AN ASSESSMENT OF ENVIRONMENTAL COSTS ON FINANCIAL PERFORMANCE: A CASE STUDY OF TWO PLASTIC MANUFACTURING COMPANIES IN SOUTH AFRICA

Submitted in fulfilment of the requirements of the Master of Accounting in the

Department of Financial Accounting

In the Faculty of Accounting and Informatics,

At the Durban University of Technology

by

Kansilembo Freddy Aliamutu

21959563

April, 2022

DECLARATION

I, Kansilembo Freddy Aliamutu declare that this dissertation is a representation of my own work both in conception and execution. This work has not been submitted in any form at another university or higher institution of higher learning. All information cited from published or unpublished works have been acknowledged.

6/04/2022

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KF. Aliamutu Date

Submission approved for examination

5/04/2022

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Supervisor Date

Dr. Anrusha Bhana

ACKNOWLEDGEMENTS

I would like to take this opportunity to express my sincerest gratitude and appreciation to the following people, without whom the completion of this research study would not have been possible:

Firstly, I am indebted to God for granting me the ability and strength to accomplish my goals and endeavours.

I would also like to thank:

I. My supervisor, Dr Anrusha Bhana, for her invaluable advice, assistance, guidance, constructive criticism and overall preparation of this project;

II. I would like to express the greatest appreciation to my parents who raised me under trying circumstances, who taught me values and lessons, “you never quit until you achieve what you set out to,” as support, encouragement and for motivating me to persist during difficult times; and

III. Therance Emily Mbiola, David Kansilembo and Nathan Kansilembo, for their patience, understanding and support for the duration of this study

ABSTRACT

Environmental sustainability has become a somewhat, “trendy” expression for the corporate, public, private and government sectors. Different theoretical reviews and empirical research investigations have, in previous years, examined the relationship between environmental responsibility and financial performance, proving that further research is required. Subsequently, having better than average environmental costs and including financial performance is important for organisations to make sustainable progress in the long-term. Environmental cost activity is a high cost which usually affects a company's net profit. The study investigated two national plastic manufacturing companies in South Africa. The research objectives are *to examine the relationship between environmental costs and financial performance, and to examine the effect of environmental costs on investors or stakeholders’ interest in the organisations.* The research aims are to investigate the assessment of the environmental cost of plastic on financial performance at the two national plastics manufacturing companies in South Africa.

The study utilised Stakeholder theory, which sees companies as a major aspect of a social system, while concentrating on different stakeholder groups in society. Additionally, the study focused on the two companies using their financial statements in the period between 2016 and 2019. Further statements were unavailable. The research used interpretative analysis because it includes precision and clearer comprehension of qualitative data. The unit of analysis are organisations of two plastic companies, the chosen criteria because they have an environmental cost, and their data is available on the public domain. A case study approach was utilised to get a more profound and extensive comprehension of the phenomena. The study found that an increase in environmental costs may influence financial performance and environmental costs. In addition, it contributed to research relating to the impact of plastic manufacturing

companies' environmental costs in South Africa. The study concluded that environmental costs have a positive and important effect on financial performance. The study recommends that the two companies should continue placing resources into environmental cost funds as much as practicable due to result in growth in financial performance.

KEYWORDS:

Plastics, environmental costs, and financial performance.

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ABBREVIATIONS

BEE - Black Economic Empowerment

DANCED - Danish Cooperation for Environment and Development

DANIDA - Danish International Development Agency

DEAT – Department of Environmental Affairs and Tourism

EPR - Extended Producer Responsibility

ESG - Environmental social governmental

JSE - Johannesburg Stock Exchange

NWMS - National Waste Management System

NPSWM - National Pricing Strategy for Waste Management

NEMI - National Environmental Management Initiatives

PE-LD - Low-density Polyethylene

PGRC - Packaging Recycling Company

IREC - Institutional Research Ethics Committee

IWMP - Industry Waste Management Plan

IREC - Institutional Research Ethics Committee

ISO - International Organization of Standardization

UNGC - United Nations Global Compact

SDG - Sustainable Development Goals

OLS - Ordinary Least Square

IREC - Institutional Research Ethics Committee

CHAPTER ONE

Introduction and overview

1.1 Introduction

This chapter introduces the field of the study under investigation. The research topic investigates the assessment of environmental costs on financial performance at two national plastic manufacturing companies in South Africa. Thereafter, the discussion of the financial performance, the establishment of the research problem and the purpose of the research is provided. The research questions are also stated. The aim and objectives are described, in conjunction with an overview of the research methodology. The chapter concludes with the limitations of the study, followed by a brief description of the structure and the content of the chapters to follow. The following section describes the field of the study**.**

1.2 Field of the study

Environmental sustainability has attracted considerable attention globally as the world population has been destroying available planetary resources. Thus, there is a need to examine sustainability and the assurance of existing sectors that require organisations to develop improved approaches to working together, as far as sustainability is concerned. The expansion in global environmental awareness and the fight for sustainable economic improvement is acknowledged by business organisations as imperative for environmental conservatism (Feng *et al.,* 2016). The requirements for success and the open window for development are key attributes to re-assembling a sustainable corporate environment. These movements are imperative for sustainable subsistence. Rokhmawati, Sathye and Sathye (2015) claimed that environmental sustainability will create basic structural obstructions to how the organisation flourishes.

Thus, the backdrop to the assessment of environmental costs on financial performance at the plastic manufacturing companies was initiated. The degree to which environmental costs impact the financial performance of an industry is determined by factors such as environment taxes, levies and fines (Carroll, 2015: 25-30). The concept of environmental cost is viewed as having raised the environmental perspective about overseeing physical assets with goals that are moderated to come (Watson *et al.,* 2004). Consequently, the environmental cost is about the financial performance exhibition of the company itself. However, national plastic manufacturing companies in South Africa responded to an awareness throughout the years when they perceived their commitments to their partners and society since environmental cost improved their reputations.

1.3 Scope of the study

The study focused on the two national plastic manufacturing companies in South Africa. They were chosen because they were most likely to have an amount of capitalisation with existing environmental costs. Plastic bags are utilised widely to transport merchandise until it is disposed of. The waste or plastics are placed/ put into plastic bag collection bins for recycling. Furthermore, because of their practicality, strength, and low cost, plastic shopping bags have swiftly grown popular with consumers worldwide in recent times. This scoping research attempts to illustrate the presence, levels, and potential ramifications of plastic penalties on financial performance to make recommendations on potential problem areas and research gaps and outlines future needs for South Africa.

Table 1.1: Two national plastic manufacturing companies' employee numbers in South Africa

YEAR	BML (A)	Nampak Ltd (B)
2016	510	6 678
2017	866	6 420
2018	846	5 641
2019	859	6 678
Total	3 081	25 417

Source*: Companies' financial data reports (2019)*

The two companies which are used in this current study are briefly described below.

1.3.1 Bowler Metcalf Limited (BML) (A)

Bowler Metcalf Limited is the national plastic packaging producer in South Africa. The company delivers customised packaging items with a product portfolio, including product offerings such as laminated tubes, plastic bottles, jars, and closures. Moreover, it offers secondary packaging services such as silk-screening, printing, foiling, labelling and other decorative. Bowler Metcalf Ltd has 859 employees across South Africa. The company's operations have been divided into Plastic Packaging and Quality Beverages. This study's focus is on plastic packaging.

1.3.2 Nampak Limited (B)

Nampak Limited's Sustainability Report (2019:5) highlighted that Nampak had been part of the Johannesburg Stock Exchange (JSE) since 1969. The firm is a majority holding corporation based in South Africa. Nampak is Africa's leading diversified packaging company in metal, plastic, paper, and glass items. Nampak also provides a wide range of

packaging requirements. Nampak employs 6 678 permanent staff (Table 1.1), with most of its operations in South Africa. Thus, South Africa is the headquarters for all Nampak operations. Nampak has a strong position in other plastic packaging companies in South Africa and elsewhere on the continent (Eccles, Krzus and Solano, 2019).

1.4 Financial performance

Chang (2015) states that the financial performance of manufacturing companies is of crucial significance for financial partners and the economy overall. The revenue, and net profit are all quite important, and a successful company can provide high and long-term funds to its stakeholders. In the study, the revenues (sales) on the plastic products of Bowler Metcalf Ltd and Nampak between 2016 and 2019 have a significant effect on a company's financial performance, as compared to its environmental costs. The environmental costs faced by the two plastic manufacturing companies are government levies, taxation and charges based on environmental issues (prevention and environmental management (Oelofse *et al.,* 2010).

Bowler Metcalf Ltd incorporates the supply chain of its clients, offering quality support and products at a cost that will help them to prosper. However, company sustainability is dependent on environmentally responsible practices through an incorporated system of waste reduction, recycling and innovative technologies. Hence, emphasis is placed on sustainability through the company's activities, time and assets *(*Chae *et al.,* 2018).

The financial performance of Bowler Metcalf Ltd and Nampak will promote employee revenue, supply superior-quality products to clients, and create a better environment for cooperative production units. Thus, sales of plastics will mean progressive future investments that will produce work openings and upgrade the revenue of individuals. Bhailall (2016) mentioned that net profit was the high or low performance of the company which was reflected in the large or small profits that can be obtained by companies in a

period. Bowler Metcalf Ltd and Nampak increase in net profit causes both manufacturing companies to produce high performance, even if they spent less funds on plastic penalties (taxes). Financial performance is an essential objective. Without financial performance, the business would not survive in the long run.

1.5 Rationale for the study

Since its business development in the 1950s, plastic has been a real performance for global production and is developing exponentially (Egbunike and Okoro, 2018). Haward (2018a) mentioned that plastic's success originates from its quality. Thus, in August 2003, the South African government implemented an approach to fight the pollution issue, common in many large metro areas and also highlighted the decrease in plastic bag litter (Dikgang *et al.,* 2012). In addition, because plastic bags are so small and frail, cashiers freely use them, often double packing and putting only a few items in each pack. In an attempt to limit public interest in plastic bags, the legislation combined regulations and cost-based economic instruments.

The plastic bags sold levy (plastic penalties) increased by R 9 million to R 242 million for the year, according to SARS tax figures (2017-2018). Ultimately, the advantage is the driving force behind any investment in diversity initiatives. Despite improved revenue collection, the actual plastic bag levy increased from 8 cents per bag in 2016/17 to 12 cents per bag in 2017/18. Furthermore, more than 2 billion plastic bags were sold in the previous financial year, down from 2.9 billion in 2016/2017 (Friedrich and Trois, 2013). Bowler Metcalf Ltd and Nampak were selling more plastic products in 2016 (Nampak) and 2017 (Bowler Metcalf Ltd), which made manufacturing companies contribute to more pollution (Rose, 2013). The rationale for this study commencing in 2016 is that this was the year that plastic manufacturing companies faced increased problems.

1.6 Significance of the study

The study is of critical significance in guaranteeing the plastic sector. More and more companies are interested in social equity and helping the country meet sustainable development (Sueyoshi, Yuan and Goto, 2017). The primary purpose of firms operating in industrialised economies, is to achieve a satisfactory return over the level of risk accepted by stakeholders (Feng *et al.,* 2016). Plastic bags effectively exhibit how environmental costs affect and engage with the communities *(Rose, 2013)*. In 2016, Statistics South Africa claimed that 12% of metropolitan family units self-announced that citizens re-used plastic, trailed by 10,8% of families across urban areas and 3% of family units in rustic domains who recycled (Moore, 2011). Of the households, plastic re-use was more common on farms than within families in provincial areas. In recent years, the spotlight has been placed on plastic, biodegradable recycling endeavours as a method for diminishing the harmful effects of waste on the environment (Nagabooshnam, 2011: 35-39). Bowler Metcalf Ltd and Nampak used environmental costs and redirected waste from landfills to re-using, which empowers these two plastic manufacturing companies to make an environmental profit and impact their financial performance *(Rose, 2013)*.

The National Waste Management System (NWMS) took the lead and set goals for all metropolitan municipalities, secondary cities, villages, and large towns to have started source programs by 2016 and to own 25% of wastelands for re-use and recovery by that year (Moore, 2011). According to the NWMS, 80 percent of towns should have implemented local programmes by 2016. Furthermore, because of the nature of their operations, plastic manufacturing enterprises are a substantial source of pollution in the environment (Doorasamy, 2015:2-5). National companies and governments are slow in authorising rules, hence companies engage in environmentally harmful practices (Sueyoshi, Yuan and Goto, 2017).

1.7 Research problem

Bowler Metcalf Ltd and Nampak are struggling to keep up with ever-increasing environmental requirements. In the environment, the major challenge faced by two plastic manufacturing companies is the management of productivity to increase profits while minimising environmental pollution. According to Nizam *et al*. (2019), environmental cost activity is a high cost that affects a company's financial performance. However, the environmental costs of the two national plastic manufacturing companies do not benefit individuals and the environment. According to Aggarwal (2013: 3-8), environmental costs provide a structure associated with financial performance.

South Africa and its vast metropolitan municipalities are facing challenges as an expanding number of individuals start to live in urban areas, placing a strain on foundation and administrative conveyances as far as solid waste management is concerned (Mackintosch, 2014). Plastic litter was initially identified as an issue by the Department of Environmental Affairs and Tourism (DEAT) in early 2000, due to its high visibility and the fact that, unlike other types of waste, there lacked an allocation dedicated to its transportation and recycling at the time (Aggarwal, 2013). To minimise the legislation's adverse socioeconomic effects, regulations to reduce, reuse, and recycle plastic bags were designed through a public-participation process comprising government, labour, and business leaders (Jackson, Boswell and Davis, 2011: 8).

Furthermore, a standards-based strategy resulted in static inefficiency because each company incurs a distinct cost in reacting to new rules. The amount of plastic used will increase, if the rate of rising plastic thickness outpaces the rate of decrease in bag use (Jambeck *et al*., 2015). According to all merchants, plastic bag sales have gradually increased after the second price increase in August 2003 (Naidoo, Glassom and Smit, 2015). The new regulations increased the cost of plastic bags, but the bags were already reusable, and customers used fewer bags because they were more grounded. One of the arguments against the regulation, according to Eriksen et al. (2014: 6), was that it would be a regressive tax (plastic penalties). While the regulation had a major short-term

assessment on the use of plastic bags, the longer-term trend has seen bag consumption nearly recover to pre-regulation levels (Chang, 2015: 15). Various elements, such as waste management expenditure, environmental taxes and government levies, determine how environmental costs affect an industry's financial performance (Carroll, 2015: 25-35). Bowler Metcalf Ltd and Nampak reacted to environmental costs throughout the years when they perceived their commitments to the national plastic manufacturing companies' partners and society since environmental cost improves their reputations (Henri, Boiral and Roy, 2016).

Plastic manufacturing companies should change their material to single-use plastics manufactured in the plant, decrease the amount of plastic that companies are placing into the supply chain and discover alternative approaches to package and carry their products (Jambeck *et al.,* 2015). The initiative presented by the PET Recycling Company (PETCO) portrayed how the presentation of Extended Producer Responsibility (EPR) can help to create local (a mobile kiosk where people can take their polyethene plastic for compacting and reusing) markets (Godfrey and Oelofse, 2017: 20-24). Moreover, the ideal approach to limit plastic pollution is to improve re-using processes, collection rates, and better methods for re-using can be researched by these two plastic manufacturing companies.

Bowler Metcalf Ltd and Nampak can decrease plastic waste entering the environment, thus minimising pollution. To guarantee their future sustainability, laws and regulations will probably be updated because of an expansion in environmental concerns (Godfrey and Oelofse, 2017). Since environmental protection has become a worldwide issue, Haward (2018b: 15-17) states that plastic manufacturing companies need to produce biodegradable products that can be re-used. In light of this research and from a financial approach, there is minimal previous research that has explored the assessment of environmental costs on financial performance within the South African plastic manufacturing companies.

1.8 Aim of the study

This study aims to investigate the assessment of environmental costs on financial performance at the two national plastics manufacturing companies in South Africa.

Within the scope of this study, the following research questions are attempted:

1.9 Research questions

The following research questions were set to achieve the aim of the study.

I. Is there a relationship between environmental costs and financial performance?

II. How do environmental costs effect investors' or stakeholders' interest in organisations?

1.10 Research objectives:

The objectives of the study are:

I. To examine the relationship between environmental costs and financial performance;
II. To examine the effect of environmental costs on investors' or stakeholders' interest in the organizations.

1.11 Definition and terminology

In this study, the following two definitions are important:

1.11.1 Environmental costs

Ifurueze *et al.* (2013) defined *environmental costs* as environmental measures, environmental losses, including cleanup costs, re-using materials, preserving energy, capital utilisation and development expenditure. Pain *et al.* (2019) highlighted that those environmental costs are incurred due to the actual or potential degradation of the

environment because of manufacturing companies' activities. Moreover, Chen *et al.* (2014) contend that environmental cost is the total cost of all estimates essential to re-establish the environment to its condition before the harmful incident. The environmental cost could be identified with an item's natural effects or a manufacturing procedure.

1.11.2 Financial performance

Financial performance is defined by Mackintosch (2014) as usually assessed through measures like income, benefits, and costs. Tunggal *et al.* (2014) highlighted that financial performance is an emotional proportion of how an organization utilizes its essential advantages to produce income. Gok *et al.* (2019) defined financial performance as the degree of performance of a business over a specified period, communicated regarding general benefits and misfortunes during that time. The term can likewise be implied as an overall proportion of an organisation's financial health over some time (Murerwa, 2015).

1.12 The theoretical framework of the study

The study utilised the *Stakeholder Theory* to assess the relationship of environmental costs to financial performance at the two national plastic manufacturing companies. Hence, with the extra dimension of effect and developing stakeholders, in progressively requiring a system that can speak to the idea of financial performance in three dimensions, it has a link with the Stakeholder Theory that sees companies as a major aspect of a social system while concentrating on the different stakeholder groups within society. As Gray (2006) indicated, Stakeholder Theory deals with these connections in light of various factors: the nature of the undertaking's condition, the remarkable quality of stakeholder groups, and the estimations of decisions that decide the stakeholder positioning procedure.

1.13 Study’s limitations

There are no recognised or consistent indicators for measuring environmental costs or financial performance, which is one limitation of study on the relationship between environmental costs and the financial performance of the two plastic manufacturing companies. In addition, these two national plastic manufacturing companies are listed on the Johannesburg Stock Exchange, which allows access to their financial reports. The analysis is limited to two national plastic manufacturing companies and their claimed environmental cost initiatives.

1.14 Research methodology

1.14.1 Introduction

The following section offers an overview of the most critical aspects of the current study's research methodology. Stead (2001) highlighted that researchers' scientific approaches should be unbiased, devoid of factors such as authority, traditional views, and personal preferences. The study used the interpretivism paradigm. The interpretivism paradigm is the understanding of individuals which relies on the interaction between the company’s participants in observation. It entails collecting the most relevant methodologies and approaches to answer the research question, as the research question drives the research.

1.14.2 Research design

Stead (2001) stated that the research design for a complete research project including research method, data collection techniques and data analysis which can be influenced by both technical and contextual factors. The unit of analysis are organisations of two

plastic companies; they were chosen because they meet the criteria of having an environmental cost, and their data is available in the public domain.

1.13.3 Population

The study's population comprises companies in the same industry: plastic manufacturing companies (Herak, Herak and Trifunac, 2011). The two national plastic manufacturing companies recorded in the study were chosen due to them being the main plastic manufacturing companies currently participating in environmental costs and have a national scope of operations.

1.14.4 Rigor and relevance

The study's analysis incorporated pertinent information from various sources, such as documents, and financial statements. This is an essential strategy for ensuring the research's dependability (Creswell *et al.,* 2016). Relevance is defined as getting a better understanding through the experiment. Rigor is a method of establishing trust or confidence in a research study's findings. The fact that a strict focus was maintained throughout the study demonstrates the legitimacy of this research endeavour. Herak *et al.,* (2011) stated that relevance must be established for both objective and subjective investigations. The method approach used for this research demonstrates the rigor of this research (Picardi *et al.,* 2013). Since any development in research might be questioned, based on under-representing or being debased by different elements. Creswell *et al.,* (2008) advised, moving beyond the method strategy by applying a generalisability theory-based variance partitioning technique.

1.14.5 Data collection technique

The data collected in this study is through the compilation of secondary sources. Three sorts of data sets were downloads from the annual reports of the two plastic manufacturing companies which are in the public domain. The first set of data was the statement of comprehensive income, the second was the statement of financial position, and the third data set was the sustainability reports for the companies' environmental costs. The secondary data for this research study came from these data sets.

1.14.6 Data analysis

Data analysis refers to an environmental cost and financial performance analysis in the present study. Content analysis used qualitative information, which was the concentration in this study. Moreover, the content analysis for the two national plastic manufacturing companies has underlined two characteristics: objectivity and being methodical (Downe and Wamboldt, 1992). One of the many research approaches used to analyse content information is qualitative. Content data can be derived from annual reports or print material such as articles, books, or manuals and kept in an electronic version (Picardi *et al.,* 2013). Qualitative content analysis moves beyond word-checking to a more in-depth study of language to classify a large amount of information into a reasonable number of classifications, indicating comparative implications (Stemler, 2000).

1.14.7 Ethical considerations

The secondary data for the study was downloaded from the two plastic manufacturing companies' annual reports which are in the public domain. The names of companies and the results from the data analysis are disclosed in Chapter 4. This study does not involve data collection and analysis from humans. For this reason, the Institutional Research Ethics Committee (IREC) required no ethical clearance to be obtained for the study.

1.15 Outline of study

Chapter One: INTRODUCTION

Chapter One introduced the study and reviewed the research area confined to two national plastic manufacturing companies in South Africa. Thereafter, an outline of the rationale, the significance of the study, research problem, research aim and objectives including the research questions was presented.

Chapter Two: LITERATURE REVIEW

The second chapter provides the literature review of other researchers' studies and their contributions to plastics. Moreover, it provides a detailed discussion on plastics. Furthermore, the chapter outlined the importance of environmental cost and financial performance.

Chapter Three: RESEARCH DESIGN

Chapter Three describes the methods and tools used to achieve the results of this study. It additionally describes the study's target population and sample size. The chapter includes the research instrument that will be utilised to collect data on environmental costs to be analysed in the following chapter.

Chapter Four: PRESENTATION OF RESULTS AND DISCUSSION

The fourth chapter discusses the interpretative analysis of the collected data. Thereafter, the chapter presents the interpretative analysis and findings on the variables of the study.

Chapter Five: CONCLUSION AND RECOMMENDATIONS

The fifth chapter concludes the study, while recommendations are also made, based on the findings. The conclusion outlines the extent to which the research aims, objectives, and questions have been addressed. In addition, the chapter concludes with the limitations and the conceptual framework for the research.

1.14 Conclusion

The purpose of the research topic was covered in this chapter. The field of the study, the scope of the study and the discussion of financial performance were explained, followed by the research problem and the motivation behind the research. The aim and objectives were expressed, the research methodology was clarified, and the limitations were discussed and featured. The chapter ends with a conclusion of the structure and a description of the following chapters. The following chapter then provides the review of the literature.

CHAPTER TWO

Literature review

2.1 Introduction

Chapter 1 presented the introductory aspects for the current study under investigation. Chapter 2 focuses on presenting empirical findings for each of the research themes. The literature review starts by presenting empirical findings relating to the components of environmental costs. In particular, the review relates to the assessment of environmental costs on financial performance. More specifically, plastic and the environmental costs, global plastic pollution, ordinary uses of plastic, and waste management evolution. Thereafter, the review progressively narrows in scope to the emergence of recycling in Bowler Metcalf Limited, and Nampak Limited. This is done by reviewing evidence, which relates to environmental costs and Investment (Stakeholders' interest). The latter part of the review concludes with presenting previous empirical findings relating to environmental cost on financial performance. The following section explains the use of Stakeholder theory as the theoretical framework for the current study.

2.2 The theoretical framework of the study

The study utilised the Stakeholder Theory to assess the relationship of environmental costs to financial performance at two national plastic manufacturing companies. Hence, Stakeholder Theory that sees companies as a major aspect of a social system while concentrating on the different stakeholder groups within society. Stakeholder Theory looks at capitalism that emphasises the linked interactions that exist between a company its stakeholders and communities. As Gray (2006) indicated, Stakeholder Theory deals with these connections in light of various factors: the nature of the undertaking's condition, the remarkable quality of stakeholder groups, and the estimations of decisions that decide the stakeholder's positioning procedure. The Stakeholder Theory expresses those stakeholders are: "those whose relations to the undertaking cannot be contracted for; yet

upon whose collaboration and imagination it depends for its survival and thriving" (Stemler, 2000). Stakeholder Theory clarifies explicit corporate activities and exercises a stakeholder-agency approach which focuses on how associations with stakeholders are overseen by companies as far as the affirmation of their host societies is concerned (Filbeck *et al.,* 2004).

2.2.1 The assessment of environmental costs on financial performance

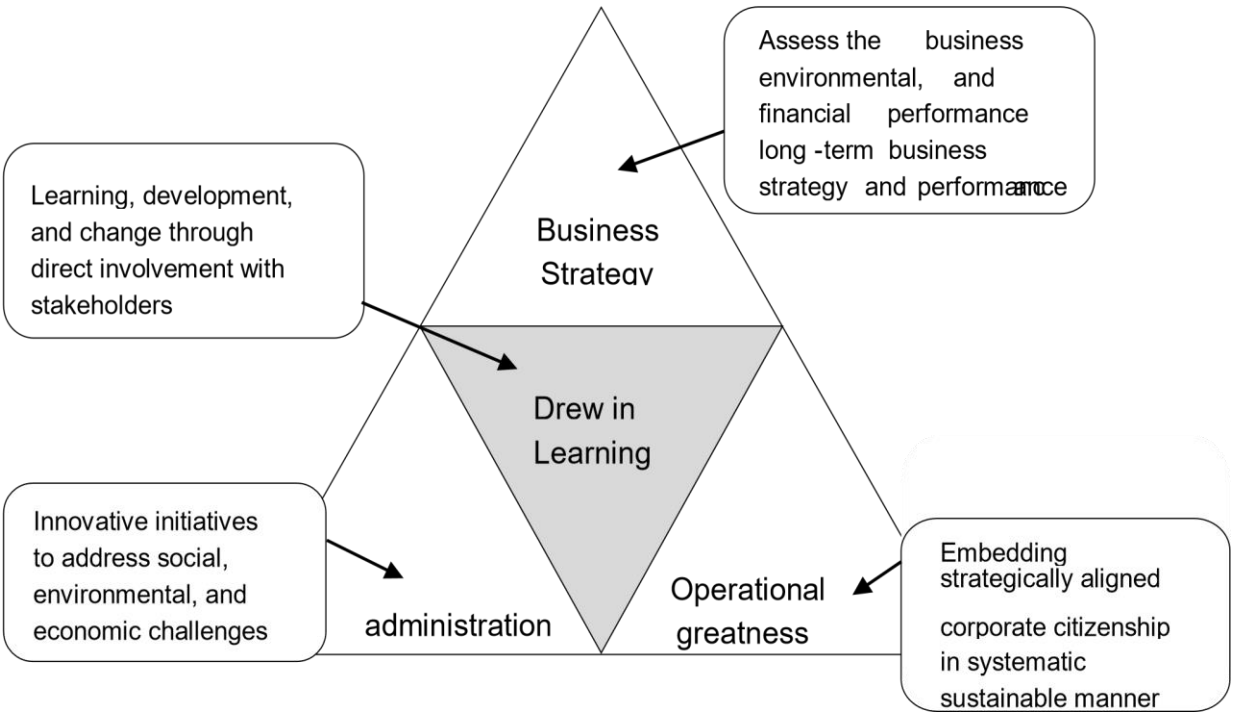


Figure 2.1: Stakeholder theory adapted

Source: Mirvis and Googins (2018)

Figure 2.1 shows *that stakeholder theory* involves four areas: In the first area, called "business strategy*,"* organisations assess their business needs, their environmental cost and considers the arrangement of their business strategy with financial performance (Moskowitz, 1972). The second area named "drew in learning," manages how organisations communicate with their managers to characterise their approach to environmental costs through meeting (Aggarwal, 2013). The third area is "administration,"

the dedication of the enterprise to take authority on environmental costs of plastic pollution issues that are imperative with an assessment on financial performance (Stemler, 2000). Operational greatness's fourth area manages how organisations install corporate citizenship through the coordination of procedures, practices, approaches, and connections amongst the organizations and their various partners (Johnson, 2004: 35-39). The organisation will guarantee arrangements between the business strategy and how that will prompt the accomplishment of the ideal company objective (Filbeck *et al.,* 2004).

Stakeholders in the two plastic companies are the suppliers, creditors, waste generators and recyclers, recognising the business strategy from organisations, to assess the two plastic companies on financial performance. Furthermore, these stakeholders communicate with their managers to characterise their approach to environmental costs through meetings. In administration, the managers of the two plastic companies are authorities on environmental costs of plastic penalties issues that are imperative with an assessment on financial performance. Lastly, operational greatness managers install the coordination of procedures, practices, approaches, and connections amongst the organisations. Stakeholder theory stipulates company's responsibilities to all their stakeholders - such as responsibility with financial performance, and responsibility of drew in learning.

2.3 Explanation of key concepts

2.3.1 Definitions of plastics

Plastic is a synthetically created substance made from oil that is used to make a variety of products. It is low in weight and does not decompose properly (Browne *et al.,* 2008). Jones (1989: 66) defined plastics as man-made polymers delivered from synthetic resins formed during fabricating and can go through various plastic states during preparation. Aggarwal (2013) defined plastic as a single word for a multifaceted reality, enveloping a wide diversity of polymers and added substances with various chemical and physical properties.

Plastics include single-use plastic, food wraps and plastic jugs, floats and engineered filaments utilised in the attire or fishing companies. Moore (2011) warns that plastic materials are likely a greater problem as the population increases. Humanity needs to manage its resources as the reutilisation of raw materials is transforming into a critical activity. However, plastic bags are used widely to transport merchandise until disposed of in the dumpster, the trash or, if plastics are placed or put into plastic bag collection bins, for recycling (Filbeck and Gorman 2004). Hasson, Leiman and Visser (2007: 10-16) highlighted that plastic shopping bags could be re-used to line waste bins, but these bags still end up at landfill sites.

Plastic has been the topic of a growing number of articles in the media, especially about the measure of plastic waste. Thus, Zarenda (2013) highlighted that plastic re-use can be an environmental cost reducer with the correct approach. Plastic material is an excellent utility for packaging, therapeutic applications, and a wide variety of applications (applications in medicinal, electronic and logical gear, creation of vehicle parts, toys, gadgets, and so on) (Browne *et al.,* 2008). Plastics have tremendous benefits and can be used to protect a variety of products against decomposition. Likewise, the packaging is utilised as promotion and item-acknowledgement instruments (Da Fonseca, 2015). Different advantages include plastics being lightweight and subsequently decreasing vehicle costs.

2.3.2 Plastic production

The following diagram shows how plastic is produced.

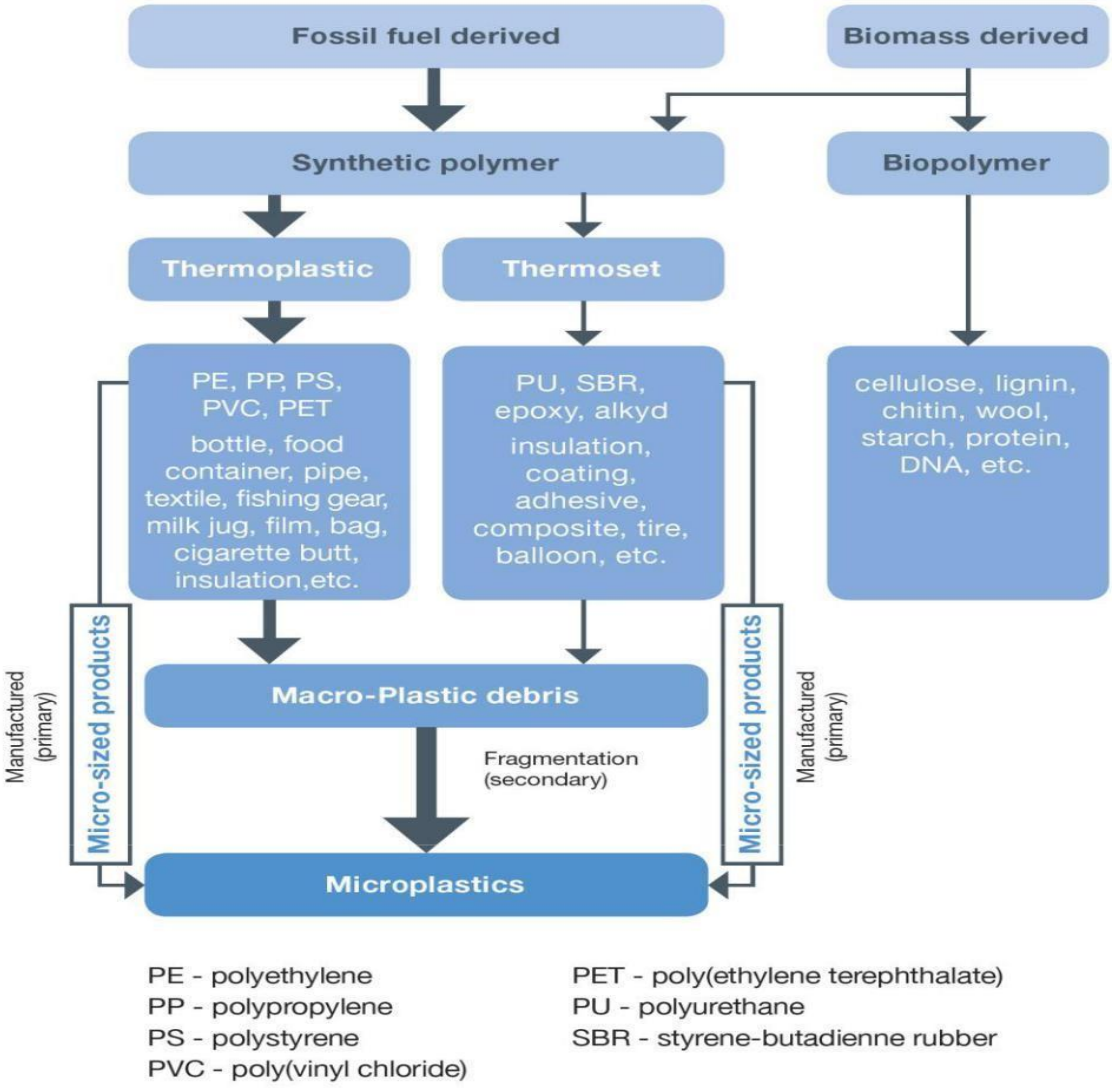


Figure 2.2: A schematic of plastics production (Adapted)

Source: (Dikgang *et al.,* (2012)

A diagram of the plastic production process is shown in Figure 2.2. The density of various polymers is significant because it reveals their lightness concerning the cost to the environment. Numerous different types of polymers can be used to manufacture plastics, as well as many other classification systems for them, such as substance and crystalline structure:

I. production process,
II. hardness,
III. design,
IV. density,
V. ability to absorb water, and
VI. conductivity, and degradability (Figure 2.1) (Dikgang *et al.,* 2012).

The great majority of monomers (pure polymers) used in the production of plastics are generated from fossil fuels, making them non-biodegradable. Given the challenges of fossil fuel-based plastics, biomass-derived or biodegradable polymers are increasingly gaining energy and are often made from lignin, chitin, wool, starch, protein, DNA, and other components (Eccles, Krzus and Solano, 2019). Plastics such as polyethene and polypropylene are pure polymers formed entirely of their constituent monomers, with no extra compounds added to influence their properties or appearance (Eriksen *et al.,* 2014). Furthermore, plastics are manufactured in petite proportions, known as microplastics, microbeads, or Nano plastics. The next theme discussed concentrates on plastics and environmental costs.

2.3.3 Plastic and environmental costs

The study's main focus is on cost management in the environmental sector. Therefore, it is necessary to consider viewpoints concerning this. However, waste separation programs have been introduced that guarantee environmental costs are taken and arranged according to legislative necessities. The environmental cost has been extended to incorporate the protected disposal of all waste classifications (Hillman and Keim, 2001). Plastics are more affordable than elective materials from packaging to building innovation, customer products, furniture and electrical (Eriksen *et al.,* 2014). In addition, there are two types of difficulties relating to plastics and environmental costs: those relating to raw

materials and manufacturing processes and those relating to plastic litter and trash (Ronquest, Ross, Vink and Sigge, 2015). Eccles *et al.* (2019) warn that all plastics are delivered utilising non-sustainable, substantial pollutant petroleum of plastic waste made such that the entire planet could be encompassed by it. In South Africa, plastic litter and bags are exceptionally environmentally costly (Da Fonseca, 2015). Plastic litter is similarly dangerous to live creatures which may be caught in it (Stemler, 2000). It is assessed that more than 100 000 marine warm-blooded animals and 700 000 ocean winged animals are caught in plastic marine debris (Rapp *et al.,* 2020).

Given South Africa's vast coastline and marine assets, there is an urgent need for plastic restrictions (Stötter and Schulte-Wülwer-Leidig, 2019). The problem has grown to where plastic litter and trash may be seen even on remote rural beaches. Much of the plastic garbage discovered on city beaches is land-based, having come from boats such as those employed in the fishing industry (Sueyoshi, Yuan and Goto, 2017). Plastic makes up around 7% of the weight of urban rubbish in South Africa on average (Akenji *et al.,* 2020: 18-19). Tvedt *et al.* (2014) warn that, in addition to the harmful effects of plastic litter and debris, there is also the death of marine life and increased waste management costs due to the environmental cost. Each year, an average of R8 million is set aside to cover the cost of preventing consequences from plastic litter, a figure that is expected to rise in the future. Plastic is such a common material that it has been suggested that it may be used as a stratigraphic maker (also known as the Plastic-sphere) (Sighicelli *et al.,* 2018).

In 2020, the increase in face masks and gloves being utilised to avoid the spread of coronavirus is adding to plastic pollution, undermining the health risk of seas and marine life (Akenji *et al.,* 2020: 15-19). However, not only is there a risk to one's health from discarding old masks and gloves during a pandemic, but many of them contain materials that cannot be re-used and are not biodegradable (Dumbili and Henderson 2020: 25-29). Moreover, used surgical masks and gloves add to an already important issue. Sueyoshi *et al.* (2017) disclosed to *The Independent*: "How I see these masks in the environment is

simply one more expansion to the ever-developing marine debris emergency the seas are confronting. No better, no more awful, just shouldn't be there in any case," (Rose 2020: 28). Li *et al.* (2020: 28-30) warns that masks add to Hong Kong's marine waste issue, which streams from Mainland China. In the US, Maria Algarra was so worried about the uptick in plastic trash that she began a hashtag campaign on 23 March called "The Glove Challenge", requesting that individuals send photographs as an approach to follow littered gloves and raise awareness of the problem (Rapp *et al.,* 2020).

The environmental cost of plastics, on the other hand, was first reported decades ago. As a result, the acknowledgement was firstly modest. However, a Google Scholar search for the terms, "costs of plastic waste" and "microplastic" found 1 290 publications, with the most recent publication date (beginning on 14 January 2018) (Villarrubia-Gómez, Cornell, and Fabres 2018). Plastic pollution has surfaced as a major source of concern (Dumbili and Henderson 2020: 25-29). This makes it clear for all parties involved, including manufacturers, dealers, and consumers, to see that plastic causes pollution.

Synthetic polymers (human-made polymers derived from petroleum oil can be found in a wide range of consumer products such as honey, glue, and so on) are made to endure a long time and are hence primarily non-biodegradable (Wilson and Smit 2002). As a result, synthetic polymers collect rather than degrade in landfills or the environment, and virtually all the plastic ever produced is still in use in some facilities today (Chen *et al.,* 2014). Plastics that float in the waters have been known to travel great distances (Rapp *et al.,* 2020).

However, understanding the cost of plastic bag pollution and environmental costs is lacking (Dumbili and Henderson 2020: 25-29). Given this weakness, it is more practical to assess the key aims of a plastic charge and determine a level at which these goals are most likely to be realized efficiently (Wilson and Smit 2002). This is possible if the plastic manufacturing companies understand the elasticity in demand for plastics (plastic

pollution) (Retief and Chabalala 2009: 8-10). Secondly, plastic products that end up as environmental costs are, in this manner, a profoundly differing complexity of products that will be biodegradable (Davies and Hughes 2014).

In addition, biodegradable plastics might be utilised when it's difficult to control and when the detachment of plastic during waste management is challenging. For example, in South Africa, trash management is under-developed (Van Rensburg *et al.,* 2020). The usage of low-carbon electricity in the plastic manufacturing sector is essential to decrease greenhouse gas emissions (Clarkson *et al.* 2013). Besides, air, land and water pollution are caused by the mining and consumption of non-renewable energy sources (Bernardi and Stark 2018). Moreover, moving to 100% low-carbon vitality could expand these advantages to R 15.2 million and 31% separately.

These advantages might be conveyed to some degree, as national power generations working toward low-carbon sources following duties under the South Africa Framework Convention on Climate Change (Chen *et al.,* 2014). Moreover, this procedure could be made quicker by using proactive systems to utilise low-carbon power in the plastics sector (Sighicelli *et al.,* 2018). Development in plastic material and packing change technology that empowers the equivalent or better packaging applications than being conveyed with less plastic could fundamentally diminish the costs of plastic use over the value chain while simultaneously creating changes to deliver new packaging organisations to the buyer products sector (Bernardi and Stark 2018: 35-38). Diminishing the weight of plastics utilised in packaging for food, cold drinks and ice sectors by 30%, through a change from rigid to flexible packaging, could decrease environmental costs by over R 7.3 million (Lo, Yeung and Cheng 2012). Alongside plastic production, transport is amongst the most significant drivers of the environmental cost of plastic use in the shopper merchandise sector, at over R 53 million in 2015 (López-Gamero, Molina-Azorín and Claver-Cortés 2010).

However, modest upgrades of 20% in the fuel efficiency of the vehicle fleet, including modal moving, progresses in engine technology, and a change to electric, hydrogen other low outflow vehicles, could diminish transport impacts by R 10.6 million (Horváthová, 2010). Significant increases in the recuperation of post-customer waste plastic, reliable with circular economy principles, could decrease environmental costs by over R 7.9 million for every annum whenever actualised in the whole of South Africa (Cormier and Magnan 2015). Hazardous waste treatment, such as combustion or pyrolysis, is the best option for reducing the volume of plastic trash, as it just shifts pollutants from one structure to the next (Akenji *et al.,* 2020).

Therefore, the persistence of plastics in the natural environment and the pollution generated by them are becoming a major concern (Rapp *et al.,* 2020). This understanding has inspired plenty of actions worldwide, including limitations or outright bans, to reduce plastics' environmental impact, particularly in South Africa (Yang, Shen and Li 2004). The financial, environmental, and social aspects of sustainability were also highlighted as causes for the influence of reusing plastic trash's environmental cost. Some of the challenges are that labour costs are expensive; there is no collecting capacity; there is no producer responsibility; tooling area is weak; lack of arranging facilities; complex mould design; poor troubleshooting in the operation of processing machines; no or limited machine producers; no or limited machine producers; no or limited machine producers; no or limited machine producers; no or limited machine producers; no or limited machine producers; no or limited machine producers; no or limited machine producers the cost of re-used material is governed by quality, which varies depending on technical requirements (Bellucci *et al.,* 2019).

Moreover, there is the absence of expanded maker obligation and a plan for the earth. For social effects of supportability, the next aspects were identified: limited innovative work, low residential interest for reused materials, negative society picture towards the plastic businesses, absence of broadened maker obligation, and no or restricted machine

makers. These obstructions have influenced the recyclability of plastic waste from the financial, natural and social effects (Li *et al.,* 2020).

The environmental costs of sustainability include the absence of confirmation to decide quality standards; lack of value testing facilities; legitimate plastic waste management; lack of regulation on plastic trash collection and re-use; extended producer responsibility; and lack of an environmental management system (Cormier and Magnan 2015). The following societal ramifications of sustainability were highlighted: Limited R&D, poor household interest in re-used commodities, high-quality demand for re-used materials, poor social perception of the plastic industries, lack of extended producer responsibility, and no or few machine makers are all factors.

These limits have hampered the long-term cleanup of plastic trash from its financial, environmental, and social effects. The two national plastic manufacturing companies have demonstrated all three implications of sustainability. The environmental cost report for 2020 outlines the two plastic manufacturers' environmental cost objectives for the coming years, focusing on environmental protection. As a result, by 2021, the two national plastic manufacturers would like to:

I. Reduce overall trash creation by 30% from the 2016 baseline, indexed to revenue;
II. Reduce energy consumption by 30% from the 2016 baseline;
III. Eliminate 5 million kilos (5, 000 metric tons) of packing material from products shipped to customers; and
IV. Reduce water consumption by 35% from the 2016 baseline, adjusted to revenue.

By 2021, they will examine potentially endangered watersheds related to Baxter operations and set stringent water conservation goals for high-risk areas to help achieve this (Yang, Shen and Li 2004).

The evolution of waste management in South Africa will be explored in the following section.

2.3.6 Evolution of waste management in South Africa

In 2016, the National Pricing Strategy for Waste Management (NPSWM) was released as the framework for determining waste management prices in South Africa. The NPSWM believes that waste management is currently undervalued (Dikgang, Leiman and Visser 2012). Thus, it does not support waste generators and holders to decrease wastage or re-use management, yet instead propagates the utilisation of landfills which is seen as the least expensive technique for waste transfer (da Costa *et al.*, 2016). The NPSWM sets out a structure and approach for assessing waste management rates in South Africa. It charts potential waste management levies or financial instruments that could be used as part of South Africa's overall financial and tax collection plan (Eriksen *et al.,* 2013).

2.4 Waste management hierarchy as per the National Waste Management Strategy

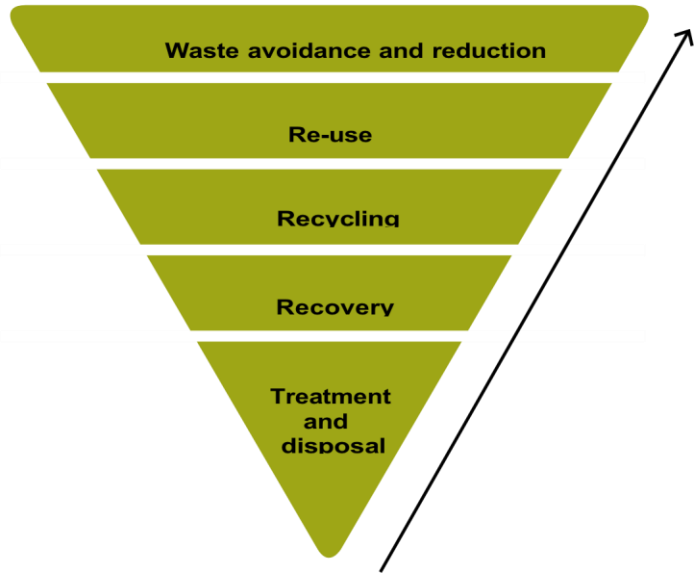


Figure 2.3: Waste management hierarchy

Source: Eriksen *et al.* (2014).

The Waste Management Hierarchy (Figure 2.3) depicts the framework of treatment and disposal, recovery, recycling, re-use, and waste avoidance and reduction in South Africa's National Waste Management policy (Eriksen *et al.,* 2014). Plastic packaging was announced as a necessity for waste management by the government in the National Environmental Management: Waste Act 2008 (Act No 59 of 2008) Section 28 Notice, distributed on December 6, 2017 (Eccles, Krzus and Solano 2019: 14-19). In the following section, the emergence of recycling in Bowler Metcalf limited, and Nampak limited is explored.

2.4.1 Emergence of recycling in Bowler Metcalf Limited and Nampak Limited

Two national plastic manufacturing companies are currently focusing on reducing waste and pollution (Friedrich and Trois 2013). Furthermore, Bowler Metcalf Ltd and Nampak Limited have conducted several initiatives to reduce landfill costs by forming agreements with major providers (Godfrey *et al.* 2017). Metal Box and Crown Cork (the forerunners of Nampak) launched, “Collect-a-Can” in 1976 to encourage plastic manufacturing to recycle and reuse abandoned beverage cans (Oelofse and Strydom 2010). In the 1970s, waste management offices in large urban areas such as Johannesburg and Pretoria were recognized (Noble 1976). In 1973, South Africa was represented by a paper recovery rate of 23 percent (Brooks 1977). In the 1970s, as per Collect-a-Can, resulting in refreshment packing with the creation of the White Paper, Eriksen *et al.* (2014) outlined the Government's aims for promoting progressively crucial waste reuse.

These policy guidelines were created with the help and sponsorship of the Danish Cooperation for Environment and Development (DANCED) (Eriksen *et al.,* 2014). Targets for reusing were not set and embraced by the government (taking note of not every single national division), business, and regular society until the main National Waste Management Summit and the distribution of the Polokwane Declaration in 2001 (planned to map South Africa's progress towards zero waste) (Matete and Trois 2008). South Africa

is a worldwide pioneer in reusing beverage cans – 76% of plastic packing items are re-used every year. Be that as it may, these objectives "were not managed and have become a combative issue inside the two national plastic manufacturing waste sectors," (Nhamo 2005: 2).

For a long time, re-using has been at the forefront of two national plastic manufacturing companies, driven chiefly by social requirements and the enthusiasm for specific resources (Nagabooshnam 2011). Nampak Ltd, and Bowler Metcalf Ltd have concentrated on diminishing product complexity and limiting the negative effect of packaging on environmental costs. These manufacturing companies have specifically focused on improving their plastic packaging (Morgan 2012). With an explicit focus on activities set up and the combination of the two national plastic manufacturing companies (Nampak Ltd, and Bowler Metcalf Ltd) had a 35,30% decrease in total greenhouse gas emissions during the 2016 to 2019 financial year (Rapp *et al.,* 2020). Using the administrations of a third-party waste management organisation has additionally improved re-using rates which brought about a 52,34% reduction in plastic pollution over similar periods (MacArthur, Waughray and Stuchtey 2016).

Nampak Limited and Bowler Metcalf Limited are also moving towards expanding their re-using rate and their utilisation of re-used materials to produce new packaging items. These two national plastic manufacturing companies move towards a progressively sustainable future (Matete and Trois 2008). The guidelines set by companies and the legislature will mean that organisations, for example, the two national plastic manufacturing companies have the option to forge ahead with a negligible effect on the environmental cost (Ermenc, Klemenčič and Buhovac 2017).

2.4.2 Emergence of recycling in the two national plastic manufacturing companies

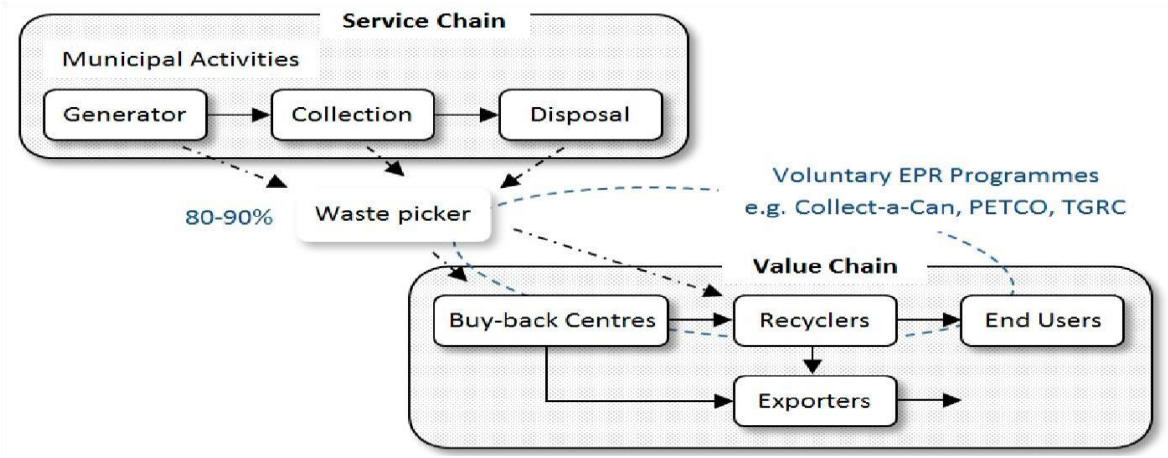


Figure 2.4: Casual waste picker bridging the service- and value-chains in the two national plastics manufacturing companies

Source: Godfrey and Oelofse (2017: 69-83).

Figure 2.4 shows, the role of the casual waste picker in crossing the service and value-chains with consideration on plastic and packaging (Matete and Trois 2008). South Africa is answerable for the assortment of 80–90% (by weight) of the post-buyer plastics recovered for reuse, saving municipalities between R309.2–R748.8 million in landfill airspace (in 2016) at next to zero cost (Wohner *et al.* 2019: 15-18). In this way, the natural area has been productive in connecting the organisation and value chains, despite basically no consolidation of city waste management services (Godfrey and Oelofse 2017: 69-83).

The Department of Environmental Affairs and Tourism (DEAT) appropriated two guidelines for helping the national plastic manufacturing companies execute the first NWMS (Rapp *et al.,* 2020). The guidelines, entitled, "Working with waste: Guidelines on waste management in high thickness and serviced territories" and "Working with waste: Guidelines for reusing," were financed with the assistance of the Danish International Development Agency (DANIDA) (Nkosi 2014). As noted in the foreword of the guidelines,

"The point of convergence of waste management in the two national plastic manufacturing companies is developing (Mirvis and Googins 2018). Never again is the accentuation on the exchange of waste, yet rather on keeping up a strategic distance from its age and limiting the waste stream at every possible opportunity" (Mackintosch 2014: 2). In addition, in 2003, the prohibition of single-use, lightweight plastic bags were established, as was the implementation of a plastic bag levy aimed at reducing the volume of plastic bags polluting the South African scene (Eriksen *et al.,* 2014).

Since 2001, the re-using of waste pollution was improved to pre-empt conceivable government regulation action. It could create and execute progressively reasonable, sensible, and lower-cost arrangements than government-enforced guidelines, manufacturers and financial issues as a focused reaction to various materials (Oelofse and Strydom 2010). Moreover, international packaging associations, for instance, the PET Recycling Company (PETCO) and the Packaging Recycling Company (PGRC), created a further driving force to the collection and re-use of packaging recyclables (Nkosi 2014).

Godfrey and Oelofse (2017) claimed that since, worldwide companies, for instance, Coca-Cola, was related to these unique activities and the establishment of PETCO. Moreover, the management of end-of-life products in Europe or the USA would have affected the arrangement of Nampak Ltd and Bowler Metcalf Ltd's re-using plans and operational structures (Friedrich and Trois 2013). These deliberate materials associations have influenced the South African re-using scene. Collect-a-Can has increased refreshment can collection rates from 18 percent in 1993 to 72 percent in 2015 because of a name change and re-dispatch in 1993 (Black 2016). Since the establishment of PETCO, post-purchase Polyethylene Terephthalate (PET) bags re-use has extended from 16% in 2005 to 55% in 2016 (Veenhoven 2014). The waste management ("commitment") of plastic recyclables in Nampak Ltd and Bowler Metcalf Ltd generally has generated from 41.6% in 2016 to 57.1% in 2019 (Wohner *et al.* 2019).

According to the South African government, casual waste pickers numbers vary between 60 000 and 90 000 on the country's landfills (Villarrubia-Gómez, Cornell, and Fabres 2018: 8-12). Supposing Linzner and Lange's (2013: 69-83) findings are extended to South Africa, where casual trash pickers make up about 0.6 percent of the metropolitan population, there could be as many as 215 000 casual trash pickers. The rise in the number of casual waste pickers in recent years is primarily due to South Africa's rising unemployment rate, which has led people to seek work in the informal sector (Godfrey and Oelofse 2017).

The South African government has effectively pushed cooperatives to formalise the informal sector and encourage job creation and business growth. However, in South Africa, trash and re-using co-agents have an unusually high negative rate of 91.8 percent (Godfrey *et al.,* 2015). Cooperatives in South Africa confront various challenges, including a lack of "basis," such as access to a ship or facilities for sorting and storing recyclables (Villarrubia-Gómez, Cornell, and Fabres 2018). Additional "operational" challenges, such as difficulty travelling to company areas or thievery of recyclables, as well as a lack of "capacity" to work a firm, were discovered to stymie fruitful implementation (Haward 2018a). Some co-agents are establishing themselves as regular businesses (e.g., by adopting Ltd business models), with the five co-usable individuals (the minimum enrollment criterion for) attempting to take on managerial roles and employing personnel to assemble and collect trash (Tvedt *et al*., 2014).

In South Africa, several actions and studies are ongoing, to determine the best response to the casual debris industry (Zarenda 2013). South Africa had recently had the option of diverting 10% of all trash produced away from landfills and toward re-use (as of 2011) at this stage to the accompanying (Godfrey and Oelofse 2017). There is still much to be done to strengthen the community's ability to re-use pollutants, and the two national plastic manufacturing companies claim that a discretionary resource economy in South Africa is still a long way off (Steytler and Powell 2010). However, in national approaches and approach records, the waste and secondary resources industry has been recognized as

a sector that may contribute to South Africa's economic development and the creation of green jobs (Oelofse and Godfrey 2008: 242-246).

The two national plastics manufacturing companies decrease plastic raw material used in their things, embracing the perspective of making a motivating force increasingly with less and advancing the use of limitless and re-utilised materials (Freudenreich, LüdekeFreund and Schaltegger 2019). There is no proof that stakeholder initiatives improve the financial performance of the two national plastics manufacturing businesses, but there is plenty of evidence that they improve environmental performance. However, waste management has recognized their investment need for upgrading plastic packaging specifically every year from 2016 to 2019 and has handled stakeholders so that they benefit financially or environmentally as a result of the intervention (Freeman, Phillips and Sisodia 2020). The sorts of advantages from such interventions incorporate diminished removal costs, decreased pollution and the capacity to re-think needs and redirect methodologies as a result. In reality, not conducting such an analysis may prompt significant exclusions or an inability to envision likely problems and issues (Li *et al.,* 2020).

The main argument for not doing a stakeholder analysis is that it involves time, ability, and information that may not be readily available within the organisation, resulting in some cost, which may be an issue for smaller firms. In addition, various systems of stakeholder identification, characterisation, analysis, and management are quickly summarised to position such an intervention. Then, a technique to organise and assess Stakeholders for Waste Management of these two national plastic manufacturing companies is determined (Steytler and Powell 2010). However, without agreeing on an understandable process for identifying, categorising, and managing stakeholders in various domains, the three firms consider the potential impacts or influences that could be positive, neutral, or bad for any firm. Petco practices in the two plastic manufacturing companies is discussed in the next section.

2.4.3 PETCO practices in Bowler Metcalf Limited and Nampak Limited

It is, along these lines, progressively significant for the two national manufacturing companies to decrease the effect of the environmental cost of their items and management all through their whole lifecycle (Sueyoshi, Yuan and Goto 2017: 35-39). The two national plastic manufacturing companies that fail to consider environmental performance in product design and development are finding it increasingly difficult to participate in a rapidly changing national market (Zaki, Hazwani and Othman 2013: 27-30). Bowler Metcalf Limited and Nampak Limited offer a broad scope of branded packaging, including PET plates for national and worldwide quick-moving customer products, cheap food, fresh nourishment and refreshment (Bhailall 2016). By marking with PETCO, Nampak Limited, and Bowler Metcalf Limited contribute by paying a deliberate PET charge to PETCO, given household PET item deals as a component of its responsibility in providing answers post-purchase waste pollution (Oelofse, Muswema and Koen 2016).

The two national plastics manufacturing companies guarantee and stay agreeable with the government's call in the plastic and packaging sector to have an Industry Waste Management Plan (IWMP) set up (Friedrich 2013). Responsible production re-using remains a critical need, and through a long-standing relationship with PETCO, the two national plastics manufacturing companies are making a substantial commitment (Mannie and Bowers 2014). Waste management in South Africa is managed according to the waste hierarchy of importance (Bhailall 2016). The progression includes various levels, each representing a way to deal with waste management, arranged in descending request of need (Naidoo, Glassom and Smit 2015). These rules are based on a PET plastic packaging design that encourages re-use. This is minor but essential guidance for sustainable production and usage in South Africa. Furthermore, these rules are influenced by the needs of the mechanical re-use process in South Africa (Heinkel, Kraus and Zechner 2001: 11-15).

As new facilities enter the company's operations, some of the current constraints (especially for barriers, opacity, and colour) may be lifted (Hasson, Leiman and Visser 2007). The advice and recommendations in this archive were designed to assist producers and brand owners in recognizing that PET material is far too valuable to be discarded and encourage PET re-use (Haward, 2018b: 13-18). This document does not cover all of the concerns that have been discovered in the re-use of PET packaging. Thus, the two national plastics companies acknowledge that the direction of recyclability is one component of a massive sustainability challenge, and PET implies sharing as much information as possible (Eccles, Krzus and Solano 2019).

There are more significant pertinence challenges, both in analysing the overall environmental costs of separated PET packaging systems and in terms of developing effective operational solutions for the re-use and recovery of used PET plastic packaging (Haward, 2018b). It is recognized that a recyclability structure cannot be achieved overnight and that continual work by existing stakeholders, such as architects, manufacturers, waste and asset management professionals and governments, would be required to address these emerging concerns (Filbeck and Gorman 2004). It is likewise essential to note that since the packaging market is described above all else by "fit-for-reason", there will be explicit conditions where the connection between packaging production and re-use will keep developing (Mintz *et al.,* 2019).

The objective of improving PET packaging recycled content must not compromise item security or reduce item usefulness (Haward, 2018b: 15-19). Moreover, plastics must be sufficiently able to ensure the substance is ideal all through the supply chain (Jambeck *et al.* 2015). However, improving recyclability should positively add a general decrease in the environmental cost effect of the absolute item offering. Notwithstanding, brand proprietors ought to be fatigued with enabling excuses, particularly considering government legislation (Ifurueze, Lyndon and Bingilar 2013). Packaging should be functional and designed to be reused at the end of its life cycle.

Recyclability is also thought to be only one component of sustainability (Hasson, Leiman and Visser 2007). Re-use is essential because it can extend the life of important materials, reduce plastic use, waste, and litter. It is the product's entire life-cycle – all environmental costs, social and economic benefits, as well as adverse effects for the duration of the product's life cycle – that must be taken into account (Haward 2018b). Following these recommendations will aid in coordinating cultural preferences with the practices of the two national plastics manufacturing companies and increase market share by promoting a product's environmental cost highlights to an environmentally concerned shopper (Heinkel, Kraus and Zechner 2001).

PET plastic is 100% recyclable when essential structure standards are followed. Nampak Ltd, and Bowler Metcalf Ltd are set up to help guarantee that PET plastic packaging does not cause re-using issues and has an incentive a long way past its unique planned reason (Friedrich and Trois 2013). Existing plastic packaging companies (Bowler Metcalf Limited and Nampak Limited), producers of packaging and brand proprietors are solicited to survey their current portfolio from PET packaging against these structure rules (Hasson, Leiman and Visser 2007). Moreover, the two national plastic manufacturers feature any viewpoints where designs might be improved and afterwards execute the progressions when the open door presents itself (Filbeck and Gorman 2004). New plastic packaging organisations, producers of packaging and brand proprietors are approached to incorporate these guidelines into the structure procedure at the absolute starting point to limit cost and expand the open door for consistency (Eriksen *et al.* 2014). The following section introduces the two national plastic manufacturing companies' context EPR for the current study.

2.4.4 Two national plastic manufacturing companies' context for Extended Producer Responsibility (EPR)

Bowler Metcalf Limited and Nampak Limited have been far slower than other developed manufacturing companies in actualising EPR (Da Fonseca 2015). A portion of the

difficulties related to implementing EPR in the two national plastics manufacturing companies are as follows:

I. Consumers keep an eye on re-use or dump items as opposed to re-using;
II. Re-using is attempted to a great extent by the casual division, difficult to execute and presents dangers to the environment and human health;
III. Customers are unwilling to return items for re-use or pay for garbage disposal;
IV. Lack of consumer and government understanding of the environmental and health consequences of improper waste disposal, as well as the benefits of re-using, including potential financial rewards;
V. Inadequate waste management and recycling due to a lack of funding;
VI. Absence of subsidising to fund re-using or even sufficient waste management;
VII. Lack of waste management and re-use legislation, rules, and enforcement;
VIII. Absence of adequate limit, abilities, and innovation; and absence of reliable information for planning effectively.

Nevertheless, in the two national plastic manufacturing companies, national legislation has given the government a consistently expanding capacity to actualize EPR (Aggarwal 2013). The National Environmental Management Act 107 of 1998 states that "responsibility for the environmental health and security results of a policy, program, project, product, process, service or activity exists throughout its life-cycle" (Da Fonseca 2015). Furthermore, EPR and product take-back legislation is also mentioned in the National Waste Management Strategy (Department of Environmental Affairs and Tourism) as needing further inquiry, with a utilisation perspective sooner, rather than later.

EPR is one of the National Integrated Waste Management principles (Aggarwal 2013). Most recently, the National Waste Management and Waste Act established an environmental cost that can be used to assess EPR (Gwartney, Lawson and Norton 2008). Following legitimate interviews, the National Waste Management Strategy allows the environment minister to develop national standards for EPR and accommodate the implementation of across-the-country EPR policy measures. At the same time, provincial waste management authorities may correspondingly implement EPR policy measures at

a provincial level (Friedrich and Trois 2013). The government has targeted packaging trash as a waste stream where EPR may be implemented. In addition, this has resulted in the enactment of the law in certain situations (such as in the case of plastic shopping bags) and the publication of statements of understanding with industry in other circumstances (for example, glass and PET, a form of plastic) (Godfrey *et al.,* 2017).

The two national plastic manufacturing companies established joint manufacturing company activities for dealing with EPR (Aggarwal 2013). In 1993, an industry activity was established in another situation (steel beverage cans). As a result, the subsequent section compares these various actions, emphasizing the success of deliberate strategies (e.g., cans, glass, and PET) against required law (e.g., plastic bags) in encouraging the recovery of post-consumer packaging materials for re-use (Egbunike and Okoro 2018). The following section will discuss environmental costs.

2.5 Empirical review

The following section focuses on Environmental costs.

2.5.1 Environmental costs

Ifurueze *et al.* (2013) defined environmental costs as environmental measures of environmental losses, including cleanup costs, re-using materials, preserving energy, capital utilisation and development expenditure. Pain *et al.* (2019) highlighted those Environmental costs are incurred due to the actual or potential degradation of the environment because of manufacturing companies' activities. Furthermore, Chen *et al.* (2014) contend that Environmental cost is the total cost of all estimates important to re-establish the environment to its condition before the harmful incident. Costs that could be identified with the natural effects of an item or a manufacturing procedure are considered environmental costs. Furthermore, any costs that emerge from general natural work in an organization are additional environmental costs (Deegan 2002: 212-214). These costs are obtained in expectation, diminishing or fixing the harm to the environment and checking resources (Egbunike and Okoro 2018). In any case, environmental losses are costs that

carry no points of interest to the business. For example, fines, penalties, remuneration and transfer losses identifying with resources may be dismissed because environmental costs harm the environment (Friedrich and Trois 2013).

Some of them can be seen after understanding the resources exercise, while others are seen during the use of environmental resources (Friedrich and Trois 2013). Environmental costs are operating costs, and the environmental protection costs can be ordered likewise as uncommon costs and social costs. Also, environmental costs, social qualities and advantages are viewed as struggling with shareholder benefits in the two national plastic manufacturing companies (Hillman, Withers and Collins 2009: 14-27). In Africa, the New Partnership for African Development gives locally focused gatherings access to actualising and observing sustainable development activities (Innocent, Okafor and Egolum 2014).

New legislation, such as the Broad-based Black Economic Empowerment (BEE) Act, which was signed into law in January 2004, has elevated BEE to the top of the corporate agenda in South Africa (Da Fonseca 2015). The Act required the Department of Trade and Industry to issue illustrative BEE training codes to assist businesses in implementing BEE regulations and developing corporate area change charters (Friedrich and Trois 2013). These codes and charters, taken together, establish new ground rules for broad-based empowerment and transformation (Chang 2015: 36-45). Regarding the consideration of Corporate Social Investment (CSI) in the Codes, charters have presented another arrangement of company concerns and needs (Innocent, Okafor and Egolum 2014). The Codes establish the initial phase in actualising an organised national BEE administrative system and cover seven key change components –be a specific proprietorship, the board and control, business value, abilities development, particular procurement, enterprise improvement and a residual (CSI) component (Godfrey *et al.,* 2017).

The Codes (CSI) incorporate focuses on BEE consistency, and progress is estimated by the Scorecard, which has determined focuses for every one of the seven components (MacArthur *et al.,* 2016). By setting priorities, the Scorecard provides plastic manufacturing companies with clear guidance about where they should center their transformational endeavours (Pain *et al.* (2019). Most corporate pioneers concur that a major objective for the economy, is sustainable development. Sustainability expects companies to strive for eco-effectiveness, simply quantifying by delivering precise data on environmental costs, salary, and financial performance (Brammer, Brooks and Pavelin 2006). Innocent *et al.* (2014) postulate that Environmental costs are various costs that organisations realise, to giving products and administrations to their clients.

Ifurueze *et al.* (2013) contend that revealing and seeing environmental costs identified for an item, procedure, or office is critical for acceptable management choices. Accomplishing such targets as reducing environmental costs, growing salary and improving financial performance requires concentrating on current, future and potential environmental costs (Jiao 2010: 15-18). The volume and degree of activity determine how a company characterises an environmental cost and how it expects to use the data (for example, cost distribution, capital planning, process/item structure, and other management considerations) (Innocent *et al.,* (2014). Also, it's not always clear whether a cost is "environmental" or not; a few expenditures fall into a category that could be described as "environmental," in part, but not entirely. It is not necessary to determine if an expense is "environmental;" the purpose is to guarantee that high costs are adequately considered (Aggarwal 2013).

2.5.1.1 Identifying environmental costs

Aggarwal (2013) recommend that environmental accounting utilises, such as the life cycle to underscore those traditional strategies, were incomplete in scope. Moreover, environmental accounting ignored critical environmental costs, potential cost investment funds and revenues. Managers therefore need to begin looking for and uncovering

significant environmental costs and determine how it affects the organization's structure. (Miles and Covin 2000).

2.5.1.2 Various methods of environmental transmutation

The various methods of environmental transmutation are as follows.

1) Bidding games

In this method, participants are asked to offer suggestions for decided environmental resources, either absolute or marginal, and the recommendation must show the costs.

2) Shadow Pricing

This is the way toward learning the characteristics of natural resources from a group of individuals by asking a couple of requests and questions –The ordinary test answers are considered for valuing those particular assets (Tvedt *et al.* 2014). Here, the cost is not dictated by demand and supply law. To choose the total cost, the quantity used by the organisation is expanded by the typical cost per unit (Linzner and Lange 2013: 37-39).

3) Expert Opinion

Based on expert opinion and assessing the all-out worth, the cost of explicit environmental assets is discovered here. For instance, when an individual purchases packaged mineral drinking water, the amount it costs is the cost of the plastic packaging for a relative amount, polluted by the environment (Linzner and Lange 2013: 37-38).

4) Priority Evaluation

According to Huang *et al.* (2013: 25-29), the types of pollution control devices presented include steps taken to co-ordinate raw materials, vitality steps taken for production process waste, steps taken for the development of the working environment, product and service quality, and production methods (Tvedt *et al.,* 2014). Environmental costs may also be mentioned in any or all of these categories in different organizations to focus more on environmental costs in management choices and justified technical announcements. Environmental Cost utilises practically arranging systems to perceive costs that must get the board's consideration named the "immediate" costs or "direct" costs (Chang 2015: 36-

45). Moreover, costs that might be obscured through treatment as overheads or distorted through inappropriate distribution to cost focuses or overlooked are named, “covered up,” “unexpected,” “hazard,” or “less tangible” costs (Jiao 2010: 15-18).

2.5.1.3 Image and relationship costs

Some environmental costs are classified as "less tangible" or "intangible" because they affect the subjective (but measurable) perceptions of management, clients, workers, communities, and regulators (Coomes and Grubb 2000). "Corporate image" and "relationship" expenditures have been assigned to these costs. This category might include the costs of annual environmental reports and community relations efforts and costs incurred on purpose for environmental actions (such as tree planting), and costs incurred as a result of recognition programs (Tvedt *et al.* 2014). Although the costs are not "intangible," the immediate advantages of partnership /corporate image costs are (Pain *et al.,* (2019).

2.5.1.4 Environmental cost-examples

Environmental accounting's success does not rely on "properly" reporting all of a company's costs; instead, it will almost certainly ensure that necessary data is made available to those who can use it (Coomes and Grubb 2000). Furthermore, Nampak Ltd, and Bowler Metcalf Ltd employ procedures that allow a cost item to be classified as “environmental costs” for one reason or another (Miles and Munilla 2004). Companies can explain what should be included in an "environmental cost" and how to put it up, based on their destinations and planned uses for environmental accounting. Nampak Ltd, and Bowler Metcalf Ltd, for example, assist in pollution control in capital planning and so may consider separating environmental expenditures that can be avoided (Miles and Covin 2000).

2.5.1.5 Environmental costs and Investment (Stakeholders' interest)

Investments in production equipment may mitigate environmentally hazardous situations. Environmental costs are attributed to such investments. The majority of investments are not undertaken solely for environmental reasons but also to reduce the usage limit (Coomes and Grubb 2000). These expenditures are environmentally friendly and cost-effective (Pain *et al.,* (2019). Thus, the circular economy is an option to the traditional make-use-arrange economic model, which organises the augmentation of item-life cycles, extracting the most powerful incentives from assets being used and afterwards recuperating materials toward the finish of their service life (Carroll 2015).

However, a significant guideline of the circular economy is expanding the catch and recovery of materials in waste streams with the goal that plastics can be re-used and recycled in new items (Akenji *et al.,* 2020). Re-using and vitality recovery is a significant method for reducing the net environmental costs of plastic use by displacing essential plastics and vitality production with that recovered from post-shopper waste (Miles and Munilla 2004). Miles and Covin (2000) found that 95% of the plastic packaging material is lost due to landfilling and poor waste management practices. The estimation of the lost material is evaluated to be R 80 - 120 million for each annum, in addition to the outside environmental costs that are the subject of Plastic Recycle South Africa reports (Miladiasari *et al.,* 2021).

Carroll (2015) claimed that the plastics manufacturing companies tried to assess the potential effect of increments in re-using, predictable with circular economy principles. In addition, on the environmental costs of shopper products are plastics utilised by modelling an expansion in plastic packaging re-using rates to 55% decrease in landfilling to 10%. However, under the circumstances, the environmental costs of plastic use could be diminished by R 4.8 million for every annum, including R 3.9 million, because of the environmental advantages of recycled plastic production (Black 2016). If this were

extended to incorporate both plastic packaging and item waste avoidance, environmental costs would increase to R 7.9 million for every annum, incorporating R 6.3 million in profits by material and vitality recovery (Dikgang, Leiman and Visser 2012). The advantages of expanded material recovery in this situation exceed the extra outer costs of waste management, showing the critical potential environmental cost and return on investments in re-using.

This could portray that stakeholders' interest in the environmental cost activities increased in more recent years and that these national plastic manufacturing companies adhere to stakeholders' desires. The method of identifying relevant stakeholders necessitates a significant amount of time and resources (Mouheb *et al.* 2012). Stakeholder identification, characterisation and management show up ‘‘dispersed and detached” and stakeholders could be ‘‘anyone and anything” (Black 2016). Any business activity and its anticipated impact assessment on or by stakeholders is loaded with risk. Due to this ambiguity, it has been proposed that future responses, and the presence of stakeholders, cannot be accurately predicted (Choudhary *et al.,* 2013).

Since the aspects of stakeholder–company relations, Mitchell, Lee, and Agle (2017) suggest that urgency be included as a criterion. There is a lack of clarity in comprehending the dynamics of stakeholder interactions due to the lack of a consistent methodology for their identification, grouping, analysis, and management. This can be explained by the fact that consciousness and willful activity are not always present; stakeholder attributes are socially constructed rather than as an objective reality and stakeholder traits are changing rather than constant (Miles and Munilla 2004). This makes it challenging to identify stakeholders because Bowler Metcalf Ltd and Nampak Ltd can vary, depending on the scenario, resulting in the lack of an agreed-upon method of identification (He 2006). A diverse set of stakeholders has been identified for any organisation, and environmental and waste management operations have been highlighted more explicitly (Elliott and Zhou 2013).

2.5.1.6 Relationship between environmental costs and financial performance

Various studies have utilised profitability and financial performance to define differences in disclosure levels. The link between financial performance and environmental cost is probably one of the most contentious problems yet to be resolved (Kang and Choi 2000). Proponents contend that there are extra costs related to social and environmental costs, which diminish the financial performance of the reporting company (Aggarwal 2013). Dikgang *et al.* (2012) found a clear linkage between a company's profitability and environmental costs. However, Patten (2002) struggled to establish any significant positive relationship between profitability and environmental costs. Derwall et al. (2005) investigated the relationship between US corporations' eco-efficiency ratings (given by Innovest), performance, investment style, and industry impacts. They found a positive and critical relationship between high environmental levels and high performance. In particular, a high-positioned portfolio out-performed a low-ranked one reporting about the environmental parameters recognised (Davies and Hughes 2014).

Tunggal and Fachrurrozie (2014) contend that discretionary improvement in environmental costs regularly gives financial advantages because pollution decreases cause future cost reserve funds by expanding proficiency, diminishing environmental costs, and limiting future liabilities. In a similar vein, Elliott and Zhou (2013) claim that companies who adhere to a single set of strict environmental guidelines worldwide have greater market valuations than companies that do not. Other studies confirm a positive connection between environmental guidelines and financial performance. Patten (2002) claimed a positive relationship between environmental control records and profitability. He (2006) highlighted a more positive response from the stock market after environmental crises.

Lo, Yeung and Cheng (2012) contend that the connection between environmental costs and profitability is required to be impartial. Davies and Hughes (2014) upheld this

argument, arguing that pollution control consumption and companies' profitability are not connected. Qiu, Shaukat and Tharyan (2016) saw comparable outcomes, who found that share returns, and environmental costs have no direct relationship. Previous studies recommend that the connection between environmental costs and financial performance is not clear.

2.5.2 Financial performance

Financial performance is defined by Mackintosch (2014) as usually assessed through measures like income, benefits, and costs. Tunggal *et al.,* (2014) highlighted that financial performance is a proportion of how well an organisation utilises its essential advantages to produce income. Gok *et al.,* (2019) defined financial performance as the degree of performance of a business over a specified period, communicated regarding general benefits and misfortunes during that time. The term can likewise be implied as a broad proportion of an organisation's financial health over some time (Murerwa 2015). Financial performance is assessed to provide investors with the management group's track record. Assessing a company's profitability, advertised worth, and development possibilities are essential (Davies and Hughes 2014).

Accounting-based measures look at the idea of a link between specific indices of social performance (reputation, social information disclosure, and environmental behaviour) and financial performance derived from accounting data (Nagabooshnam 2011: 15). Financial performance (for example, return on equity) has appeared to improve environmental costs. In contrast, environmental liabilities have been found to have an intensifying negative impact on financial results (Ronquest-Ross, Vink and Sigge 2015).

Measuring financial performance has many advantages; for example, utilising a common financial unit allows companies to think about the significance of different impacts on net profits (Aggarwal 2013). It can also be used to quantify the accomplishment of programs

to reduce environmental cost impacts. For example, redirecting waste from landfills to re-using waste empowers a company to make an environmental profit and loss account for its business, incorporating it into its mainstream financial accounts (Mwanza and Mbohwa, 2017). The two national plastic manufacturing companies' management can comprehend the risks they face if tighter guidelines or consumer requests force them to pay these costs. This information can urge companies to take early action to reduce these risks by cutting environmental effects (Akenji *et al.,* 2020). The two national plastics manufacturing companies determined the environmental cost of material used by changing the physical quantities of various environmental effects, for example, metric tons of particulate issue into a financial cost and including them together (Davies and Hughes 2014).

Company performance is fundamental to management as it is a result accomplished by an organisation, identified with its position and responsibility in accomplishing the objective legally, not illegally and conforming to the moral and ethical aspects (Godfrey *et al.,* 2017). Performance refers to an organisation's ability to acquire and manage resources in a few distinct ways in order to obtain a competitive advantage. Financial performance and non-financial performance are two types of performance (Da Fonseca 2015). The literature usually recognises financial performance or economic performance that leads to better company performance (Akenji *et al.,* 2020).

Financial performance is often reported in sales, turnover, employment, or share prices. In contrast, inventive performance is frequently reported in expenditures, licenses, percentage of innovative sales, or self-reported (results of) inventions (Murerwa 2015). Although both types of performance are usually interconnected, the literature frequently treats them as separate concepts or only focuses on one of them (Nagabooshnam 2011: 15-18). Company performance is an assessment of what the company has accomplished and how well it has performed over some time (Hagedoorn and Duysters 2002). The purpose of estimating the accomplishment is to acquire helpful information identified, which is the flow of funds, the utilisation of funds, effectiveness, and efficiency. Besides,

the information can also motivate managers to settle on the best choice from others (Hagedoorn and Cloodt 2003).

2.5.2.1 Measures of financial performance

Different measures of financial performance exist. The average ratio of how successfully a corporation uses its assets to create benefits is a measure of financial performance (Morgan 2012: 35-39). Gok *et al.* (2019) state that a company ought to acquire benefits to survive and develop over a long period. Benefits are basic, yet it is inappropriate to expect that each activity started by a company should focus on benefit maximisation to the detriment of the environment, employees, and society (Dwyer *et al.,* 2009). Traditionally, the success of these two national plastic manufacturing companies' system-related measures is the country (Retief and Chabalala 2009). In general, financial indicators have been used to evaluate the success of a manufacturing system or organization.

In any event, financial performance information can provide the determinants of operational performance in financial service firms. Furthermore, as the line between ownership and control blurs as a result of corporate growth, contracts must be established to ensure that the economic interests of owners and managers are aligned (Wohner et al. 2019). As a result, the efficiency of contractual mechanisms in attracting, retaining, and regulating managerial talent in ways that maximise owners' wealth will determine operational performance (Zarenda, 2013). The following section discusses the revenue.

2.5.2.2 Revenue (sales or turnover)

Revenue is the gross inflow of economic benefits during the period arising from the course of the ordinary activities of an entity when those inflows result in increases in equity, other

than increases relating to contributions from equity participants. As a result, commercial revenue is often known as sales (Wohner *et al.,* 2019). After deducting the costs of providing services, a company's gross income is determined. The sales of plastics which resulted for Bowler Metcalf Ltd and Nampak, had a significant effect on their profitability.

2.5.2.3 Net profit

Net profit is (recorded as comprehensive income by Nampak) an actual profit that has recognised for a given time after deducting expenses that were not included in the gross profit calculation. Bhailall (2016) mentioned that net profit was the high or low performance of the company, which was reflected in the large or small profits that can be obtained by companies in a period. Therefore, the higher net profit of the company was considered to make high plastics pollution, plastics recycling, and plastics wastage. Kaza *et al.* (2018) noted that the amount of gross profit after deducting all the expenditures and paid expenses during the period would increase net profits without any negative impact on the product quality, which drives the company's operations more efficiently.

2.5.2.4 Company size

The *size* of companies influences their financial performance from many points of view. Enormous manufacturing companies can abuse economies of scale and scope and, in this manner, are increasingly effective when contrasted with little companies (Steytler and Powell 2010). Moreover, smaller companies may have less force than huge companies. Consequently, small companies may think it is hard to contend with enormous companies, especially in exceptionally serious markets (Wohner *et al.,* 2019). Furthermore, as companies become bigger, may suffer from inefficiencies, prompting second-rate financial performance. Therefore, there remains uncertainty as to the exact connection between size and performance (Majumdar, 1997).

2.5.2.5 Company age

Gok *et al.* (2019) argued that the age of a company has an impact on its success. Kaza *et al.* (2018) noted that hierarchical inertia in old companies makes them rigid and reluctant to recognise changes in environmental costs. Despite difficulties such as a lack of funding, brand names, and corporate reputation, newer and smaller enterprises grab market share from larger companies. More established organisations may also benefit from reputational effects, allowing them to win a bigger sales margin (Kakani, Saha and Reddy 2001). On the other hand, older businesses are prone to lethargy and the bureaucratic classification that comes with age. Furthermore, businesses may have formed routines that are out of step with changing market conditions, resulting in a reverse relationship between age and development (Feng and Wang, 2016). Studies have investigated whether there is a relationship between environmental costs and stakeholder's equity. These studies are discussed next.

2.5.2.6 Environmental costs and stakeholders' equity

Bhailall (2016) utilise information on 40 restricted liabilities organisations listed on the Nigerian Stock Exchange. Information collected was analysed using correlation analysis, regression analysis, and Analysis of Variance (ANOVA). The result of the investigation showed a positive connection between environmental costs and the stakeholders' equity. Gok *et al.* (2019) considered whether a relationship exists between environmental cost and stakeholders' equity of paper manufacturing companies. This analysis utilises stakeholders' equity funds as an intermediary for firm financial performance. The analysis shows that Italian paper manufacturing companies do not show any critical relationship between environmental costs and stakeholders' equity funds**.**

Kaza *et al.* (2018) utilise a study design to collect data from four oil companies in Nigeria and inspect the relationship between environmental cost and stakeholders' equity. In this

study, stakeholders' equity was estimated to fund the firm. The study found a critical relationship between oil financial performance and environmental cost. Bhailall (2016) utilised a quantitative research method to analyse the relationship between environmental cost and stakeholders' equity. The study used data on variables that were found to have a relationship with environmental cost and stakeholders' equity. These variables included penalties, provisions, contingent liabilities and common equity.

Gok *et al.* (2019) noted that no company could generate long-term profit unless it makes every stakeholder happy. The two national plastic manufacturing companies in this current study specify requirements to stakeholders' funds for waste reduction or at least to make it recyclable using its processes. As indicated by Gray (2006), *Stakeholder Theory* deals with these connections in light of various factors: the nature of the undertaking's condition, the quality of stakeholders' equity and the decisions that decide the stakeholder positioning procedure in environmental cost. The business strategy focuses on stakeholder pressures that the organisation's business processes have negatively impacted, or a corporation's action willingly to alleviate stakeholder pressures and boost profit and reputation (Kakani, Saha and Reddy 2001). Bowler Metcalf Ltd and Nampak Ltd address the various degrees of stakeholders' interest during the four years in the period of study.

Waste management firms, such as Bowler Metcalf Ltd, and Nampak Ltd, play an essential role, since they provide recycling facilities and methods for diverse waste products. The method of identifying important stakeholders necessitates a significant amount of time and effort (Mouheb et al. 2012). According to Kaza *et al.* (2018), stakeholders are identified, characterised, and managed in a "distributed and detached" manner, and stakeholders might be "everyone and everything." Uncertainty can occur in any business activity, and it is expected to have an impact on or be experienced by stakeholders. Based on such uncertainty, it has been contended by Gok *et al.* (2019) that the future response or understanding of the presence of stakeholders cannot be precisely anticipated.

Since neither power nor authenticity include the aspects of stakeholder or company interactions, Mitchell, Lee and Agle (2017) advocate introducing urgency as a criterion. There is a lack of clarity in comprehending the dynamics of stakeholder interactions due to the lack of a consistent framework for stakeholder identification, grouping, analysis, and management. The reasons for this include consciousness; stakeholder attributes that are socially constructed rather than objective in reality; and stakeholder attributes that are unique rather than constant. For this reason, there is no accepted technique for identifying stakeholders. This makes it challenging to identify stakeholders because Bowler Metcalf Ltd and Nampak Ltd can change depending on the scenario, resulting in the lack of an agreed method of identification. Stakeholders in the two plastic companies: suppliers, creditors, waste generators and recyclers, stipulate both companies to their responsibilities. In the section to follow, the contingent liabilities will be explored.

2.5.2.7 Provisions/Contingent liabilities

Provision is a liability of uncertain timing or amount. The key principle is that a provision should be recognised when a potential obligation is likely due to something that occurred in the past (Lopes and Reis 2019). This is therefore only applied in respect of genuine obligations, such as a legal outcome. In this study, Bowler Metcalf Limited Limited and Nampak limited their requirement are for the amount to be estimated reliably. Stated more formally, a provisioning event creates a legal obligation. This means an entity has no alternative but to settle that legal event with a payment. The distinction between a contingent liability and a provision (for a contingent liability) is salient. Under IAS 37, a contingent liability is a possible obligation (D'Souza, 2004).

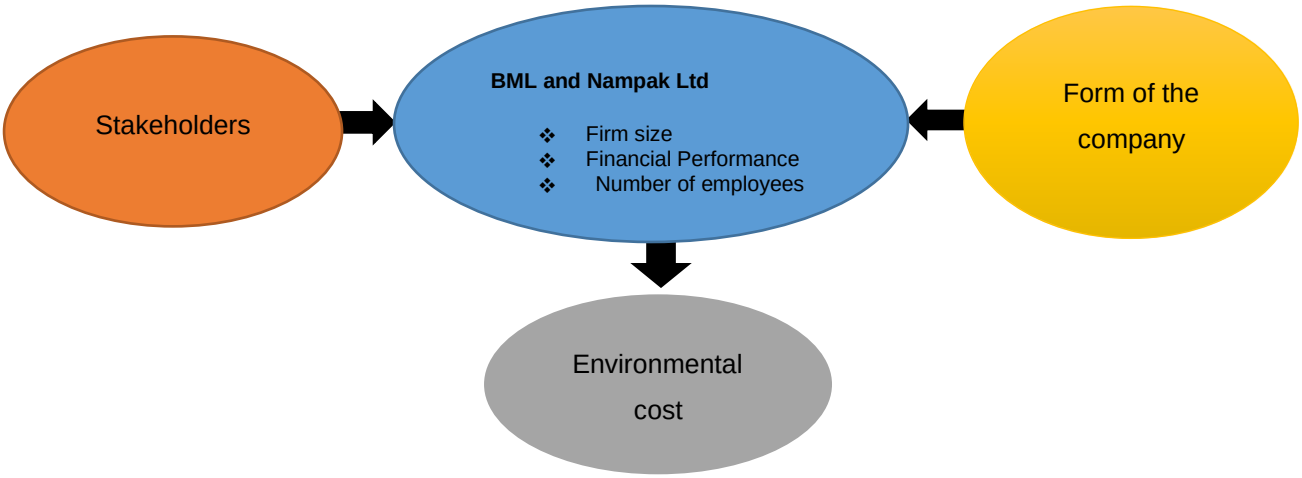
In addition, Bowler Metcalf Limited Limited and Nampak limited have guaranteed the borrowings of a subsidiary, but these subsidiaries are in good financial condition. This would have no impact on either the statement of financial position or the statement of net profit or loss (Hennes, 2014). Although it may be sometimes possible to quantify the possible obligation in financial terms it would have no impact on the reported financial

performance of both plastic companies. The probability criterion is used to differentiate between a potential liability that is simply declared and a probable liability that is perceived and introduced under "provisions" (unless the chance of outflow is distant, in which case financial statement preparers do nothing) (Lopes and Reis 2019).

However, signs of this signal are predicted to be positively received by stakeholders' market value, affecting market value and financial performance. The contingent liabilities of the two national plastic manufacturers are to the benefit of both individuals and the environment (McDonald and Horwell 2020). This builds the significance of bringing awareness' of these national plastic manufacturing companies and promoting initiatives for acting by the environmental cost. Another factor that does not support sustainable behaviour is the financial factor (Farisani 2017). Therefore, Bowler Metcalf Ltd and Nampak Ltd are evaluated continually to decide whether an outflow of assets epitomising financial benefits or service expected has gotten probable. When it becomes likely that an item may require an outflow of future financial benefits or service potential, it is now managed as a contingent liability (Tkachuk 2018). The following paragraph presents the proposed model of the study.

2.6 Proposed model of the study

Figure 2.5: Schematic diagram of the study



The schematic diagram presented in Figure 2.5 provides a visual representation of the factors utilised in the study and how these factors decided the environmental cost. The first part of the schematic diagram centers on the two national plastic manufacturing companies and the fundamental characteristics that distinguish Bowler Metcalf Ltd and Nampak Ltd. These characteristics incorporate each *firm size*, the most recent *asset size* as per distributed or documented reports (relating to firm size), the most recent annual sales as per published or annual reports (relating to financial performance), and the *number of employees* under the manufacturing company. These qualities are factors isolated from different factors due to their uniqueness such that even if the details of each plastic manufacturing companies are not revealed; these factors can still distinguish one company from the other.

The second part of the schematic diagram refers to the factors that assess the operations of the *business firms*, and eventually their environmental costs. The *form of company* organization may or may not influence the scope of environmental costs and the amount of resources devoted to them. The form of company organisation not only gives experiences into environmental costs but also into the constraints that challenge their

implementation. Lastly, stakeholders exert pressure on the business firms by highlighting social, environmental, and cultural issues, which urge business firms to assume responsibility towards their commitment to these issues. These factors, when put together, may or may not influence each business firm's environmental costs.

2.7 Summary

Chapter 2 provided an explanation of the development of plastics, environmental costs, and financial performance. The developing understanding that organisations commit to working for social improvement is one of the reasons for the expanding pressure on organizations to practice and exhibit their obligation to environmental costs of plastic pollution. Moreover, the environmental cost of plastic on financial performance using prior research were examined. The stakeholder theory proposed in the literature review reveals the absence of reliable measurements for assessing the effect of environmental cost on financial performance. The challenge and unpredictability of estimating environmental cost and financial performance, despite the development in the number of organisations that take part in environmental costs were underscored. As explained in Chapter 2, most studies to date have revealed a positive relationship between environmental cost and financial performance but the discussion about the connection between environmental cost and financial performance remains unresolved. In the chapter that follows, the research design and methodology is discussed.

CHAPTER THREE

Research Methodology and Design

3.1 Introduction

Chapter 2 provided the literature underpinning the research questions stated in Chapter 1. This chapter presents the research methodology and research design utilised in this research. According to Bhana (2018), research is a process that incorporates the application of processes and objective methods to acquire scientific knowledge on a specific issue while excluding the researcher's personal feelings. Stead (2001) noted that researchers' scientific approaches should be unbiased, devoid of factors such as authority, traditional views, and personal preferences. Picardi and Masick (2013:10) argue that research is a complex, iterative process to ensure the reliability and validity of the study done. It entails collecting the most relevant methodologies and approaches to answer the research question, as the research question drives the research.

The study used the interpretivism paradigm. The interpretivism paradigm is the understanding of individuals relies on the interaction between the company's participants in observation. Research methodology is a systematic approach to solving a research problem that illustrates the logic behind research methods and strategies. Picardi and Masick (2013: 8) highlighted that research methodology is a learning process involving acquiring new knowledge or the advancement of existing knowledge to find an effective solution to a problem.

Induction and deduction are the two methods of reasoning that research can use to tackle a problem (Picardi and Masick, 2013:7). The researcher studied current literature and what prior researchers had done to generate the research issue that needed to be addressed. As a result, an inductive method was used. As asserted by Blumberg *et al.*, (2014:21) to induce something, is to draw a conclusion from one or more specific facts/realities or pieces of evidence, therefore the conclusion describes the facts or reality and the facts or reality support the conclusion. It is clear from the definitions above that research is carried out to develop and evaluate concepts and theories.

The first step in conducting research is to determine what kind of study is being done. Basic research and applied research are the two main categories into which research may be classified. According to Picardi and Masick (2013:8), basic research is research in which questions are produced to understand a phenomenon better. In contrast, applied research is conducted to fix a problem that has already occurred.

This study aims to assess the relationship of environmental costs on financial performance at two national plastic manufacturing companies in South Africa. Based on identifying the study category, the following step is to commence the research process. Picardi and Masick (2013:9) established a seven-step cyclical methodology for conducting research:

1. Identify the problem;
2. Use research to understand the situation better;
3. Develop the research problem;
4. Develop a methodology for conducting the study;
5. Obtaining data and analysing the outcomes;
6. Interpretation of findings; and
7. Arrive at a conclusion

In this research, the procedure stated above was used. This chapter provides an overview of the research approaches used, the method of data collection, specifics of the design of the data collection instruments, the target population, and sample techniques. This chapter also covers the interpretative analysis that is utilised to analyse the data in this study.

3.2 Research design

The research design is known as a complete research project, including research method, data collection techniques, and data analysis, and it can be influenced by both technical and contextual factors. In this study, the unit of analysis are two companies and because they have environmental costs funds, and their data are available in the public domain. The researcher aimed to assess the relationship on environmental costs on financial performance at two national plastic manufacturing companies in South Africa; hence, this study was case study research. A case study approach refers to examining a present

phenomenon set inside its genuine circumstance (Creswell and Poth, 2016: 84). The case study identifies with a set number of units of analysis, for example, the companies that are inquired about seriously (d'Errico *et al.,* 2005: 13).

The case study approach was utilised to get a more profound and extensive comprehension of the phenomena. A case study is the perfect approach when a total or comprehensive, top-to-bottom examination is required. However, this study uses a case study to investigate the interrelationships amongst people, companies, occasions, and perspectives (d'Errico *et al.,* 2005: 84). Gómez-Moutón *et al.* (2001: 149) maintain that a case study can be depicted as subjective in companies and describes a gathering under 2 to 5 companies. Case study research is reasonable for illustrative, enlightening, and exploratory research design. The case study contains the following characteristics:

I. *Intrinsic* - when the researcher has a curiosity about the situation;
II. *Instrumental* - when the case is used to see more than what is recognisable to the onlooker; and
III. *Collective* - while analyzing a gathering of instances.

As previously mentioned, two national plastic manufacturing companies were chosen as the case study for study and investigation. As indicated by Creswell and Poth (2016: 82), a case study will, in general, be study-centred, usually including plastic manufacturing perceptions (in the study) and attempting to offer a general comprehension of the research space. The case study was an assessment of environmental costs on financial performance at two national plastic manufacturing companies in South Africa.

Curwin, Slater, and Eadson (2013:65) understand the range of information linked to business problems and the extent to which that information is numerical or nonnumerical.

In a qualitative study, the researcher collects, interprets, and analyses data that cannot be easily quantified and expressed in numbers. The aim of qualitative research is to explore and gain an in-depth understanding from a situational perspective (Davies 2007:191). Since the assessment of two companies' contexts are not linear, an explanatory case study is the most appropriate to study the complexity of relationships and provide explanations of observed practices. Producing qualitative data implies a permanent judgement on data gathered and its position relatively to theory. This results in subjectivity

from the researcher since there is a need to interpret the social reality being studied. A cross-sectional study is a study of a specific phenomenon at a particular moment, whereas a longitudinal study is a study of a specific phenomenon over an extended period (d'Errico *et al.,* 2005: 84). Over four years from 2016 to 2019, the independent and dependent variables were calculated and analyzed in the current study. As a result, the current research study is longitudinal.

3.3. Data collection technique

The data collected in this study is through the compilation of secondary sources. According to d'Errico *et al.* (2005), secondary data were distributed through annual financial reports obtained from various sources. Three sorts of data sets were downloads from two plastic companies' annual reports. The first data set was the statement of comprehensive income, the second was the statement of financial position, and the third data set was the sustainability reports for the companies' environmental costs. The secondary data for this research study came from these data sets. "Secondary data" is defined by Blumberg, Cooper, and Schindler (2008:315) as "information or data that has already been acquired and recorded by someone else, usually for other purposes."

3.3 Population

The study's population comprises companies in the same industry: plastic manufacturing companies (Herak, Herak and Trifunac, 2011). There is an approximation of 52 plastic manufacturing companies listed on the Johannesburg Stock Exchange (JSE) in South Africa. However, there is a sample of 2 recorded in the study because they are currently leading in environmental costs and have a national scope of operations (Doorasamy, 2015). Restricted by the number of plastic manufacturing companies, the study assessed the environmental costs on the financial performance of only these two national plastic

manufacturing companies. Moreover, the study determined the assessment of only these environmental costs on financial performance at the two national plastic manufacturing companies between 2016 and 2019.

3.3.1 Sample size

Doorasamy, (2015) describes the sample size as a list population individual. The sample size was taken from the national plastic manufacturing companies. The sampling size is a non-probability sample size that depends on the study while of analysis. Nampak Ltd and Bowler Metcalf Ltd have an amount of capitalization with existing environmental costs between 2016 and 2019. The point of sampling concentrated on specific attributes of a population that were important to the study (Finlay, 2006). Bowler Metcalf Ltd and Nampak Ltd have different expertise as explained below:

3.3.2 Bowler Metcalf Limited (BML) (A)

Bowler Metcalf Ltd has some experience in the plastic packaging, cosmetic, home, pharmaceutical, and food industries, focusing on tailored solutions rather than big volume, typical markets (Bowler Metcalf’s annual report, 2019). Injection and blow moulding, extrusion (tubes and laminated tubes) with extensive printing and decoration capabilities and injection stretch blow moulding (PET) are examples of manufacturing methods. Plastic packaging was the subject of the research. BML integrates into the clients' supply chain, providing high-quality service and products at a cost that allows them to thrive alongside us. However, the company's long-term viability is based on ecologically friendly activities such as waste reduction, reuse, recycling, innovative technology, and increased consumer and community awareness.

3.3.3 Nampak Ltd (B)

Nampak Ltd has some specialization in the manufacturing and design of the product. Nampak is Africa's largest and most diverse packaging manufacturer. The company produces glass, paper, metals, and plastic (Nampak annual report, 2019). The study focused on plastic packaging products. Nampak Ltd takes an interest in the broad collection and re-using activities and keeps on putting huge time and assets into improving sustainable items *(*Chae *et al.,* 2018). Nampak works to limit the environmental cost effect by supporting and encouraging the reusing, re-using, and recovery of packaging (Maina and Bwisa, 2014).

Having discussed the sample companies, the following section clarifies how data analyses were collected for the study.

3.4 Data analysis

In this study, the content analysis was interpretative and was thus qualitative. Moreover, the capability of content analysis for the two national plastic manufacturing companies has underlined two characteristics: Objectivity and being methodical (Downe ‐Wamboldt, 1992). One of the many research approaches used to analyze content information is qualitative.

The qualitative content analysis moves beyond word checking to a more in-depth study of language to classify a large amount of information into a reasonable number of classifications indicating comparative implications (Stemler, 2000). These classifications can represent either certain correspondence or derived correspondence. The goal of content analysis is to "provide knowledge and understanding of the phenomenon under investigation" (Downe Wamboldt, 1992: 134). Content analysis is a profoundly adaptable method. It may be very well applied to a wide variety of unstructured data and can permit

data produced about manufacturing companies that are hard to access straightforwardly. In addition, it can permit a specific measure of longitudinal analysis with relative ease.

Stemler (2000) recommend surveying documents based on such criteria as authenticity (that the record is what it claims to be); credibility (regardless of whether there is reason to believe that the report's content has been or is twisted in some way); and representativeness (that the record is what it claims to be) (whether or not the documents inspected are illustrative of all conceivable applicable record as though specific sorts of documents are inaccessible or never again exist, generalisability will be jeopardized). These kinds of considerations will be essential to bear in mind while conducting a content analysis on a document, such as a company report (Downe Wamboldt, 1992: 134). Qualitative content analysis is a research approach for abstracting content information in a study using an effective coding and differentiating procedure.

In addition, there are three different content analysis methods: conventional, directed, and summative approaches (Davies and Hughes, 2014). In conventional content analysis, classes are obtained from information during information analysis. The study is typically ready to increase a more extravagant comprehension of wonder with this methodology (Creswell and Poth, 2016). The summative approach to content analysis is unique to the earlier two methodologies (Downe Wamboldt, 1992: 134). As opposed to examining the information in general, the content is regularly drawn closer to specific content. An analysis of the patterns prompts a translation of the logical importance of explicit content.

Thus, the study reports utilising content analysis from the methodology that breaks down composition types in a specific journal or explicit content in textbooks. Additionally, the study incorporates inspecting content identified within annual reports in two national plastic manufacturing companies (Morse and Field, 1995). The investigation began by counting the pages that secured explicit subjects, followed by descriptions and translations of the content, including assessing the nature of the content (Minkov *et al.,* 2017). Others

have thought about the impacts of content analysis with other information collected inside a similar research project, for example, contrasting preferences for different sorts of national plastic manufacturing (Martin*et al.,* 2012). In a summative approach to qualitative research, data analysis begins with distinguishing terms and searches for events of those words by hand or computer. On the other hand, word recurrence means that each distinct term is identified, along with the source or speaker (Mir, 2017). The study also sought to know the frequency of words used to refer to environmental costs and the fundamental parameters for using unequivocal versus indirect terms.

It can give essential bits of knowledge into how words are utilised. Moreover, the discoveries from this methodology are restricted by their inattention to the more extensive implications present in the information (Minkov *et al.,* 2017). As proof of dependability, the study depends on credibility. A component to exhibit credibility or inside consistency is to show that the literary evidence is steady with the understanding (Mannie *et al.,* 2014). For the study, validating the two national plastic manufacturing companies utilised for environmental costs would be essential to assess plastic pollution. To guarantee that precise data was transmitted to the interpretative analysis, the data was entered into a spreadsheet with a strong emphasis on precision.

Table 3.1: The general configuration of such an interpretative analysis guide

Items	Years	Data in Rand
Items from the research question	Year of the study	Rand

Table 3.1 Presents the general configuration of such an interpretative analysis guide. The data analysis is upheld by three categories: *Items* from the research questions, *year of study* and *data* (Rand) from the financial statement. The first categories are to distinguish

research questions. Care should be taken to choose the two plastic manufacturing companies' data illustrative of various research questions. However, the interpretative perspective is accepted that more views from the study upgrade the comprehension of the research problems.

This is particularly evident during the evaluation period of the research problems. It is recommended to begin by planning the interpretation utilising an interpretative analysis guide. An interpretative analysis guide is data about the research questions, such as the motivation for the study. The selection of secondary data sources assumed that the data would be reliable, appropriate for the study's scope, and error-free. The following section contains the Rigor and relevance for the study.

3.5 Rigor and relevance

The study's analysis incorporated pertinent information from various sources, such as documents, annual reports, and financial statements. This is an important strategy for ensuring the research's dependability (Chen *et al.,* 2018). Relevance is defined as getting a better understanding through the experiment. Rigor is a method of establishing trust or confidence in a research study's findings. The fact that a strict focus was maintained throughout the study demonstrates the legitimacy of this research endeavor. Herak *et al.,* (2011) stated that Relevance must be established for both objective and subjective investigations. The method approach used for this research additionally demonstrates the rigor of this research (Picardi *et al.,* 2013). Since any development in research might be questioned based on under-representing or being debased by different elements, Creswell *et al.,* (2008) advised moving beyond the method strategy by applying a generalizability theory-based variance partitioning technique.

Furthermore, it is commonly assumed that no experiment/study can be utterly devoid of threats to Rigor because every study contains at least one hazard (Creswell *et al.,* 2008).

The researcher has tried to identify all risks to rigor to develop a sound approach that maximizes the accuracy of interpreting the data while minimizing dangers to validity. To verify that the case meets the study's quality requirements, validity and dependability are confirmed (Potter and Levine‐Donnerstein, 1999). Internal and external validity were used as validity indicators in a study strategy to ensure high rigor regarding secondary data. Internal validity refers to the level to which the outcomes can be attributed to the independent variable and not to some other competing explanation: the level of confidence in a study's effect relationship (Hersh *et al.*, 2006). To prove a construct's validity, it must be linked to other well-known or previously validated measurements

If the measures fail to reflect the concepts crucial to the research questions, the study's findings may be invalidated (Creswell *et al.,* 2016). The researcher analyzed the measure (the dependent and independent variables) and discovered an effect on the research question to prove the study's internal validity. The two national plastic manufacturing companies taking part in this research are identical. As a result, the assessment of environmental costs (dependent variables) on their financial performance is investigated in this qualitative study (independent variable). External validity refers to the extent to which a study's findings may be generalized from a small sample group to make predictions about the entire population (da Costa *et al.* 2016). The study's participants all operate for the same company and face similar social, political, economic, legal, stakeholder activism, and intercultural concerns (Twycross and Shields, 2004). As a result, the findings of this study, which assesses the top national plastic manufacturers, could be applied to other national plastic manufacturing companies.

The researcher selected both the environmental cost and financial performance. Documentations were picked to increase a complete comprehension of the material flow process being investigated and avoid any misunderstandings (da Costa *et al.* 2016). These instruments guaranteed high validity. The data collection procedures used in the study were the correct ones to use because they produced the required results (Pratt *et*

al., 2016). The researcher downloaded secondary data from companies' annual report in public domain. To ensure that one's findings are credible, Goldberg (2018: 187-189) stated that rigor must be built during the research process. Twycross and Shields (2004) concur that it is challenging to be wholly objective and detached from a situation to comprehend it fully. Creswell *et al.,* (2016) suggest four concepts to assist qualitative researchers in ensuring the study's credibility:

I. Credibility - This refers to the reliability of the findings.
II. Reliability — Are the results consistent or predictable?
III. Confirmability - Are the findings supported by additional data sources? And,
IV. Transferability - Could the findings be useful in situations similar to the one studied?

The above criteria were used to ensure during this investigation. The researcher gathered referential adequacy materials such as annual reports that might be used to see if the established themes could support the data (Ronquest-Ross, Vink and Sigge, 2015). The researcher kept detailed records of the research procedure and obtained data. According to Creswell *et al.,* (2016), the above criteria were adequate to ensure a rigorous study.

Downloads ensured the reliability of secondary data from companies' annual reports on the two national plastic manufacturing companies from 2016-2019 on environmental costs and financial performance. The study's population and data collection methods are appropriate for the issue under research (Ronquest-Ross, Vink and Sigge, 2015). The interpretative analysis was utilised to quantify the reliability of the secondary data in this study. Furthermore, it would seem that the study is reliable. Reliability of the study was set up by utilising different sources of evidence. As a result, the study's findings are thought to be more exact and persuasive. The estimation is reliable if a similar result can be obtained on several occasions or different periods (Ameer and Othman, 2012). If the estimates for the sample are credible, the researcher can predict that the results can be extrapolated to a larger population (Creswell *et al.,* 2016).

Despite the rising literature on environmental cost, quantifying environmental cost remains difficult. There are many ways of understanding environmental cost activities in the literature, but they all have some limitations. The environmental cost data are assessed (access to financial statements); thus, the study's bias and the possibility of corporate favouritism are eliminated (Ronquest-Ross, Vink and Sigge, 2015). Access to financial statements is looking at the activities of the environmental cost of these two national plastics manufacturing companies. The study assesses over an extended period illustrative of the periods essential to test the dependent variables on the independent variable. Creswell *et al.,* (2016), accepted that the above measures are adequate to guarantee that a study had meticulousness.

The following section contains the Ethical considerations for the study.

3.6 Ethical considerations

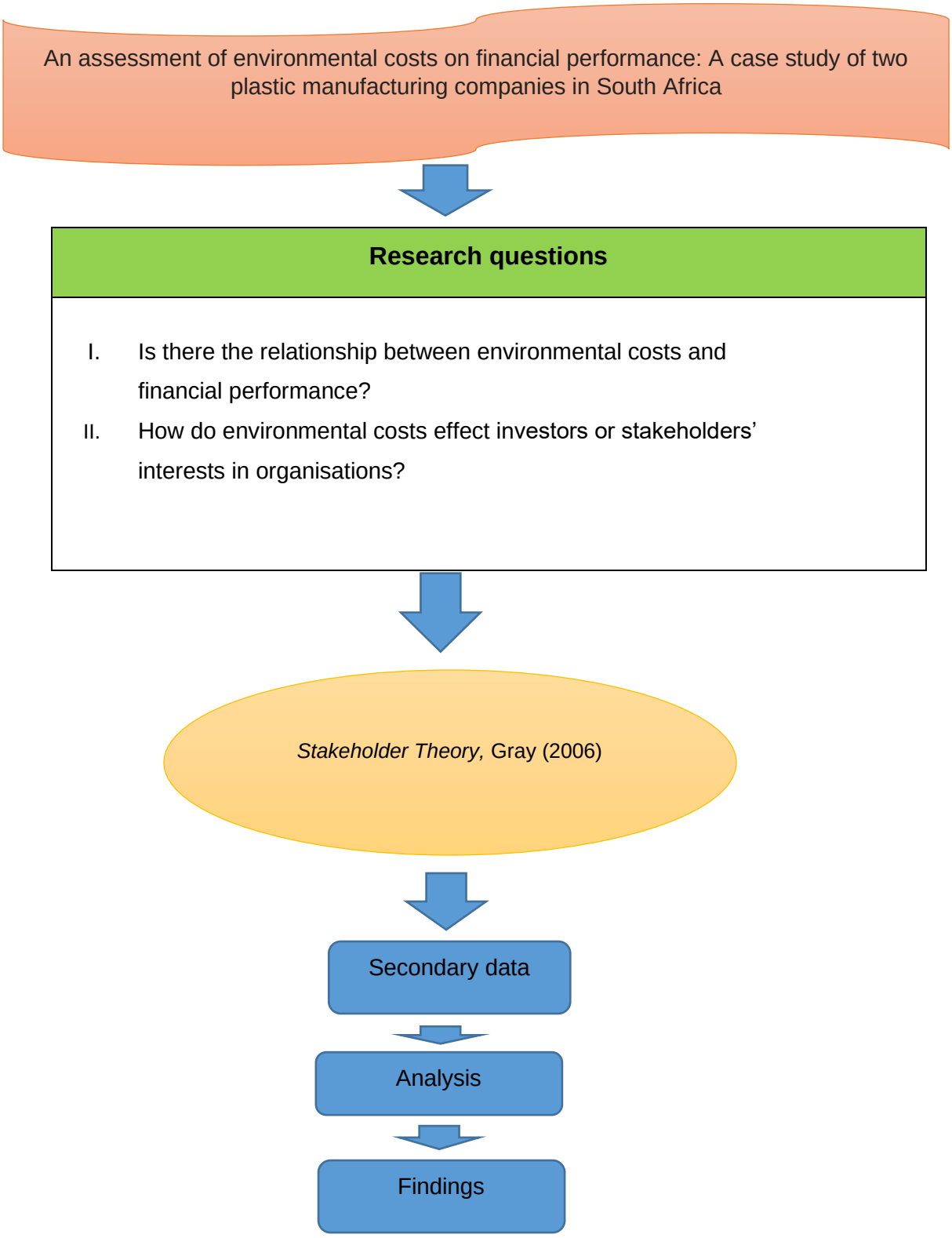
Ethics in the study are concerned with what is correct or wrong in the research. Researchers should endeavour to keep up objectivity and honesty to ethical standards in the study, showing the limitations of their discoveries, communicating their decisions precisely, legitimately and introducing their findings in a way that does not misrepresent the discoveries. Tunggal and Fachrurrozie, (2014) expressed that the study should be concerned about trustworthiness and regard for the privileges of participants. The sample population constituted two plastic national manufacturing companies. This study did not involve data collection and analysis from humans. For this reason, the study is not needed ethical clearance approval from the Faculty Research Ethics Committee (FREC) and Institutional Research Ethics Committee (IREC) of the Durban University of Technology. Secondary data was utilised, which are viewed as public information. The following paragraph discusses the research mapping.

3.7 Research mapping

Research mapping is a structured process that can help the study describe the details ideas about research. It is useful when the study involves relevant strategic planning.

3.1 The research mapping below illustrates the research process of the current study:

Figure: 3.1 Research mapping of the study



3.8 Summary

The approach and research methodology used to acquire the information required are discussed in this chapter. The researcher also discussed the pilot study's findings in this chapter. A content analysis method and interpretative analysis comprising of documentary evidence were used in this study. All attempts were made to guarantee that the instruments used as the research tools were valid and reliable publications and events. The following chapter will introduce a detailed discussion on the study's quantitative data analysis and discoveries. These outcomes were obtained from the qualitative data collection from the financial statement and were caught utilising interpretative analysis. However, the chapter will use interpretative analysis according to the study's research questions.

CHAPTER FOUR

PRESENTATION OF RESULTS AND DISCUSSION

4.1 Introduction

The previous chapter presented the research methodology. This chapter focuses on the presentation, interpretation, and discussion of current empirical findings. This chapter is based on specific research questions and relevant supporting information from the literature review. Three sorts of data sets were downloaded from the annual reports of the two plastic manufacturing companies which were in public domain. The first data set was the statement of comprehensive income, the second was the statement of financial position, and the third data set was the sustainability reports for the companies' environmental costs. The annual report is the best way to communicate between a company and its stakeholders, and it is held in high regard because it is comparable to audited financial statements. Financial performance data for the study was derived from annual reports.

The study used an interpretative analysis. The study focused on the two national plastic manufacturing companies in the country with the use of financial statements on the period of 2016 to 2019 as the 2020 financial statements were not available at the time of analysis phase in October 2020. The chapter will discuss the utilisation of a proposed model and theoretical Perspective: Research Questions. The significant relationship between environmental cost engagement in reducing plastic pollution and selected variables is further explained. The financial statements have been included in Annexures A, B, C and D

The next section discusses the research questions and the data analysis to support these questions.

4.2 Research questions

To recap, this study is based on the following research questions which address the research aim:

I. **Research question 1**: Is there the relationship between environmental costs and financial performance?

II. **Research question 2**: How do environmental costs effect investors or stakeholders' interests in organisations?

The tables below display the results between 2016 to 2019 regarding environmental cost activities' effect on financial performance.

Research question 1: Is there the relationship between environmental costs and financial performance?

All the tables in this chapter are extracts from the financial statements of the two national plastic manufacturing companies shown in the Annexures. Hence, the values are reflected in millions of the South African rands:

Table 4.1: Sales of plastics in the two plastic manufacturing companies (Revenue)

Financial Performance items	Years	BML	Nampak
Revenue (Sales)	2016	R 499.376	R 19.138.9
	2017	R 580.665	R 18.821.7
	2018	R 577.251	R 15.963.3
	2019	R 542.117	R 14.642.4

***Source**: Nampak's annual reports (2019:24); Bowler Metcalf's annual reports (2019:2)*

Table 4.1 shows the revenues (sales) of the two national plastic manufacturing companies between 2016 and 2019. It can be inferred that different components have a significant effect on a company's financial performance, as compared to its environmental costs. However, the sales of plastics which resulted for BML, and Nampak had a significant effect on their profitability.

BML (A)

Table 4.1 indicated that BML (Annexure B), had an increase in revenue to R 580.665 million in 2017. In addition, there is a decrease in revenue from R 577.251 million in 2018 to R 542.117 million in 2019. BML incorporates the supply chain of the clients, offering quality support and products at a cost that will help them prosper. However, Grant Andrew Böhler (Chief Executive Officer) claimed that company sold more plastics could be an interest in the sustainability practices through an incorporated system of waste decrease, recycling, innovative technologies, and the improvement of community awareness (Bowler Metcalf's annual reports (2019).

Nampak (B)

Table 4.1 reflected that Nampak (Annexure B), had an increase in revenue to R 19.138.9 million in 2016. In addition, there is a decrease in revenue from R 15.963.3 million in 2018 to R 14.642.4 million in 2019 which means that the decrease in revenue could be due to an increase in plastic penalties from 2018 to 2019. GR Fullerton (chief executive officer) highlighted that Nampak sold more plastics could be an interest in the reusing activities and it keeps on putting much time and assets into the improvement of sustainable items other to cover their contingent liabilities, provisions, and environmental costs funds (Nampak's annual reports, 2019).

Table 4.2: Contingent liabilities and provisions in the two national plastic manufacturing companies (in millions of the reported Rand currency)

Liabilities items	Years	BML	Nampak
Contingent liabilities	2016	R 540	R 83.6
	2017	R1.618	R 6.8
	2018	R 831	R 11.4
	2019	R 3.056	R 11.2
Provisions	2016	R 63.801	R 269.0
	2017	R 57.531	R 394.4
	2018	R57.21	R 416.1
	2019	R 50.301	R 332.9

***Source**: Nampak's annual reports (2019:65); Bowler Metcalf's annual reports (2019:37)*

Table 4.2 demonstrates the need to improve issues relating to the *contingent liabilities* (BML and Nampak) and *provisions* (Nampak) in the two national plastic manufacturing companies. These two national plastic manufacturing companies have been struggling to keep up with ever-increasing requirements (*Nampak's annual reports (2017); Bowler Metcalf's annual reports (2019)*. The major challenge faced by the two national plastic manufacturing companies is in the management of productivity in a way that increases their revenue while settling their obligations.

BML (A)

Table 4.2 reflected that BML (Annexure C), had a decrease in contingent liabilities to R 540 million in 2016. There is an increase in contingent liabilities from R831 million in 2018

to R3.056 million in 2019, which means that the company spent on settling the obligations identified with the term environmental costs: taxes (plastic penalties) (Table 4.3). However, BML had an increase in provisions to R 63.801 million in 2016. There is a decrease in provisions from R 57.21 million in 2018 to R 50.301 million in 2019. In a study directed by Hopewell, Dvorak and Kosior (2009) environmental costs such as plastic penalties were highlighted.

Nampak (B)

Table 4.2 depicted that Nampak (Annexure C), had an increase in contingent liabilities to R 83.6 million in 2016 compared to all other years, namely 2017, 2018 and 2019, which means that the company spent on settling the obligations identified with the term environmental costs: Taxes and government levies (plastic penalties) (Table 4.3). In addition, Nampak had an increase in provisions to R 394.4 million in 2017. Moreover, there is a decrease in provisions from R 416.1 million in 2018 to R 332.9 million in 2019, which means that the decrease in provisions should be because of less sales of plastics (Table 4.1). A study directed by Chang (2015) mentioned that the utilisation of contingent liabilities funds and provisions funds effectively at the reporting time will improve the value of companies. Furthermore, contingent liabilities and provisions represent the best estimate of the consideration necessary at the conclusion of the reporting period, taking risks into account.

The two national plastic manufacturing companies are in some ways, harm individuals or the government (Stötter and Schulte-Wülwer-Leidig 2019). Many plastics manufacturing companies need to guarantee equal responsibility regarding contingent liabilities and provisions issues. The high costs of satisfying obligations, known as contingent liabilities and provisions, lower a company's profit (Nizam *et al.,* 2019). This has shown that the plastic penalties are higher for these two national plastic manufacturing companies.

Table 4.3: Environmental costs in these two national plastic manufacturing companies (In millions of the reported Rand currency)

Liabilities items	Years	BML	Nampak
Plastic penalties (taxation, and levies)	2016	R 18.814	R 217.7
	2017	R 29.220	R 239.8
	2018	R 23.171	R 119.5
	2019	R 14.596	R 254.8

***Source**: Bowler Metcalf's 'annual reports (2019:36); Nampak's sustainability reports (2019:2)*

BML (A)

Table 4.3 showed that BML (Annexure C), had an increase in plastic penalties to R 29.220 million in 2017. Moreover, there is a decrease in plastic penalties from R 23.171 million in 2018 to R 14.596 million in 2019, which means that the company spent less on prevention and environmental management. This decrease in plastic penalties from 2018 to 2019 could be linked to a decrease in revenue from 2018 to 2019 (Table 4.1), These plastic penalties (taxation) are consistent with previous studies conducted by Prasetyo and Wahyuni (2019) which postulated the disclosure of environmental costs having a negative effect on revenue. Grant Andrew Böhler (CEO) is committed to ensuring that Bowler Metcalf limited is an environmentally responsible company and believe that integrated actions that they take within the operations to conserve natural resources and protect the environment make sound business sense (Bowler Metcalf's 'annual reports, 2019).

In 2019, Bowler Metcalf limited registered with several commitments as part of the environmental management system which it reduced the plastic penalties. These commitments are achieved to identify and comply with relevant legislative requirements, internal standards, as well as the requirements of stakeholders; promote environmental awareness, prevent pollution, and continually improve performance through focusing on the following aspects of the operations. The environmental costs faced by BML are plastic penalties, the taxes and charges based on environmental issues (prevention and environmental management). There is a decrease in revenue from 2018 to 2019, an increase in contingent liabilities from 2018 to 2019 and a decrease in plastic penalties from 2018 to 2019 which means that the company had no environmental cost issues. Hence, the decrease in plastic penalties from 2018 to 2019 did not impact the increase in net profit from 2018 to 2019. Therefore, a positive relationship exists between environmental costs and financial performance.

Nampak (B)

Table 4.3 reflected that Nampak (Annexure C), had an increase in plastic penalties to R 239.8 million in 2017. Moreover, there is an increase in plastic penalties from R 119.5 million in 2018 to R 254.8 million in 2019, which means that the company spent less on waste and emission control costs. that should be because of a decrease in revenue from 2018 to 2019 (Table 4.1). The finding also identifies with the negative situation described by Bhailall (2016), where the revenue, contingent liabilities, provisions, and environmental costs funds decrease simultaneously. The environmental costs faced by Nampak's plastic penalties are the government levies, taxes and charges related to environmental issues (waste and emission control costs). Table 4.1 indicated a decrease in *revenue* from 2018 to 2019, Table 4.2 also has shown a decrease in *contingent liabilities* from 2018 to 2019 and Table 4.3 presented an increase in *plastic penalties* from 2018 to 2019. Nampak increase in net profit from 2018 to 2019 (Table 4.4) which means that the company spent less in plastic penalties from 2018 to 2019. Hence, the relationships that exists between environmental costs and financial performance is negative.

GR Fullerton (CEO) claimed that Nampak acknowledges the role it has to play in providing products and services that minimise their impact on the waste and emission control costs (Nampak's sustainability reports, 2019). The group participates in extensive recycling programmes and continues to invest significant time and resources into the development of more sustainable products largely through their research and development facility. In 2018, Nampak registered with a number of producer responsibility recycling programmes as part of the South African waste regulations which it reduced the plastic penalties (taxation and government levies) (Rose 2019). Some examples of the research and development facility are continuing evaluation and qualification of new tinplate and aluminium suppliers, Broad use of our FEA modelling in light-weighting of plastic packaging and Extensive use of our 3D modelling capability for customers on new packaging designs. The environmental costs of the two national plastic manufacturing companies do not benefit both individuals and the environment.

Rose (2019) states that these positive outcomes probably improve the spending of the firms and decrease the cost of capital. Shoda *et al.* (2019) explored the idea of the impact between environmental costs and financial performance and found a negative association between them. Furthermore, Bhailall (2016) discovered that firms with a high environmental cost and those that surpass regulatory criteria have strong financial performance, whereas companies with poor environmental performance have poor financial performance. Hence, for Research Question One on the relationship between environmental costs and financial performance, there seems to be a positive relationship for one plastic manufacturing company BML (Company A) the period between 2016 and 2019. As previously mentioned in other chapters the study focused on 2016 to 2019 only as 2020 annual reports were not available on the database during the analysis phase of the study.

The next research question will explain the impact of the environmental cost on investors or stakeholders' interests in the organisations in this study.

Table 4.4: Net Profit in the two national plastic manufacturing companies (in millions of the reported Rand currency)

Financial Performance item	Years	BML	Nampak
Net Profit	2016	R 73.319	R 1.478.3
	2017	R 86.475	R 356.0
	2018	R 78.309	R 569.1
	2019	R 71.959	R 1.513.6

***Source**: Bowler Metcalf's annual reports (2019:2); Nampak's annual reports (2019:24)*

BML (A)

Table 4.4 indicated that BML (Annexure B), had a decrease in net profit from R78.309 million in 2018 to R71.959 million in 2019. In addition, there is an increase in net profit to R86.475 million in 2017. Net profit decrease may be linked with less funds on plastic penalties from 2018 to 2019. Bhailall (2016) mentioned that net profit was the high or low performance of the company which was reflected in the large or small profits that can be obtained by companies in a period. Therefore, the higher net profit of the company could have had an impact on environmental costs (Table 4.3).

Nampak (B)

Table 4.4 reflects that Nampak (Annexures B), had an increase in net profit (it mentioned on comprehension income as profit for the year) from R 569.1 million in 2018 to R 1.513.6 million in 2019. Moreover, there is an increase of R 2.162.8 million in 2016. This increase in net profit because of less funds spent on plastic penalties from 2018 to 2019 (Table

4.3). Kaza *et al.*, (2018) mentioned that the amount of net profit deducts all the expenditures and expenses during the period so that a company will increase the financial performance without any negative impact on the product quality which drives the company's operations more efficiently.

The next research question will examine the effect of the environmental cost on investors' or stakeholders' interests in the two companies in this study.

2.How do environmental costs effect investors' or stakeholder's interest in organisations?

This question will be answered in the two national plastics companies below (in millions of reported Rand currency):

Table 4.5: Shareholders' equity (in the two national plastic manufacturing companies)

Equity item	Years	BML	Nampak
Shareholders' Equity	2016	R 699.046	R9.203.5
	2017	R 661.247	R9.311.6
	2018	R766.12	R 10.140.3
	2019	R 678.899	R8.932.3

***Source**: Nampak's annual reports (2019:26); Bowler Metcalf's annual reports (2019:2)*

BML (A)

Table 4.5 (Annexure D) indicates that BML had a decrease in stakeholders' equity to R 661.247 million in 2017. In addition, there is an increase in stakeholders' equity from R 766.12 million in 2018 to R 678.899 million in 2019 which means that the Stakeholders' equity funds were high because of environmental costs had no negative impact on the Stakeholders' equity. The negative impact of plastic penalties on shareholders' equity funds are the taxes and charges based on environmental issues (prevention and environmental management).

BML's environmental costs are bound to generate costs in plastic penalties which did not lead to a negative effect on shareholders equity funds and the decrease in plastic penalties (taxes) directly did not affect stakeholders' equity. However, Table 4.2 Research question one also has shown an increase in contingent liabilities (from R831 million in 2018 to R 3.056 million in 2019) having a positive impact on the stakeholder's equity. The increase in contingent liabilities had to cover the environmental cost increases in relation to the shareholder equity fund. The environmental costs are consistent with the view that BML has many implicit contracts with stakeholders' equity. Therefore, the impact of environmental costs on investors' or stakeholder's interests is negative. The environmental costs being plastic penalties are not having a negative impact on stakeholders' equity in BML.

Nampak (B)

Table 4.5 (Annexure D) indicated that Nampak had an increase in stakeholders' equity to R 9.311.6 million in 2017. Moreover, there is a decrease in stakeholders' equity from R 10.140.3 million in 2018 to R 8.932.3 million in 2019 which means that the Stakeholders' equity funds were less because of environmental cost having a negative impact on the Stakeholders' equity. Table 4.3 Research Question One has shown an increase in environmental cost: plastics penalties (from R 119.5 million in 2018 to R 254.8 million in 2019) have a negative impact on Stakeholder's equity. However,–plastic penalties are costs, which bring no benefits to Nampak. Such as, the government levies, taxes and

charges related to environmental issues (waste and emission control costs). Plastic penalties are the entity costs to the manufacturing company. There is also a huge concern that environmental cost reduces Stakeholders' equity funds.

In addition, Table 4.2 Research Question One also presented a decrease in provisions (from R 416.1 million in 2018 to R 332.9 million in 2019) and a decrease in contingent liabilities (from R11.4 million in 2018 to R112 million in 2019) having an impact negative on the stakeholder's equity. Provisions and contingent liabilities are important because they account for Nampak expenses, it refers to Nampak's financial responsibilities, and any change in provisions and contingent liabilities also affects stakeholders' equity funds. Decrease in provision and contingent liabilities which Nampak is expected to cover the environmental cost decrease stakeholders' equity. The assessment of environmental cost on investors or stakeholders' interest in organizations is negative. Such discoveries would be in line with the findings of different studies regarding the increased impact of stakeholders' requests on firms (Mouheb *et al.,* 2012)

4.4 Theoretical Perspective: Research Questions

The next section discusses the Environmental costs

4.1 Environmental cost

Research question one examined the relationship between environmental cost and financial performance. The concept of "environmental cost," is viewed as having risen the environmental perspective about how to oversee physical assets with goals that are moderated to come (Watson *et al.,* 2004). Consequently, the environmental cost is about the financial performance exhibition of the company itself. Different aspects, such as community improvement costs, waste management costs, and environmental taxes and fines, determine how much environmental costs affect an industry's financial performance (Carroll, 2015: 20-23). However, environmental cost calls for financial development that

can diminish the incredible poverty of less developed nations because of approaches that support and grow the environmental accounting (Ayu, Gamayuni and Urbański, 2020).

Tunggal and Fachrurrozie (2014) contended that discretionary improvement in environmental costs, displays financial advantages. An example would be when pollution decreases, it ensures future cost reserve funds by expanding proficiency, diminishing environmental costs, and limiting future liabilities. The finding by Ifurueze *et al.,* (2013), contended that, accomplishing such targets as reducing environmental costs, growing salaries, and improving financial performance requires concentrating on current, future and potential environmental costs. Moreover, environmental costs, social qualities and advantages are viewed as being in a struggle with the stakeholder.

In addition, Nampak Ltd, and Bowler Metcalf Ltd used procedures that allowed a cost item to be categorised as “environmental costs” for one reason or another (Miles and Munilla, 2004). Others, on the other hand, designate a percentage of an item's or movement's cost as "environmental," while others use the term "environmental" for accounting purposes when a firm determines that a cost is more than 50% environmental (Miles, Covin and Heeley, 2000). Companies can indicate what should be attributed as an "environmental cost" and how to organize it based on their destinations and planned environmental accounting activities. Nampak Ltd, and Bowler Metcalf Ltd all reduce pollution protection in their capital planning; thus, they may want to consider separating environmental costs that can be avoided (Miles *et al.,* 2000). BML had a decrease in revenue from 2018 to 2019 (Table 4.1) and an increase in contingent liabilities from 2018 to 2019 (Table 4.3), which means that the decrease in revenue could be possibly linked to a decrease in plastic penalties from 2018 to 2019 (Table 4.3).

Nampak had a decrease in revenue from 2018 to 2019 (Table 4.1). There is a decrease in provisions from 2018 to 2019 (Table 4.2) and this could be because of decreased sales of plastics from 2018 to 2019 (Table 4.1) which means that the company spent less on construction obligations. As a result, it was determined that firms with high environmental

costs and firms that transcend regulatory requirements have strong financial performance, and firms with poor environmental performance have poor financial performance. Hence, for Research Question One on the relationship between environmental costs and financial performance, there seems to be a positive affirmation for BML. The following paragraph will discuss the Stakeholders' equity

4.2 Stakeholders' equity

Research question two examined the impact of environmental costs on investors' or stakeholder's interests in the organisations. Thus, it is important to search for a commitment from stakeholders to accumulate thoughts on how the company can use natural resources responsibly. The two national plastics manufacturing companies are being guided toward financial performance effectiveness, with a focus on incomes, cost-effectiveness, investments, marketing, strategies, and operations, as well as a large group of expert concepts aimed at increasing the organisation's long-term financial performance success. This could indicate that stakeholders' interest in environmental cost initiatives has grown in recent years, and that these national plastic manufacturing companies are responsive to stakeholders' requests. There is evidence that stakeholder contributions had a favourable influence on the two firms' environmental costs and financial performance. BML had a decrease in stakeholders' equity from 2018 to 2019 (Table 4.5), an increase in environmental cost: plastic penalties (from 2018 to 2019) (Table 4.3) having an impact negative on the stakeholder's equity.

BML's environmental costs are bound to generate costs in plastic penalties which lead to negatively affect shareholders' equity funds (Bowler Metcalf Limited, 2019:15-22). However, a decrease in provisions (from 2018 to 2019) (Table 4.3) having a negative impact on the stakeholder's equity. Nampak had a decrease in stakeholders' equity from 2018 to 2019 which means that the funds or capital investment were less because of environmental cost having an impact negative on the Stakeholders' equity funds. A

decrease in environmental cost: plastic penalties (from 2018 to 2019) (Table 4.3) having an impact negative on Stakeholder's equity. In addition, a decrease of provisions (from 2018 to 2019) (Table 4.2) having an impact, negative on the stakeholder's equity. Plastic penalties are the entity costs to the manufacturing company.

Stakeholders' equity funds are also being diminished as a result of environmental costs. Mitchell, Lee, and Agle (2017) suggest that urgency be included as a criterion. There is a lack of clarity in comprehending the dynamics of stakeholder interactions due to the lack of a consistent methodology for their identification, grouping, analysis, and management. This can be explained by the absence of consciousness and deliberate behavior, the fact that stakeholder attributes are socially constructed rather than objective reality, and the fact that stakeholder characteristics are changing rather than steady state (Choudhary and Shankar, 2013). This context dependence may, at least in part, account for the lack of a coordinated strategy for identifying stakeholders (Zhang *et al.,* 2013).

This makes the identification of stakeholders challenging, as BML and Nampak Ltd can change, depending upon the circumstances, which may have contributed to the absence of an established identification procedure (He, 2006). For any business, and more specifically, environmental and waste management activities, a diverse set of stakeholders has been identified (Elliott and Zhou, 2013). The Stakeholder Theory evaluated the assessment of environmental costs on financial performance at the two national plastic manufacturing companies. *Stakeholder Theory* is progressively needing a system that can clearly speak to the idea of both the environmental costs and financial performance. Which sees companies as a major aspect of a social system while concentrating on the different stakeholder groups inside the society (Ratanajongkol, Davey and Low, 2006). Reviewing the two national plastics manufacturing companies' sizes, the impact of environmental costs on investors' or stakeholder's interests in the organizations are turning out to be positive at BML.

4.6 Summary

The data was interpreted, and the important conclusions were provided in this chapter. The findings given, in terms of the impact of environmental costs on financial performance at South Africa's two national plastic manufacturing companies, were substantially in accordance with the literature review. The two national plastic manufacturing companies' main productivity problem is to find a strategy to improve revenue, and net profits while also dealing with growing contingent liability, provisions, and environmental costs. Lastly, it was concluded that firms with high shareholders' equity are the firms that exceed regulatory requirements and experience high environmental costs, contingent liabilities, and provisions while firms with negative environmental performance experience a decrease in financial performance (BML and Nampak).

The next chapter will discuss the accomplishment of the research objectives, the limitations of the study, the contributions of the study and will make recommendation and recommendations for future research

CHAPTER FIVE

Conclusion and recommendations

5.1 Introduction

The aim of this study was to investigate the assessment of the environmental costs on financial performance at the two national plastic manufacturing companies in South Africa. The objectives of the study were as follows: to examine the relationship between environmental costs and financial performance, and to examine the assessment of environmental costs on investors or stakeholder's interest in the organizations. The aim and objectives were accomplished in the previous four chapters. The aim of this chapter is to present a brief overview of the study, the contributions of the study, the limitations of the study, recommendations and future recommendations and conclusions for the current study.

5.2 Conclusion

5.2.1 Have the research questions been answered and the study aims and objectives were achieved

“The impact of environmental costs on financial performance in the two national plastic manufacturing companies”. As an outcome, the following research aim was set out:

I. This study aims to investigate the assessment of environmental costs on the financial performance at the two national plastics manufacturing companies in South Africa.

In order to accomplish the research aim, two research objectives were set out, namely:

Objective 1: To examine the relationship between environmental costs and financial performance. In order to achieve the first objective, the following Research question was set out:

I. **Research question 1: What type of relationship between environmental costs and financial performance*?***

Research Question One provided (Table 4.1, Table 4.2, and Table 4.3) sales of the plastics, contingent liabilities, provisions and the environmental costs in the two national plastics manufacturing companies between 2016 and 2019. BML had a decrease in revenue from 2018 to 2019 (Table 4.1) which means that the decrease in revenue could be linked to a decrease in plastic penalties from 2018 to 2019 (Table 4.3). Therefore, there is a negative relationship that exists between environmental costs and financial performance. In addition, Nampak had a decrease in revenue from 2018 to 2019 (Table 4.1).

There is a decrease in provisions from 2018 to 2019 (Table 4.2) could be because of less sales of plastics from 2018 to 2019 (Table 4.1) which means that the company spent less on construction obligations. So, the relationships that exist between environmental costs and financial performance are positive. Research Question One proved to be successful (positive) regarding the relationships between environmental costs and financial performance for BML (Company A) for the period between 2016 and 2019. The findings in Research Question One have shown that the two national plastic manufacturing companies have had an increase in environmental costs plastic penalties which has a partial positive impacted on these companies' profits to a certain extent.

Objective 2: To examine the impact of environmental costs on investors' or stakeholder's interests in the organizations. In order to achieve the third objective, the following Research question was set out:

II. Research question 2: *How do environmental costs effect investors' or stakeholder's interest in organisations?*

Research Question Two BML provided (Table 4.5), the stakeholder's equity in the two national plastic manufacturing companies between 2016 and 2019**.** Research Question One indicated a decrease in environmental cost: plastic penalties (from 2018 to 2019) (Table 4.3) and decrease in provisions (from 2018 to 2019) (Table 4.2) which may have not had an impact negative on the stakeholder's equity. So, there is a positive, impact of environmental cost on investors' or stakeholder's interest in organizations. BML had a decrease in stakeholders' equity from 2018 to 2019 (Table 4.5) which implies that the stakeholder's funds were less because of environmental costs having an impact negative on the Stakeholders' equity funds. Therefore, there is a positive impact of environmental costs on investors' or stakeholder's interests for BML.

Nampak had a decrease in stakeholders' equity from 2018 to 2019 which means that the funds or capital investment were less because of environmental cost having an impact negative on the Stakeholders' equity funds. Research Question One indicated a decrease in environmental cost: plastic penalties (from 2018 to 2019) (Table 4.3) and a decrease of provisions (from 2018 to 2019) (Table 4.2) having an impact negative on Stakeholder's equity. The impact of environmental cost on investors' or stakeholder's interest in Nampak is negative. As per the above discussion, BML and Nampak have addressed the various degrees of stakeholders' interest during the four years of the period of study.

In conclusion, the study concluded that environmental costs have an impact on financial performance at two national plastics manufacturing companies in South Africa, achieving the second research objective. All two objectives set out at the start of the research project have been achieved. The findings in Chapter four ensured that, the research aim was achieved. The following section will discuss the limitations of the study.

5.3 Limitation of the study

The impact of plastics manufacturing companies' environmental cost activities on their financial performance is investigated in this study. The study used a more refined technique that combines stakeholder feedback in rating the social responsibility activities of plastics manufacturing companies, as access to a financial statement is clear in its business practices. The following limitations are made:

I. Apart from the access to financial statements that participates in plastics manufacturing businesses on all the environmental costs activities that were evaluated in this study, the study discovered no literature on any rating agency. The Sustainability Index of the JSE is the most well-established of the several environmental cost-related indices described, with a focus on environmental issues.

II. Access to financial statements places a far greater emphasis on being trustworthy and appropriate for the task at hand. However, access to financial statements offer “a company an information base for monitoring the conduct of plastics manufacturing companies”.

III. The scope of the research was limited to determining the environmental costs of two national plastic manufacturing companies in South Africa. As a result, the findings are not generalizable.

IV. The study did not analyse any of the data using statistics. The findings therefore represent the researcher’s interpretations of any relationships in the variables under study.

5.4 Contributions of the study

The study's focus was on the assessment of environmental costs on financial performance at South Africa's two national plastic manufacturing companies. According to the findings, the study will benefit South African plastic manufacturing companies. The findings contended that an increase in environmental costs may have an impact on financial performance and environmental costs are viewed as being in a struggle with stakeholder benefits in the two national plastics manufacturing. The study identified that a gap in environmental costs and financial performance research regarding waste management in the two national plastic manufacturing companies has many advantages; for example, reduced environmental costs empower companies to increase financial performance (Aggarwal, 2013). The findings can also be used to reduce environmental costs and redirecting waste from landfills to re-using. The study empowers a company to make an environmental profit. In addition, Gartenberg and Serafeim (2019) contend that discretionary improvement in environmental costs regularly give financial advantages as plastic pollution decreases.

In a study conducted by Hopewell, Dvorak and Kosior (2009), the assessment of environmental cost on collecting and sorting plastic re-use was distinguished. Plastic pollution is an overcoming these obstacles to the recovery and re-use companies. Furthermore, the fact that environmental concerns rank last among the challenges examined by the two national manufacturing companies in this study demonstrates the importance placed on plastic re-use. Moreover, in the absence of additional legislative mandates, further progress in reusing plastics may be slower. Therefore, a second gap was identified between environmental cost and plastic pollution relationship research. Moreover, the study will contribute towards environmental costs research specifically focusing on the assessment of environmental cost on financial performance which has not been previously researched. The following section will discuss the recommendations for the study.

5.5 Recommendations made by the study

This research recommends the studies to investigate the purported linkages between environmental costs and financial performance regarding national and international plastics manufacturing companies. The following suggestions are made:

I. Reliable metrics should be utilized to measure the sustainability of organizations, which recognize shifting degrees of environmental cost. This would allow for the improvement of an interpretative analysis that more precisely reflects the relationship between environmental cost and financial performance.

II. The impact of environmental costs on financial performance at the two national plastics manufacturing companies, using accounting-based measurements, can be explored. This would explore another dimension of the purported environmental cost/financial performance linkages and assess firm-level components, which invariably play a role in the financial performance of organizations.

III. Larger samples should be utilized to test the assessments of environmental costs on profitability. This would empower these tests to be conducted within industries while meeting the sample requirements of measurable analysis.

IV. Studies should be directed on the performance of the environmental cost of plastic pollution in other emerging markets. This would give impulses to a decision to be submitted on the uptake of environmental costs in developing business sectors.

5.6 Recommendations for future research

The current research study assists in bridging the knowledge gap by investigating the assessment the impact of environmental costs on financial performance at the two national plastics manufacturing companies in South Africa. However, further study is needed to determine whether there is a causal relationship between environmental costs and

corporate financial performance. Future research should also look at the link between environmental costs and financial performance of other national and abroad manufacturing firms.

5.7 Conclusion

This chapter provided a summary of the research study. The chapter explained the achievement of the research aim and the research objectives. The findings have revealed that the study will contribute to the plastics manufacturing companies in South Africa. The findings revealed that there is a need for increased environmental costs which has had a negative to financial performance of one out of the two companies. Furthermore, the interpretative analysis results showed the impact of environmental costs on financial performance. As a result, the study concluded that environmental costs have an impact on financial performance in the period of 2016 to 2019 at BML and Nampak. This research recommends the future studies to investigate the relationship between environmental costs and financial performance of other national and international manufacturing companies. The study suggests that the two national plastic manufacturing companies should keep on putting resources into environmental cost activities as much as practicable due to the result of growth in financial performance.

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ANNEXURE A: ETHICAL CLEARANCE FOR SECONDARY DATA

Sent: Wednesday, 19 May 2021 16:27
To: Anrusha Bhana <AnrushaB@dut.ac.za>
Subject: Re: ETHICAL CLEARANCE FOR SECONDARY DATA

Hi Anrusha
Usually, you would not need ethical clearance for existing data if it is in the public domain. However, you are using sensitive data (financial statements) that is not publicly available. You will need to find out from the company what they need for your student to have access to the data.

hope this helps.
Take care

DR MOGIE RAJKOOMAR
Postgraduate Coordinator

Department of Information Systems
Faculty of Accounting & Informatics
Durban University of Technology

P O Box 1334, Durban, 4000, South Africa

Tel: +27 31 373 6776/5446
Email: mogier@dut.ac.za

www.dut.ac.za

ANNEXURE B: Plastic revenues, and Net profits

S&P Capital IQ

Bowler Metcalf Limited (JSE:BCF) > Financials > Income Statement

In Millions of the reported currency, except per share items.	**Template:**	Standard		**Restatement:**
	Period Type:	Annual		**Order:**
	Currency:	Reported Currency		**Conversion:**
	Units:	S&P Capital IQ (Defau		**Decimals:**
	Source:	Capital IQ & Proprieta		

Income Statement

For the Fiscal Period Ending	**12 months Jun-30-2016**	**Reclassified 12 months Jun-30-2017**	**12 months Jun-30-2018**	**12 months Jun-30-2019**
Currency	***ZAR***	***ZAR***	***ZAR***	***ZAR***
Revenue	499.376	580.665	577.251	542.117
Other Revenue	-	-	-	-
Total Revenue	**499.376**	**580.665**	**577.251**	**542.117**
Net profit	**73.319**	**86.475**	**78.309**	**71.959**

A B C D E

S&P Capital IQ

Nampak Limited (JSE:NPK) > Financials > Key Stats

In Millions of the trading currency, except per share items.	**Currency:**	Trading Currency		**Conversion:**
	Order:	Latest on Right		**Units:**
	Decimals:	Capital IQ (Default)		**Dilution:**

Key Financials[1]

For the Fiscal Period Ending	**12 months Sep-30-2016A**	**12 months Sep-30-2017A**	**12 months Sep-30-2018A**	**Press Release 12 months Sep-30-2019A**
Currency	***ZAR***	***ZAR***	***ZAR***	***ZAR***
Total Revenue	**19,138.9**	**17,401.8**	**17,309.8**	**14,642.4**
Growth Over Prior Year	*10.7%*	*(9.1%)*	*(0.5%)*	*(15.4%)*
	9,097.4	**8,257.3**	**7,887.8**	**14,642.4**
Margin %	*47.5%*	*47.5%*	*45.6%*	*100.0%*
Net profit	**1,478,3**	**356,0**	**569,1**	**1,513,6**

ANNEXURE C: Liabilities items

S&P Capital IQ

Bowler Metcalf Limited (JSE:BCF) > Financials > Balance Sheet

In Millions of the reported currency, except per share items.	**Template:**	Standard		**Restatement:**
	Period Type:	Annual		**Order:**
	Currency:	Reported Currency		**Conversion:**
	Units:	S&P Capital IQ (Defau		**Decimals:**
	Source:	Capital IQ & Proprieta		

Balance Sheet

Balance Sheet as of:	**Jun-30-2016**	**Jun-30-2017**	**Reclassified Jun-30-2018**	**Jun-30-2019**
Currency	***ZAR***	***ZAR***	***ZAR***	***ZAR***
Liabilities				
Contigent liabilities	540.0	1.618	831.0	**3.056**

S&P Capital IQ

Nampak Limited (JSE:NPK) > Financials > Balance Sheet

In Millions of the reported currency, except per share items.	**Template:**	Standard		**Restatement:**
	Period Type:	Annual		**Order:**
	Currency:	Reported Currency		**Conversion:**
	Units:	S&P Capital IQ (Defau		**Decimals:**
	Source:	Capital IQ & Proprieta		

Nampak Limited (JSE: NPK)

Balance Sheet

Balance Sheet as of:	**Reclassified Sep-30-2016**	**Restated Sep-30-2017**	**Sep-30-2018**	**Press Release Sep-30-2019**
Currency	***ZAR***	***ZAR***	***ZAR***	***ZAR***
Liabilities				
Contingent liabilities	83.6	6.8	11.4	11.2
Provisions	269	394.4	416.1	332.9

S&P Capital IQ

Bowler Metcalf Limited (JSE:BCF) — ***NOTES TO FINANCIAL STATEMENTS***

In Millions of the reported currency, except per share items.	**Template:**	Standard		**Restatement:**
	Period Type:	Annual		**Order:**
	Currency:	Reported Currency		**Conversion:**
	Units:	S&P Capital IQ (Defau		**Decimals:**
	Source:	Capital IQ & Proprieta		

NOTES TO FINANCIAL STATEMENTS

For the Fiscal Period Ending	12 months	Restated 12 months	Restated 12 months	12 months
	Jun-30-2016	Jun-30-2017	Jun-30-2018	Jun-30-2019
Currency	*ZAR*	*ZAR*	*ZAR*	*ZAR*
PLASTIC PACKAGING (TAXATION)	18.814	29.22	23.171	14.596

Nampak Limited (JSE: NPK)

Cash Flow

For the Fiscal Period Ending	Restated 12 months	Reclassified 12 months	12 months	Press Release 12 months
	Sep-30-2016	Sep-30-2017	Sep-30-2018	Sep-30-2019
Currency	*ZAR*	*ZAR*	*ZAR*	*ZAR*
suntainability report				
Plastic P Taxation	199.1	214.0	94.0	239.0
Government Levies	18.6	25.8	25.5	15.8

ANNEXURE D: Stakeholders' Equity

S&P Capital IQ

Bowler Metcalf Limited (JSE:BCF) > Financials > Capital Structure Summary

In Millions of the reported currency, except ratios and % of Total values.	**Restatement:**	Latest Filings	**Period Type:**	Annual
	Currency:	Reported Currency	**Conversion:**	Historical
	Units:	S&P Capital IQ (Defau	**Decimals:**	Capital IQ (Default)
	Order:	Latest on Right		

Capital Structure Data

For the Fiscal Period Ending	12 months October-30-2016		12 months October-30-2017		12 months October-30-2018		12 months October-30-2019	
Currency	*ZAR*		*ZAR*		*ZAR*		*ZAR*	
Units	**Millions**	**% of Total**	**Millions**	**% of Total**	**Millions**	**% of Total**	**Millions**	**% of Total**
Total Debt	0	*0.00%*	0	*0.00%*	0	*0.00%*	0	*0.00%*
Stakeholders' Equity	699.046	*100.00%*	661.247	*100.00%*	766.12	*100.00%*	678.999	*100.00%*

Nampak Limited (JSE:NPK) > Financials > Capital Structure Summary

In Millions of the reported currency, except ratios and % of Total values.

Restatement:	Latest Filings	**Period Type:**	Annual
Currency:	Reported Currency	**Conversion:**	Today's Spot Rate
Units:	S&P Capital IQ (Defau	**Decimals:**	Capital IQ (Default)
Order:	Latest on Right		

Capital Structure Data

For the Fiscal Period Ending	12 months Sep-30-2016		12 months Sep-30-2017		12 months Sep-30-2018		12 months Sept-30-2019	
Currency	*ZAR*		*ZAR*		*ZAR*		ZAR	
Units	**Millions**	**% of Total**	**Millions**	**% of Total**	**Millions**	**% of Total**	**Millions**	**% of Total**
Total Debt	7,524.9	*44.3%*	8,782.9	*47.6%*	9,013.1	*45.9%*	9,111.10	45.90%
Stakeholders' Equity	9,202.5	*54.2%*	9,310.6	*50.4%*	10,139.3	*51.7%*	9,420.50	50%
Total Preferred Equity	1.0	*0.0%*	1.0	*0.0%*	1.0	*0.0%*	1	0.00%

EDITING LETTER

696 Clare Road

Clare Estate

Durban

4091

06 April 2022

To: Whom it may concern

Editing of Master's Thesis: KF Aliamutu (21959563)

AN ASSESSMENT OF ENVIRONMENTAL COSTS ON FINANCIAL PERFORMANCE: A CASE STUDY OF TWO PLASTIC MANUFACTURING COMPANIES IN SOUTH AFRICA

This letter serves as confirmation that the aforementioned thesis has been language edited.

Any queries may be directed to the author of this letter.

Regards

MP MATHEWS

Lecturer and Language Editor: DUT

mercillenem@dut.ac.za