paper industry, in South Africa, is working towards reducing its impact on the environment.

| | Strongly Disagree | Disagree | Neutral | Agree | Strongly Agree |
|--|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|
| | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

In your opinion, does government do enough to regulate the actions of industry?

1. Yes
2. No

Do you believe that the paper industry needs to be more vocal on their environmental activities?

1. Yes
2. No

Which of the following methods do you believe will be the most effective in reaching the public? You may choose any number of options.

1. Advertising in community newspapers.
2. Website
3. Printing on packaging
4. Billboards
5. Leaflets
6. Social network
7. Other

End of Survey. Thank you for your participation.

1. MBA Dissertation Questionnaire - 2013

Annexure Two - Ethical clearance



23 October 2013

Mr Kugendran Moodley (9042465)
Graduate School of Business & Leadership
Westville Campus

Protocol reference number: HSS/1266/013M
Project title: Perceptions on the Environmental Responsibility of South African paper producers

Dear Mr Moodley:

Expedited Approval

I wish to inform you that your application has been granted Full Approval.

Any alteration/s to the approved research protocol i.e. Questionnaire/Interview Schedule, Informed Consent Form, Title of the Project, Location of the Study, Research Approach and Methods must be reviewed and approved through the amendment/modification prior to its implementation. In case you have further queries, please quote the above reference number. Please note: Research data should be securely stored in the discipline/department for a period of 5 years.

I take this opportunity of wishing you everything of the best with your study.

Yours faithfully


Dr. Sheruka Singh (Acting Chair)
/ms

cc Supervisor: Steven Msoni
cc Academic Leader Research: Dr E Mungoma
cc School Administrator: Ms Wendy Clarke

Humanities & Social Sciences Research Ethics Committee

Dr Sheruka Singh (Acting Chair)

Westville Campus, Gwasa Mbeki Building

Postal Address: Private Bag 254001, Durban 4001

Telephone: +27 (0) 31 260 988/2950/4557 Facsimile: +27 (0) 31 260 4600 Email: shs@ukzn.ac.za / shs@ukzn.ac.za / shs@ukzn.ac.za / shs@ukzn.ac.za

Website: www.ukzn.ac.za

1910 - 2011
INSTITUTION OF ACADEMIC EXCELLENCE

[Working Calendar](#) [Expedited](#) [Lower College](#) [Medical School](#) [Partnership](#) [Website](#)

Annexure Three - Turnitin Report – Originality Report & Similarity Index

Turnitin Originality Report

MBA Dissertation 2013 - Final by Kugendran Moodley

From Final draft (Dissertation 2013)

- Processed on 25-Nov-2013 4:59 PM CAT
- ID: 377149595
- Word Count: 18260

Similarity Index

7%

Similarity by Source

Internet Sources:

1%

Publications:

0%

Student Papers:

6%

SOURCES:

1

5% match (student papers from 12-Dec-2011)

[Submitted to University of KwaZulu-Natal on 2011-12-12](#)

2

1% match (Internet from 11-Mar-2011)

<http://www.slideshare.net/mehtabmr/lecture-07-2498485>

3

1% match (student papers from 02-Oct-2012)

Class: MBA2

Assignment:

Paper ID: [272225083](#)

4

1% match (Internet from 11-Jan-2008)

http://www.coe.montana.edu/wti/wti/pdf/4264542\CMS_final.pdf