Towards Measuring Corporate Sustainability in the Nelson Mandela Bay Automotive Manufacturing Sector

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Towards Measuring Corporate Sustainability in the Nelson Mandela Bay Automotive Manufacturing Sector

By

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DECLARATION

I, Abulele Adams 207012203, hereby declare that the thesis for MSc Geography to be awarded is my own work and that it has not previously been submitted for assessment or completion of any postgraduate qualification to another University or for another qualification.

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DEDICATION

To my mother, Lindelwa Makubalo, without whom, my studies would not be possible.
ACKNOWLEDGEMENTS

I would like to acknowledge my dearest mother, aunt, Siphiw’Okuhle Adams, Lubabalo Adams and Songezo Adams for their constant support and prayers throughout this long journey. Without them, this would not be possible.

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ABSTRACT

This study explored the methods available for measuring corporate sustainability and created an instrument to measure corporate sustainability in the Nelson Mandela Bay (NMB) automotive manufacturing sector. The instrument was created based on three components of sustainability which are environment, society and economy. The study went a step further and added a fourth dimension, current trends to design a measuring instrument. The instrument was then applied on participating companies and further refined to improve it.

A total of 16 multi-dimensional indicators to measure corporate sustainability were created and applied to 12 companies in the automotive manufacturing sector. The indicators were used to create a composite corporate sustainability index which can be used to compare the corporate sustainability performance of companies. These indicators were created based on theoretical research and fist hand experience observing the automotive manufacturing sector in the NMB. The indicators were applied to companies as a pilot to test whether they are feasible. Following this, the indicators were refined, improved and applied to more companies to measure corporate sustainability performance. The results of the study were the measuring instrument created, the creation of a composite index as well as the application of the instrument on 12 companies to determine whether the instrument was refined enough to detect differences in the corporate sustainability performance of companies.

The results are discussed and further recommendations are made for improvements in the creation and application of the instrument to measure corporate sustainability in the NMB automotive manufacturing sector.
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<th>Description</th>
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<tbody>
<tr>
<td>AHP</td>
<td>Analytical Hierarchy Process</td>
</tr>
<tr>
<td>ACCA</td>
<td>Association of Charted Certified Accountants</td>
</tr>
<tr>
<td>BC</td>
<td>Before Christ</td>
</tr>
<tr>
<td>BRICS</td>
<td>Brazil, Russia, India, China and South Africa</td>
</tr>
<tr>
<td>CS</td>
<td>Corporate Sustainability</td>
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<td>CSR</td>
<td>Corporate Social Responsibility</td>
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<tr>
<td>DJSI</td>
<td>Dow Jones Sustainability Index</td>
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<tr>
<td>DJSW</td>
<td>Dow Jones World Index</td>
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<tr>
<td>SASB</td>
<td>Sustainability Accounting Standards Board</td>
</tr>
<tr>
<td>EMAS</td>
<td>Eco-Management and Audit Scheme</td>
</tr>
<tr>
<td>EMS</td>
<td>Environmental Management System</td>
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<tr>
<td>GDP</td>
<td>Gross Domestic Product</td>
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<tr>
<td>GM</td>
<td>General Motors</td>
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<td>GRI</td>
<td>Global Reporting Initiative</td>
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<td>ISO</td>
<td>International Organisation for Standardisation</td>
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<tr>
<td>JSE</td>
<td>Johannesburg Stock Exchange</td>
</tr>
<tr>
<td>NGO</td>
<td>Non Governmental Organisation</td>
</tr>
<tr>
<td>NMB</td>
<td>Nelson Mandela Bay</td>
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<td>NMBM</td>
<td>Nelson Mandela Bay Municipality</td>
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<tr>
<td>OECD</td>
<td>Organization for Economic Cooperation and Development</td>
</tr>
<tr>
<td>SASB</td>
<td>Sustainability Accounting Standards Board</td>
</tr>
<tr>
<td>SHE</td>
<td>safety, health and environmental</td>
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<tr>
<td>SRI</td>
<td>Socially Responsible Index</td>
</tr>
<tr>
<td>UNEP</td>
<td>United Nations Environment Programme</td>
</tr>
<tr>
<td>USA</td>
<td>United States of America</td>
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<td>VW</td>
<td>Volkswagen</td>
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CHAPTER 1
INTRODUCTION

1.1 INTRODUCTION

The idea of sustainable development has grown both in recognition and importance in the global era where stakeholders have influence on corporation relations and easy access to information. From the perspective of corporations, sustainable development has traversed from being principally an environmental concern, to one that involves business’s integrating sustainable development principles into their practices (Delai and Takahashi, 2013). Growing environmental concerns amongst stakeholders such as pollution and greenhouse gas emissions put corporations under scrutiny. This has led to increasing recognition, monitoring and reporting of corporate sustainability by corporations (Krajnc and Glavič, 2005; Roca and Searcy, 2012). As a concept, corporate sustainability implies that companies place and implement strategies to meet the various expectations of consumers of a product, managers of corporations and the general public in addition to meeting the goals of sustainable development (Hahn and Kühnen, 2013; Lozano, 2013; Roca and Searcy, 2012; Van Marrewijk, 2003).

Environmental and social issues such as carbon emissions of corporations and employees being paid less than minimum wage are at the forefront of many consumers’, producers’ and international agendas. Therefore, these must be taken into account in a corporation. The implementation of corporate sustainability has gathered impetus as a result of increased demands for accountability by stakeholders (Van Marrewik, 2003) and of late, the concept has become crucial for sustainable business practice (Roca and Searcy, 2012). Although the exact contribution of corporations to present day environmental and social problems is under debate, the main areas of discussion are now how to integrate corporate sustainability into corporations’ business strategy and not whether or not a corporation should invest in corporate sustainability (Epistein, 2008). The debate around how to integrate corporate sustainability into corporation business strategy has led to the definition of corporate sustainability. This definition of corporate sustainability is one that is continually evolving. The evolution is occurring as understanding on how to measure and integrate the concept into business practice evolves (Linnenluecke and Griffiths, 2013). Part of
measuring corporate sustainability involves the use of indicators and composite indices which are useful tools to translate corporate sustainability into measurables and to identify trends in company corporate sustainability performance (Mori and Christodoulou, 2012).

Not only are indicators used to measure corporate sustainability, they are also used to report on the corporate sustainability performance of a corporation. The number of corporations publically sharing corporate sustainability initiatives has increased over the years (Roca and Searcy, 2012). There are a number of corporate sustainability reporting frameworks with indicators structured around the triple bottom line of sustainability such as the Dow Jones Sustainability Index (DJSI) and Sustainability Accounting Standards Board (SASB). These frameworks have been made available to the public with the most prominent being the Global Reporting Initiative (GRI) which details the indicators which should be used when measuring and reporting on corporate sustainability. Although the frameworks provide the necessary general guidance for corporate sustainability reporting and the indicators which can be used, the design and creation of indicators, which should be specifically tailored for a company or sector, must be more specific in order to allow for company or sector specific evaluation (Linnenluecke and Griffiths, 2013). Literature tends to focus on the benefits of corporate sustainability monitoring and reporting, how the concept has evolved to what it is today, measuring it using the indicators commonly used in sustainability reporting frameworks such as the GRI, DJSI and definitions of sustainability reports (Roca and Searcy, 2012). The growing body of available research on corporate sustainability reporting does not contain enough literature that focuses on the design of indicators that capture the complicated three dimensions, (economy, society and environment), of the triple bottom line concept of sustainability.

This study proposes a set of indicators which aim to capture corporate sustainability as close to the definition of sustainability, its parent concept, in the best way possible. The focus is on developing multi-dimensional corporate sustainability indicators and applying these indicators on International Organisation for Standardisation (ISO) 14001 certified corporations in the NMB municipal area automotive manufacturing sector. The study examines the idea of the perfect set of multi-dimensional corporate sustainability indicators. The aim is to create a multi-dimensional indicator system that
can be used to evaluate the corporate sustainability in the NMB municipal area’s automotive manufacturing sector. This is done in order to identify the challenges associated with designing and implementing multi-dimensional corporate sustainability indicators.

1.2 CORPORATE SUSTAINABILITY: AN INTRODUCTION

Since the term was coined, there have been many variations of the definition for sustainability which have surfaced. Some define sustainability as a point where the biophysical capacity of the earth is not surpassed, a standard of living for all is maintained and all this is achieved by not infringing on governance and values of society (Robinson, 2004). The concept of the triple bottom line where social performance, environmental performance and the economic performance intersect have equal value in order to use resources so that they are not depleted was one of the concepts in which corporate sustainability originated from (Linnenluecke and Griffiths, 2013).

With sustainability being the overarching concept, sustainable development was a concept which evolved from it. With sustainable development, there are many definitions and it appears to be vague, however the common, accepted definition that has been used from the Brundtland Commission Report (1987) states:

Sustainable development is development that meets the needs of the present without compromising the ability of future generations to meet their own needs”. It contains within it two key concepts:

- the concept of 'needs', in particular the essential needs of the world's poor, to which overriding priority should be given; and
- the idea of limitations imposed by the state of technology and social organization

As previously mentioned, on the international front, corporations are increasingly making corporate sustainability part of their day- to- day business. This is because of various government regulations, consumers being increasingly ‘green’, realizing that corporate sustainability can help with competitive advantage and thus lead to financial gain and other forces such as non-governmental organizations (NGOs) (Epstein,
Towards the common goal of sustainable development, corporate sustainability is a tool that will prove to be most useful in achieving this goal. There are many names by which this concept is known; corporate social responsibility and corporate social investment are two (Linnenluecke and Griffiths, 2013). The term corporate sustainability as used in this study encompasses all that is involved in a company making a positive impact on environment, society and the economy. It must however be pointed out that this term, corporate sustainability, is vague and is not concrete. It involves many aspects and therefore has been interpreted differently by different people (Quadduss and Siddique, 2011).

1.3 BACKGROUND TO THE STUDY AND PROBLEM STATEMENT

Emerging economies such as Brazil, India, China and South Africa, have been in the spotlight with regards to the impacts that corporations have on the environment (Association of Charted Certified Accountants and GRI, 2009). The South African and NMB municipal area economies have experienced significant growth since 1994. Nationally and locally, industrial expansion has been at the heart of this growth. However, this economic growth has occurred at the expense of environmental and socio-cultural issues. Issues such as industrial waste, mismanagement of natural resources and salary/wage inequalities have received much attention. Historically, the financial bottom line was the main focus for corporations and environmental and social issues were neglected (Langenwalter 2007). Today, many corporations have heeded the call for sustainable development in a business sense and have implemented corporate sustainability strategies in efforts to better represent themselves to stakeholders, gain competitive advantage and reduce the impacts of climate change (Roca and Searcy, 2012).

The NMB municipal area contributes significantly to the national economy, with a share of 42% and 8.1% of the Gross Geographic Product of the Eastern Cape and South Africa, respectively. This area has been a strong place for industrial growth with many prominent corporations sprouting over the years. Manufacturing is the largest industry in the NMB municipal area with large vehicle assembly plants available; Volkswagen (VW) and General Motors (GM) being two of the six in the country (Nelson Mandela Bay Business Chambers, 2011). Manufacturing accounts for 67% of the total output.
from the province. It is also important to note that 60% of all manufacturing exports from NMB are from the automotive industry (Horn and Lloyd, 2013).

There has been increased pressure from various stakeholders on corporations to be accountable not only for the economic aspects but to include social and environmental accountability. This has made corporate sustainability grow in importance and corporations need to take action in this regard (Blowfield and Murray, 2011). Understanding and evaluating the state of corporate sustainability in a corporation is a means to take action and be more transparent and accountable to stakeholders.

The growth of the industrial sector of the NMB municipal area is the motivation behind creating and applying an instrument that can be used to evaluate corporate sustainability. The lack of a robust corporate sustainability framework has hindered efforts to adequately assess the effectiveness of corporate sustainability efforts of corporations in the automotive manufacturing sector in the NMB municipal area. This problem is compounded by the lack of multi-dimensional indicators to assess corporate sustainability. The available frameworks to measure and report on corporate sustainability usually address three dimensions of sustainability (economic, social and environmental) separately, instead of looking at them holistically (Lozano 2013).

In addition, industrializing countries such as South Africa face environmental and social problems such as waste disposal problems, pollution and loss of biodiversity (Lourenco and Branco, 2013). As a result of this, corporate sustainability strategies can be seen as methods to reduce the negative environmental impacts caused by companies. Evaluating the efficiency of corporations in a country or city with regards to corporate sustainability is essential in order to determine the current state and the areas that need improvement. Research around corporate sustainability has concentrated much on developed countries with limited focus on emerging economies (Yang, 2011). This makes focus on evaluating the corporate sustainability of developing countries a necessity. In NMB, corporate sustainability of corporations in the automotive sector has not been evaluated. In addition to this, the creation of indicators and an index to measure corporate sustainability has not been applied in this area. This motivates the current study.
1.4 SIGNIFICANCE OF THE STUDY

The following section details the significance of the study. It details the research on corporate sustainability conducted in the NMB municipal area as well as the corporate sustainability indicators research in the NMB municipal area automotive manufacturing sector.

The automotive manufacturing sector is one that plays a role in different sectors globally and most activities of this sector, whether directly or indirectly, have environmental impacts (GRI, 2004). Hence the need for corporate sustainability priorities to be adopted in automotive corporation’s business strategy. As mentioned in section 1.3, in the NMB municipal area, the automotive sector plays an important role in job creation and is a major contributor to the Gross Domestic Product (GDP) of the Eastern Cape. In order for local automotive manufacturing corporations to trade and engage with multinational automotive companies, environmental standards have become increasingly essential. Research on corporate sustainability in the NMB municipal area is lacking and as an important aspect of the economy of the Eastern Cape and NMB municipal area, this research will add to the lacking body of research of the automotive industry in the NMB municipal area and will assist in identifying suitable indicators to measure corporate sustainability. This research may inform how companies in the automotive manufacturing sector in the NMB municipal area may improve in corporate sustainability initiatives (NMBM, 2013).

The growing body of available research on corporate sustainability reporting does not contain enough literature that focuses on the design of indicators that captures the complicated three-dimensional, (economy, society and environment), concept of corporate sustainability. The triple bottom line relation to corporate sustainability has been the cause of many indicators in reports being compartmentalized to economy, environment or society (Hahn and Kühnen, 2013; Krajc and Glavic, 2004). This compartmentalized view of corporate sustainability is not holistic and does not capture the inter-linkages between the three components (Lozano and Huisingh, 2011). The GRI G2 framework encouraged organizations to use more integrated measures in order to better capture corporate sustainability as close to the definition as possible. Azapagic, 2004, developed a framework which integrates the three components of sustainability to create indicators which are more holistic. Lozano, (2013) identifies a
need to create indicator systems that address the faults that arise with compartmentalized corporate sustainability indicators. There is limited research on the creation of indicators for the automotive industry in the NMB automotive manufacturing sector and this study is significant as it aims to address this as it is important for this growing sector.

1.5 RESEARCH AIM AND OBJECTIVES

The aim of this study is to develop a measuring instrument that would reflect the state of corporate sustainability in corporations in the automotive manufacturing sector in the NMB municipal area. This study has the following specific objectives:

- To give a theoretical overview of corporate sustainability
- To give a theoretical overview of corporate sustainability in NMB and the automotive manufacturing sector
- To give a theoretical overview behind measuring including existing and contemporary methods
- To formulate a methodology that would establish a cutting-edge measuring instrument in corporate sustainability
- To apply the above mentioned instrument to local corporations in the automotive manufacturing sector
- To adapt the instrument accordingly once it has been applied to corporations
- To present and discuss the results of the application of the measuring instrument on corporations in the automotive manufacturing sector in the NMB municipal area
- To critically evaluate the research findings and recommendations for future studies
- To draw best practice from the companies with highest corporate sustainability index scores

1.6 STUDY AREA

As previously mentioned, NMB is one of the largest contributors to economic development in the Eastern Cape with strong holds in sectors such as manufacturing, service sector, (banking and financial services), tourism and agro-processing.
Manufacturing is the largest contributor in the province and is an important stronghold for NMB. This area houses some of the major power houses in the automotive sector. The study area has more than 80 companies involved in the automotive sector with 60 ISO 14001 registered corporations in the automotive sector in NMB (NMBM, 2013).

NMB is located on the south-eastern coast of South Africa in the Eastern Cape Province (Figure 1.1). As a result of the strategic location of the metro, the ports have become optimal areas for the establishment of the automotive industry due to ease of transportation of raw materials. The automotive industry began in 1924 with Ford opening the first car assembly plant in South Africa. Following suit was General Motors who opened an assembly plant in 1926. With the construction of assembly parts, followed the opening and operation of the first tyre company in Port Elizabeth, established 1936 by Firestone Tyre and Rubber. Goodyear Tyre then followed with a plant in Uitenhage in 1945 (SA History Port Elizabeth Timeline).

The municipality is 1 959 km² in size and is one of six metropolitan municipalities in South Africa (Local Government Handbook, 2014). The municipality comprises of Port Elizabeth, Despatch and Uitenhage and has a total population of 1 152 115 (Local Government Handbook, 2014). The unemployment rate of the municipality is 36.6% and the manufacturing sector plays a large role in the employment for NMB and the Eastern Cape. As can be seen in Figure 1.1, the automotive concentrated in the industrial areas of the NMB with one of the major companies, Volkswagen being situated in Uitenhage.
1.7 METHODOLOGICAL APPROACH

The methods used in this study included qualitative and quantitative methods. The benefits of using these two methods in conjunction are discussed in Chapter 3. The qualitative aspect of the study included the use of questionnaires and interviews to obtain data from people in human resources, health and safety and environmental departments of corporations in the automotive manufacturing sector in NMB. The qualitative aspect also involved first-hand experiences at the corporations which were visited. The quantitative aspect involved the use of the data obtained from questionnaires to compose a composite corporate sustainability index. The above methods are discussed in detail in Chapter 3.

1.8 STUDY OUTLINE

The dissertation begins with an introduction to corporate sustainability, a brief introduction to corporate sustainability in NMB and the reasons why corporate
sustainability is essential in the NMB automotive sector. The fact that corporate sustainability in NMB is not a well-studied area is established in this chapter. Furthermore, the research aim and objectives are outlined in this chapter and a brief overview of the study area is given.

Chapter Two contains a theoretical background of corporate sustainability research in general and one of corporate sustainability in South Africa. This chapter further explores corporate sustainability measurement instruments such as common reporting frameworks used to measure corporate sustainability. Furthermore, this chapter explains the various stages a corporation goes through to achieve corporate sustainability.

Chapter Three consists of the research methodology that is applied to collect and analyse data. It also discusses the research design to maintain ethical practices in all aspects of the research. The indicators used in the research are also explained in this chapter.

Chapter Four is the research findings from applying the research methodology. The results are represented in the form of tables and graphs. Further, this chapter analyses the results.

Chapter Five contains the synopsis and a discussion on the key findings of the research. The limitations of the study are also discussed in this chapter. Further, recommendations for future research are discussed in this chapter.
CHAPTER 2
LITERATURE REVIEW

2.1 INTRODUCTION

Sustainability is a term that has evolved and is still currently evolving. This term has, since its inception, evolved and is the parent concept of sustainable development, corporate sustainability, corporate social responsibility and corporate citizenship to name a few. Corporate sustainability is a concept that has gained credibility and supporters as consumers become more aware of their rights and impacts of companies on a local, regional and global scale (Van Marrewijk, 2003).

In order to fully understand and answer the research objectives, knowledge about sustainability must be gained as to how it is related or linked with the corporate world. In this chapter, the theoretical framework for the research is described. The literature review addresses the main concepts of the study, providing a theoretical foundation and conceptual framework from which further research is focused. Both primary and secondary sources have been used, including literature from popular and academic sources (books, articles, journals, theses, and Internet sites).

The literature review begins by exploring the origin of corporate sustainability. Following this a local review of corporate sustainability evaluation in South Africa and in NMB is reviewed. Finally, current corporate sustainability reporting methods and indicators are investigated and these form the basis for the data collection and analysis.

2.2 CORPORATE SUSTAINABILITY EXPLORED

Although the term corporate sustainability has recently been coined, people have been evaluating corporations based on moral ethics and environmental impacts for many years before the term was coined. This term is said to have borrowed elements from five concepts which are: sustainability, sustainable development, corporate social responsibility, stakeholder theory and the corporate accountability theory (Wilson, 2003).
As soon as trade began, concerns of environmental and social impacts arose. King Hammurabi of Mesopotamia, around 1700 BC, was known for implementing the death penalty on the workers if their environmental negligence caused the harm of citizens (Asongu, 2007). From the time of the Industrial Revolution, there was a large migration of people from rural areas to urban areas. With this migration towards cities, there was rapid city growth and problems which accompany this growth. Some of these problems were pollution, disease, overuse of resources and indecent housing (Williamson, 2002). In the late 1770s there were protests about improving the lives of those involved in industrialization. Various acts were passed as early as 1819 in the United Kingdom and more followed to ensure the working conditions in coal mines were safe in 1842 (Hindman, 2009).

Since Cadbury found itself in a pickle for using and supporting cocoa purchased from slave trade in 1909 to the more recent oil spills of powerhouse oil companies, environmental and social issues have been in the forefront of corporations for the twentieth and twenty-first centuries. Prior to the First World War, corporations grew in strength and influence and began to share rights like citizens from the middle of the nineteenth century. Many corporations merged and began to influence not only economies but the political arena as well. Free trading globally increased in the periods following this prior to the First World War and soon after, many campaigned for equality as a result of failure shown by world leaders at that time. The significance in the formation of the International Labor Organization in 1919 was that corporations began to consider the effect of their activities on society and the environment. In this period, New Capitalism was born. This is when corporations show their activities are not harmful to society. This new capitalism gained momentum in times of the Great Depression and the Wall Street Crash as many believed corporations were to blame for these. The works of Berele and Means, (1932), about the separation of the modern world from corporations has opened avenues for other writers of theories of corporate responsibility and sustainability. Corporate sustainability did not have a definite name then and there were laws in place that corporations followed; these days corporate sustainability and corporate social responsibility are voluntary.

Post World War Two, pollution was one of the biggest problems with smog being the cause of death for many. Pollution Control Acts were passed in the USA in 1955, the
UK in 1956 and soon after scientists discovered an increasing amount of carbon dioxide levels in oceans. The 1962 book, Silent Spring was about the effects of pesticides on the environment and is said by many to be the push towards modern day environmentalism. NGOs such as Greenpeace (1971) were formed, also those advocating for civil rights and women’s rights. These events have all played major roles in the change in corporations and how they interact with society and the environment as many with malpractices were under scrutiny (Blowfield and Murray, 2011). Davis (1973) was one of the original theorists who stated that unlike earlier views from corporate philanthropy, the entire company should be responsible and not individuals. This then resulted in the notion of using corporations’ resources for the good of society and the environment (Blowfield and Murray, 2011). The formation of the stakeholder theory which was made popular by Freeman (1984) has also contributed to the definition of corporate sustainability. He defined stakeholders as anyone or any group of people that is affected by a corporation’s achievement of objectives. The stakeholder theory emphasizes that good relations with all those affected by the corporation will lead to better business opportunities. This theory is a managerial concept that is built on when corporations have good relations with stakeholders it is easier to meet their objectives (Wilson, 2003). The problem comes when stakeholders must be identified. There are the obvious choices such as investors and employees. What of others? Who else will be affected by the corporation? That is the current issue on the stakeholder theory, the identification of stakeholders. The stakeholder theory has contributed to the definition of corporate sustainability as this theory identifies the business reason for keeping stakeholders happy by working towards sustainability (Wilson, 2003).

The definition of sustainability is one that remains ambiguous. The essence of sustainability is the point where the biophysical capacity of the earth is not surpassed, a standard of living for all is maintained and all this is achieved by not infringing on governance and values of society (Baumgärtner and Quaas, 2010; Robinson, 2004). In short, the triple bottom line where society, environment and the economy have equal value further explains the concept of sustainability. Fraser (2005) states that the economy is a subset of society and society is bound by physical limits or carrying capacity of the environment.
With sustainability being the overarching concept, sustainable development is derived from it. The term sustainable development was used in 1987 by the United Nations World Commission on Environment and Development. This term means different things to different people, as stated previously the most widely used definition is that of Brundtland Commission Report (1987:43) (Refer to Section 2.1)

As discussed in Section 1.2, the three pillars of sustainability are economy, social and environment. Corporations incorporate these pillars in a business environment. Essentially, corporate sustainability is sustainable development in a business sense (Dillick and Hockerts, 2002). Sustainable development contributes to the theory of corporate sustainability in two ways. Firstly, it points out areas of concern for corporations; economy, society and environment and also it allows for goals to be set between governments, society and corporations.

Following the definition of sustainability, the United Nations Conference on Environment and Development (1992) used the term sustainable development and the concept gained impetus. A business charter was created in this conference which stated that economic gain should not be at the expense of society or the environment. The Business Council for Sustainable Development was also formed with more than fifty leaders of worldwide corporations. Authors such as John Elkington have also been instrumental in the formation of corporate sustainability. In 1994, he introduced the triple bottom line and also the term sustainable corporation. Corporate sustainability is therefore related and sometimes overlaps with corporate citizenship, corporate social responsibility and business ethics as they all share a starting point (Visser, 2007).

Currently, in an era of globalisation, where information is freely available, national boundaries are easily taken down via the Internet and corporations' transparency, corporate sustainability has been important and the definition continues to evolve from predecessors of this theory. Questions surrounding the means of making a profit lead to the rise of corporate responsibility. This focused on the managers, leaders and entire corporations and the part they play in social and environmental matters. Questions started to be asked concerning the economy and society. Are these two principles synonymous? Does the state of the economy reflect a sustainable society?
This term has now evolved to ‘corporate citizenship’ which means corporations are citizens in the community and must uphold the rights of individuals in the local and global community (Blowfield and Murray, 2011). The evolving of the term naturally would then mean that the definition also evolved and is currently evolving. It is important to understand that the social, environmental and economic priorities of corporate sustainability in each corporation will change in order to better adapt to changing times and circumstances (Asif et al., 2011). The European Commission sees corporate social responsibility and corporate sustainability as a link where corporate social responsibility is the business contributing towards sustainable development (2002). Although the term corporate social responsibility has existed longer than sustainable development, it contributes to the theory of corporate sustainability by adding the ethics component (Wilson, 2003).

This study will use the definition of corporate sustainability which states that it is a measure of sustainable development in a business sense (Dillick and Hockerts, 2002). Essentially this means that social and environmental concerns are included in business operations in order to meet the needs of current and future stakeholders (European Commission, 2011; Van Marrewijk, 2003). Similarly, authors such as Hahn and Kühnen (2013); Lozano (2013) and Roca and Searcy (2012), define corporate sustainability as the need for a company to include ethics, society and environmental issues into their business strategy. Dyllick and Hockerts, (2002) build on these aforementioned definitions and define corporate sustainability as Elkington (1997) defined sustainability. They define corporate sustainability as companies’ ability to meet the needs of current stakeholders without compromising resources for future stakeholders. This thinking is directly related to the triple bottom line coined by Elkington (1997).

Relating this concept to the triple bottom line has allowed for a variety of instruments such as environmental management systems such as the International Organization for Standard (ISO) 14001 and sustainability reporting which can be used by companies to measure and report on corporate sustainability using a variety of methods. These instruments are used to enhance transparency to stakeholders, enable comparison between companies, increase brand value and to continually improve corporate sustainability efforts by a company (Hahn and Kühnen, 2013).
A paper by Van Marrewijk (2002) called for a more specific definition of corporate sustainability which is accompanied by methods of implementation. For the purpose of this study corporate sustainability is defined as elements borrowed from corporate social responsibility, stakeholder theory and sustainable development and ultimately means sustainable development in a business sense (Dillick and Hockerts, 2002). This involves the activities of a corporation to include social and environmental concerns into the operations of the corporation (Van Marrewijk, 2002). The following sections will discuss corporate sustainability based on the above mentioned definition.

2.3 CORPORATE SUSTAINABILITY IN EMERGING MARKETS

This section discusses the origin of corporate sustainability in South Africa and in NMB. South Africa, as a country classified as an emerging market, has a different approach to corporate sustainability as opposed to countries in the first world such as Germany, which have been leaders in corporate sustainability. Approach refers to the indicators used and the measuring of corporate sustainability.

Debates on the effectiveness of corporate sustainability contributing towards sustainable development have focused on Europe and North America. In a paper by Global Compact Lead (2012) the question whether there is such a thing as an emerging market approach to corporate sustainability was asked. The World Bank defines emerging markets or economies as countries with low to middle income. This term has evolved to include the upper middle market bracket. These are all countries with a gross national income of less than $12 195 per capita. These countries include South Africa, Brazil, Turkey and Poland amongst others (World Bank, 2012). The justification for a specific focus on corporate sustainability in emerging markets is explained in the work of Visser (2008). Here there are four reasons mentioned:

- developing countries represent the most rapidly expanding economies, and hence the most lucrative growth markets for business (International Monetary Fund, 2006);
- developing countries are where the social and environmental crises are usually most acutely felt in the world (WRI, 2005; United Nations Development Programme, 2006);
developing countries are where globalization, economic growth, investment, and business activity are likely to have the most dramatic social and environmental impacts, (both positive and negative), (World Bank, 2006); and

developing countries present a distinctive set of corporate social responsibility (CSR) agenda challenges which are collectively quite different to those faced in the developed world.

The indicators that are used for an indication of emerging markets companies’ participation in corporate sustainability are certification with ISO 14001, being members of the DJSI, participating in the GRI and the various reactions to the CDP2. These indicators of course, only partially paint a picture of corporate sustainability (Baskin, 2005). It goes without saying that there are many other corporations which are in emerging economies and are not registered with these initiatives due to bureaucracy, finances or other reasons but are however improving efforts of sustainability within their own realm (Bansal and Bogner, 2002).

The DJSI began in 1999 as a global sustainability benchmark. They use the ‘best in class’ approach where companies which meet certain criteria are rated better than peer companies; this includes all sectors of trade (Sustainability Index, 2012). There are about 2500 companies which are eligible for the Dow Jones World Index (DJWI). From these 2500 companies the DJSI determines which qualify for corporate sustainability. There are about 10 percent of these that qualify to be listed on the DJSI and of these, 4.6 percent of the companies on the DJWI are from emerging markets but only 2.8 percent of 318 companies on the DJSI are from emerging markets (Baskin, 2005).

With the GRI, compliance is not audited. Corporations are required to register with the GRI when they begin using GRI indicators in their annual sustainability reporting. The main purpose of this as an indicator is that it identifies the companies that are participating in sustainability reporting. In 2005, there were 614 companies registered with the GRI and 12.4 percent of those were from emerging markets (Baskin, 2005). In 2010, it was reported that GRI reporting increased by 68 percent in key emerging markets such as South Africa, Brazil and South Korea (GRI, 2012).
Fortune 500 companies are surveyed with regards to mitigation to climate change and greenhouse gasses. This is the third indicator, the CDP. Emerging markets did not fare well in participation in this project.

The ISO 14001 standard is used as an international standard for environmental management systems. The trends worldwide show an increase in ISO 14001 certifications in both developed and developing nations, many of these increases are as a result of developing nations playing their part in corporate sustainability. Amongst the countries with the highest certifications, are China with 55,316 certifications, Russia, and Brazil. Since the instatement of the ISO standards in China in 1996, the growth in the number of certifications has increased (Baskin, 2005).

In South Africa, in the early 1970s, Felderg, a professor at the University of Cape Town, was recorded saying that businesses should invest back into the communities their employees come from and sell to (Trialougue, 2004). With the rich history that South Africa has, corporate sustainability or rather corporate social responsibility can be traced back, from a social point of view, to the days of sanctions of multinational corporations during apartheid. Companies benefited from exploitation of people of colour, this gave rise to NGOs which also contributed to corporations changing their ways. Of course, the major contributor was political change and international pressure. Changes in political power and constitution ushered in new environmental laws in the constitution that make mention of polluters’ pay and also with poverty and other social issues have prompted business to join hands with communities. These legislations include The National Environmental Management Act (Act 107/1998), Mineral and Petroleum Resources Development Act (Act 28/2002), Skills Development Act (Act 97/1998) and the Employment Equity Act (Act 55/1998) are but to name a few. With changes in laws there have been challenges with enforcing these laws as other social and economic issues take a higher precedent than corporate sustainability. The King II Report (2002) formally presented the triple bottom line to South African corporations in an effort to encourage reporting on environmental policies and social investments. With South Africa having hosted the World Summit on Sustainable Development in Johannesburg (2002), corporate sustainability issues have been highlighted even more.
This is still a voluntary process despite the Johannesburg Stock Exchange (JSE) having a Socially Responsible Index (SRI). With easy access to information and many local corporations becoming international, this has impacted corporate sustainability in South Africa positively. An increase in social investment has definitely been occurring in South Africa. According to Harrison (2005) there was an increase of 77 billion Rand in the year 2003-2004. Currently in many industries, corporate sustainability is a larger corporate responsibility. The challenge is to infiltrate all industries and also include small and medium enterprises.

As Africa is a large continent with varying socio-economic conditions, the corporate sustainability in the continent is much the same, varying. South African corporations are leaders of the continent in this regard. South African corporations report a variety of issues on the corporate sustainability front such as employment equity, health and safety policies, ISO 14001 and ISO 9000 audits and environmental management practices in a survey of 154 companies that were listed on the JSE (KPMG, 2004). In 2004, there were 51 companies listed on the JSE SRI which met the criteria of integrating the principles of the triple bottom line into their activities (JSE, 2011). A KPMG survey (2004) suggests that South African corporations are leaders in reporting on social issues. This has to do with the history of inequality in the country.

In a study by Jeremy Baskin (2006) showing Brazil, Russia, India, China and South Africa, BRICS countries, South African corporation came out with the most points on overall corporate reporting. This study also indicated that the focus areas of corporate sustainability were different in emerging markets and developed nations. This is to be expected because the social issues and environmental issues of developing countries are different to those of the developed. An example of this is the HIV pandemic. This is especially a problem in emerging markets such as South Africa so corporations include this in their investment back to communities.

A study in developing nations showed that leadership in South African companies stands out when it comes to corporate social responsibility. This study investigated 127 companies in emerging economies and showed that South Africa has high volumes of corporations participating in corporate responsibility compared to similar sample sizes from other emerging market companies (Baskin, 2005).
South Africa has the essential laws in place for sustainable development. It is even reported to be one of the only countries with sustainable development as a human right in the constitution (Du Plooy, 2006). Inequality is one of the main hindrances to sustainable development in South Africa but many inroads are being made by corporations in the name of corporate sustainability as the number of ISO 14001 registrations increases and corporations employ other methods to increase corporate sustainability efforts. A brief overview of corporate sustainability in emerging markets has been discussed. The following section will discuss how corporate sustainability is quantified.

2.4 MEASURING CORPORATE SUSTAINABILITY

The following sections detail the motivation for employing corporate sustainability strategies, the tools and instruments used to measure corporate sustainability and the various methods of measuring corporate sustainability.

2.4.1 Motivation for employing corporate sustainability and theoretical framework

Prior to discussing the various tools of measuring corporate sustainability, the reasons why corporate sustainability efforts are undertaken are discussed. The theory behind corporate sustainability involves economic responsibility to internal and external stakeholders, the correct ethics to society and legal duties to the country. The stakeholder theory applies where environment and societal resources are considered to be goods belonging to the public. The financial reasons for corporate sustainability have been discussed above; however there are no consistent results to the business case for corporate sustainability.

The business case for corporate sustainability can be defined as when there is economic success and also environmental and social sections of business are performing well (Schaltegger et al., 2012). Elkington (1997) was the first to find a way to connect conventional economics and sustainability and this was where many studies on the triple bottom line and the business case for sustainability began. There have been a number of studies trying to link corporate sustainability practices to corporate financial performance. Curran and Moran (2007) found that there was no link between these concepts using FTSE4 good index and linked it with share price, while Lopez et
al. (2007) found a negative link between the two concepts and Consolandi et al., (2009) found a positive link. Margolis and Walsh (2001) investigated 95 studies between the years 1972 and 2000. Most of these studies showed a positive correlation. The studies represented in Table 2.1 show an equal division amongst research on the financial benefits of implementing corporate sustainability strategies. Implementing corporate sustainability has proven to be difficult for many corporations. The measuring and implementation still has had some grey areas and this is partly because of the lack of a concise definition. The variety of data and methods used seems to be the main reason for differences in results.

**Table 2.1: The relationship between corporate sustainability and financial performance from selected studies** (Adapted from Lee, et al., 2011)

<table>
<thead>
<tr>
<th>Authors</th>
<th>Relationship between CS and corporation performance</th>
<th>Methodology</th>
<th>Dependent variable (performance)</th>
<th>Independent variable (Environmental variable)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>(170 food factories in France and the UK)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>McWilliams &amp; Siegel (2000)</td>
<td>Neutral</td>
<td>Regression analysis</td>
<td>Financial performance (accounting profits)</td>
<td>Corporate social performance from Domini 400 social index; R&amp;D intensity as a control variable</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(524 firms)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Edwards (1998)</td>
<td>Significant positive impact</td>
<td>Comparison between groups</td>
<td>Return On Equity</td>
<td>Environmental performance and Management</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(243 US firms)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
If the studies show ambiguity in results regarding the business case for corporate sustainability, what are some of the other reasons for undertaking corporate sustainability as it is a voluntary act in many countries. A study by Hahn and Scheermesser, (2005) investigated corporate sustainability in German companies. One hundred and ninety five companies that were currently undertaking corporate sustainability practices such as being registered with ISO 14001, Eco Management and Audit Scheme (EMAS) and other sustainability frameworks were surveyed and were expected to reveal their main motivations for employing corporate sustainability. The main motivations for corporate sustainable practices were ecological, social and ethical reasons. Another reason was the image and reputation of the corporation. Issues such as cost saving, customer demand and financial growth were rated as not as important or not as a main motivator as environmental, social and ethical reasons. The minor motivations include pressure from NGOs or other political groups, pressure from external stakeholders such as providers of capital and societal stakeholders. Further, a factor analysis was performed to determine a trend in the various motivators for corporate sustainability that were identified. The factor analysis showed four groups of motivators for corporate sustainability:

- responsibility to people and the environment
- market- orientated reasons such as an increase in revenue
- keeping stakeholders happy
- cost-saving as a motivator.
In a paper by De Prins et al. (2009) the four main motivators for corporate sustainability were risk control, including upholding the image of the brand, business opportunity, the ethics involved in terms of social and environmental issues and lastly because corporate sustainability is already part of the values of a corporation. Risk management was found to be a reason to employ corporate sustainability. A study by ICF Kaiser, Inc. looked at 300 corporations and concluded that positive environmental performance can lead to an increase in stock price by a maximum of 5 percent a year (Ben Dunphy and Griffiths, 2004).

The motivators to corporate sustainability are important to recognize as a corporation may in turn be able to pinpoint exactly where they are in the stages to achieving ‘ultimate corporate sustainability’. Figure 2.5 is a representation of the various stages of corporate sustainability.

Figure 2.1: The stages of corporate sustainability (Hardjono & Klein, 2004; Marrewijk, 2003; Tulder, et al., 2008; Willard, 2005)

The first stage of achieving corporate sustainability is said to be rejection. This comes as a result of a corporation holding the view that the main aim of business is to make a profit and this is the only reason business is in existence. The merged company Exxon and Mobil are an example of a corporation seen by many to be in the rejection phase. It is reported that this company has funded research that supports the notion
that climate change is happening. Also, their rejection of the then proposed Kyoto protocol is another reason to say they are in the rejection phase. The next stage is the non-responsive or the pre-compliance stage. Environmental costs are at this stage avoided and the social and environmental consequences are ignored as much as possible. The first two phases can be seen to be defensive and also inactive on the part of the corporation. The next stage is the compliance phase. This entails meeting the minimum standards and laws of the land in order to reduce sanctions and have a safe working environment for employees. There are short courses and training on health and safety and sustainability but these are not part of the core values of the business and are not practiced on a day-to-day basis. Only the ‘serious’ laws and regulations are given attention and not all employees are clued up on sustainable practices. Following this stage is the efficiency stage. This is when corporate sustainability is seen as part of the core values of a corporation (Bell, 2011). Environmental training is given to employees and corporate sustainability is used as a tool to create efficiency by reducing operational costs and waste. Standards such as ISO 14001 are used with other health and safety and Total Quality Management are used in a corporation. Investigating the supply chain also begins at this stage; sourcing supplies from suppliers which aim to be sustainable. Towards the corporate sustainability goal, a corporation begins to become offensive and proactive (Figure 2.5). The next phase is the strategic infiltration of corporate sustainability into business strategy. Here, corporate sustainability is viewed as a tool for competitive advantage. Corporate sustainability is ethically driven and not only as a means for improved financial performance. Corporate citizenship initiatives begin at this stage and innovation to be better occurs in this stage. Capital and strategies are developed for the use of innovative technologies and better ways of becoming sustainable. The final stage, although sustainability is an ongoing process there is no final stage per se, is the corporate citizen or the sustaining corporation. Here, business still has a goal of making a profit but goes about this with ecological and social practices fully integrated in the corporation. This is far beyond the compliance stage but the corporation actively seeks to be part of society, uplifting, being ethical and environmentally sustainable.
Figure 2.2: The Dunphy phase model for corporate sustainability (Adapted from Dunphy, 2003).

The Dunphy phase identifies five stages of implementing corporate sustainability in a corporation (Figure 2.6). The first is rejection of the concept of corporate sustainability. A corporation can begin by mere compliance to laws and regulations. The second is a lack of response stage where there is no opposition to corporate sustainability but there is also no active effort to engage in it. The third is just when corporations comply with rules and regulations, a measurement and monitoring system is developed and a risk management system is drawn up. The corporation benefits from the minimization of risks and better relationship with stakeholders. In the fourth stage, corporations add on compliance so that performance improves; environmental and human health safety for employees is improved. Energy and resource use are reduced, recycling is used and meeting international standards such as GRI is part of this step. The corporation benefits from cost reduction and better employee involvement and productivity. Finally the fifth stage is where the long term issues such as global warming, are addressed by corporations and sustainability is incorporated into their business strategy. Innovation is used to decrease the corporation’s footprint, stakeholder and employee involvement is increased, external auditing is used to monitor sustainability and the corporation is rebranded with corporate sustainability in the business strategy. The corporation benefits from increased market and revenue share, better stakeholder relationships and being the leader in developing markets (Veleva and Ellenbecker, 2001).
Porter and Kramer (2006) also viewed corporate sustainability in a number of stages. They state that corporations are either shareholders, those who have shares in a corporation, or stakeholder-orientated, those include employees, consumers and any who are affected by the corporation. If corporate sustainability is of low priority for a shareholder valued corporation, initiatives for corporate sustainability are minimized, thus it is not part of the corporation’s overall strategy but a separate program and there is minimal compliance with laws. If it is a stakeholder-valued corporation, the triple bottom line is balanced, the corporation is marketed as a sustainable corporation and stakeholders are involved in decision-making. When corporate sustainability is a high priority in the shareholder-valued corporation, corporate sustainability is implemented in a manner in which financial gain will be visible and all corporate sustainability initiatives are aggressively marketed. In a stakeholder-valued corporation corporate sustainability is integrated into corporation strategy, the long term impacts of corporate sustainability are highlighted and lines between main strategy and marketing strategy are blurred as corporate sustainability becomes part of the corporation. With these different stages or stand points in corporate sustainability, views by these merged the two and developed the four stages in corporate sustainability. The first is compliance. As previously stated this area is when a corporation complies with laws and regulations and corporate sustainability is not integrated as strategy. The second stage is the opportunistic stage. This is when a corporation only enters in corporate sustainability for gains which increase financial standings short-term. All corporate sustainability initiatives are marketed and publicized. The third stage is the good citizenship stage. Human health and safety regulations are adhered to, the supply chain is reviewed to incorporate corporate sustainability, the triple bottom line or the corporation is balanced and stakeholder involvement increases from the previous stage. The last stage is the intrinsic stage. Here, corporate sustainability is integrated in corporation strategy; there is a long term commitment to corporate sustainability and other sustainability issues (Agbonkhese, 2006).

Studies seem to show a general consensus with regards to the levels or stages of corporate sustainability. These phase models can be used in conjunction with evaluation methods to identify the current position of a corporation with the aim of improving efforts. The stages of corporate sustainability are all governed by the various
indicators that are used to measure them. The proceeding section discusses the indicators used to measure corporate sustainability.

### 2.4.2 Corporate sustainability indicators

The use of indicators for sustainability can be traced back to The World Commission on Environment and Development in 1987 which recognized a need for an integration of social, economic and environmental factors to solve environmental issues and United Nations Environment Programme (UNEP) reported that environmental and natural resources should be monitored and that criteria for indicators of environmental standards should be developed. What then followed was the emphasis of the use of indicators in decision-making in the United Nations Conference on Environment and Development Agenda 21 in 1992. In this conference, the use of these indicators was highlighted on the international arena. This agenda also emphasizes the need for indicators for evaluating progress on sustainable development. In 2002 at the World Summit on Sustainable Development, sustainability indicators were highly improved and were said to be used as tools to achieve sustainability. The Human Development Reports that are published are an example of the use of indicators, social and economic, to compare development across nations. Organization for Economic Cooperation and Development (OECD) has aided in the development of indicators and methodologies. Environmental, social and economic indicators of sustainability have been developed by the OECD. This organization has a number of evaluation programs; an example of which is the Environmental Performance Review program which was started in 1992.

Sustainability performance indicators are usually divided into economic, social and environmental indicators. The use of indicators is important in measuring a corporation’s effort. Indicators aim to assess the effectiveness of current systems, assess areas in need of improvement and conclude if goals have been met. Staniškis and Arbačiauskas (2009) summarize indicators into four types: absolute, relative, aggregate and index indicators. Index and aggregate group aspects into categories and come up with one overall value that is the assessment of performance. These lack detailed information but are however useful in reviewing the general performance of a corporation. Absolute and relative indicators are used to identify changes in values with regard to a common denominator. Staniškis and Arbačiauskas (2009) conclude
that these indicators are better tools for effective monitoring as they can be expressed in natural units and/or monetary terms. A study by Parmenter (2007) discusses three kinds of sustainability indicators. The first are Key Result Indicators. These measure variables of a corporation over time or can be said to be a review of how a process functioned over six months or a year or whichever time period was given for evaluation. Performance Indicators are used to measure any variable at any given time. An example of a performance indicator is a measure of the number of employees who participated in a sustainability course offered by the corporation at any given time. The last set of indicators this study mentions are the Key Performance Indicators. These indicate the areas that need change the most. These are the areas which are the most important to the success of the corporation.

The qualitative and quantitative measure of sustainability is a discipline that is constantly evolving. Corporate sustainability (CS) is measured by using the principles of the triple bottom line. The social, environmental and economic performance of a corporation in total makes up the CS ratings of a company. There are a number of studies on measurement systems. The Process Analysis Method is one of these and is aimed at choosing the indicators to use when measuring sustainability (Chee Tahir and Darton, 2010). Some studies go further and not only create measurement systems but also include a plan on how to act and achieve sustainability (Searcy, 2012). The Global Reporting Initiative (GRI) is one of the most commonly used indicators (Staniškis and Arbačiauskas, 2009; Searcy, 2012). Over 1500 corporations use this method of evaluating and reporting CS. In this guideline, there are 70 indicators (GRI, 2006). The GRI indicators are used as a benchmarking tool and are used worldwide. Staniškis and Arbačiauskas (2009) say that one of the biggest drawbacks of these indicators, the impact on decision-making, is limited. The nature of the indicators are also only of limited use to some stakeholders. There are also no indicators which measure quality. Issues such as product quality and service quality are not part of the GRI indicators.

The eco-efficiency assessment of the World Business Council for Sustainable Development was developed in 2000. These indicators integrate environmental and economic dimensions of sustainability. These indicators can be used for specific activities or as a general means of evaluation. These indicators are favoured by some
because they help pinpoint main problems and are a good source of applying preventative measures. A drawback is that process indicators are used.

The ISO is a group of standards that is also used worldwide. The ISO 14000 group deals with environmental performance. The ISO 14001 is about environmental management systems. The ISO 14031 is a guideline of how corporations can develop indicators for environmental performance. Here, there are management performance indicators, environmental process indicators and environmental conditions indicators. The motivations for adopting this set of standards vary from identifying a business case to ethical views of the environment (Morrow and Rondinelli, 2002). This standard is a good starting point to identifying the various aspects of a corporation; however it does not identify the underlying issues behind the aspects. This standard relies on the employing an environmental policy; plan, do, check and manage (MacDonald, 2005).

Indicators can also be divided by sectors. There are indicators which are created for mining, Global Mining Initiative, chemical engineers, Britain’s Institution of Chemical Engineers and other sectors have their own sector-specific indicators. The gist of all of these is the use of aggregates of indicators. The end result of these indices or aggregates is a single value which can be used to quantify corporate sustainability. This will be discussed in the proceeding section.

2.4.3 Using indicators to quantify corporate sustainability

Evaluation is applying social research with the main aim of assessing the effectiveness of the current knowledge and the use is to guide practical actions (Clarke and Dawson, 1999). Tangen (2005) describes a measurement system as performance measures that provide a corporation with information that helps with the implementation of the program being measured. Evaluation helps to improve a set program by pointing out the strengths and weaknesses. Sustainability measurement is a broad concept which involves the measurement of the principles of the triple bottom line. Zhang (2006) notes four reasons for an evaluation system; it can be used as a benchmarking tool, it can be used as a means for continuous improvement, it can be used to appease stakeholders and it can be used as part of the decision-making process if all is evaluated in an appropriate manner with an appropriate evaluation system. There are a number of evaluation methods that are used for sustainability evaluation and some
have been mentioned and discussed in the above sections. Auditing, monitoring and inspections are a few of these methods.

Many papers have been published on designing a measurement system. Chee Tahir and Darton (2010) published a paper on The Process Analysis Method. This method is used to select indicators to use to measure corporate sustainability. The GRI indicators are the most commonly used. A paper by Veleva and Ellenbecker (2001) opted to used 22 indicators and also included in this study how to apply the indicators. Environmental Management Systems are the most widely used sustainability tools (Seary, 2011). Berkeley (2003) mentions that there is a wide variety of standards and a corporation should select and modify a standard to suit their business situation. The need for the performance indicators and evaluation technique must be known before selecting them as the indicators need to identify areas that need improvement, determine the laws which must be complied with, assess progress and a report should be created on the current standing of a corporation.

Development of a measurement system and implementation are two different things. The challenge comes in the implementation part (Seary, 2011). A study by the International Institute for Sustainable Development looked into the use of measurement systems. The study reviewed corporate sustainability reports and interviewed 15 experts and the consensus was that there is not much known about the implementation of sustainability indicators (Seary, 2009). Searcy (2011) concludes that more studies are needed including how to use the results from implementation in managerial decisions, providing links of indicators to goals and the integration of these indicators with sustainability reporting.

Jeinghaus (1999) states that indicators can be viewed as the middle ground between science and policy. They are not created to replace quantitative methods, but are used to simplify information to a broader audience (Zhang, 2006). In order for corporate sustainability to be an integrated part of a company, it needs to be translated into a measurable variable so that the strengths and weaknesses of a company can be identified. The use of indicators in environmental studies is not new. Societies have used indicators for many years, from farmers using crops as an indicator of soil fertility to the measurement of ambient temperature to track climate change.
Choosing suitable indicators depends on a number of factors. In order to find suitable indicators for measuring corporate sustainability, a few criteria and requirements were followed. The requirements for creating indicators are that indicators should:

- be able to communicate ideas and policy – this involves the clarity and the ease of interpretation of the indicators;
- be measurable – data should be available or feasible in terms of availability of data. Data should be logical and representative of the required information;
- be able to identify goals and targets for the future – indicators should be relevant and associated not only with the overall goal corporate sustainability but should identify goals within the three pillars of sustainability;
- be on par with current trends – current trends should be apparent so that the indicators and the study should be relevant;
- be able to track progress – indicators should accommodate changing goals and objectives of a company once progress has been tracked.

Keeping the number of indicators in a manageable range and making sure that there is a link or coherence between indicators across components are two more criteria to consider, in other words; a multi-dimensional approach. Keeping indicators in this manageable range is essential because; the study becomes focused, manageable and for the communication of results. Minimising the indicators to key areas of interest is essential to convey the desired message. This is why the selection of primary indicators is important and useful for this study (NESC, 2002).

The second part of keeping a multi-dimensional approach to indicator selection involves merging the three capitals of sustainable development and corporate sustainability which are economic, environmental and social to form indicators that are not compartmentalized into these three components. This study created indicators which are two- and three-dimensional which not only measure a phenomenon in each pillar of sustainability but merges two or more pillars to form a more comprehensive multi-dimensional indicator (Figure 2.7). Merging indicators from different pillars of sustainability enables the measuring instrument to capture the relationship between the pillars as measuring CS. Using compartmentalized indicators is not as progressive towards representing CS. Sustainability is a continuous effort, all pillars overlap, are interlinked and the indicators created should reflect the dynamic nature of CS by not
being fragmented. Indicators should not only represent economic, social or environmental aspects but be interlinked and show where the economy meets the environment, where society meets the environment and where the economy meets society (National Economic and Social Council, 2002).

Figure 2.3: The three pillars of sustainability and where they overlap two- and three-dimensional indicators (NESC, 2002)

Once suitable indicators are chosen, information for qualitative and/or quantitative, the positive and negative aspects of the corporation will be seen using a chosen rating system (Table 2.2 and Table 2.3). There are many processes that need to be analyzed and choosing the correct aspects is essential for achieving the goals of measurement.

Another study by Zhang (2006) investigated and evaluated corporate sustainability in 136 corporations in China. In this study, indicators from the GRI were selected under the themes economic, environmental, social and managerial aspects. A scoring system of 1-5 where 1 was minimal sustainable development issues and 5 was where the corporation was a leader in the field, was developed for each aspect. The mean of each indicator was plotted on orientation graphs for each of the corporations. These graphs then showed the trends of all the corporations. Zhang notes that a scoring
system is not merely for mathematical accuracy but to compare corporations. Also, the scoring system can be manipulated to suit the need of the auditor. Corporations were also asked to internally evaluate themselves against their goals and a gap analysis was performed to identify room for improvement. This scoring system proved successful in identifying areas of concern for corporations.

A similar study by Munteanu and Guo (2011) used indicators and the Dunphy phase model to evaluate the corporate sustainability of Royal Dutch Shell. This study devised a ‘Green Model’ where the GRI standard indicators were used in an entirely qualitative manner. The performance of the corporation on a particular aspect is rated green as favourable, orange as neutral and red as unfavorable. For the economic aspects net income, revenue market breakdown and contribution to world GDP were used. For the environmental aspects total waste disposal, environmental investment and biodiversity policy are some of the choices. Finally, in the social aspects local employees to total employees, employee training and total tax and royalties paid were some of the chosen indicators. These were qualitatively assessed and a pie chart representing the environmental, social and economic results of Shell were presented. Based on these, the Dunphy model was used to interpret which phase of sustainability Royal Dutch Shell is in with the conclusion being that it is in the efficiency stage (Figure 2.6).

Evaluating corporate sustainability in similar industry corporations is easier than that of different industries because comparison is based on the same environmental, social and economic aspects. The aspects to be measured are similar; therefore it is easier to compare. When industries differ, the aspects to be compared are different; therefore choosing a method to compare across industry is more of a challenge. The study by Zhang (2006) evaluated corporate sustainability in Chinese companies. This study used a common benchmarking system. Another approach is to individually assess the corporate sustainability of a corporation and then rate the overall performance on the Dunphy scale. The position on the Dunphy scale can be used as a method of comparison across industries. The scoring system is not meant to be mathematically correct but is used as a means to view current progress or standing of a corporation towards reaching and becoming a sustainable corporation (Zhang, 2006).
Table 2.2: An example of qualitative indicators for sustainability assessment in a corporation (Adapted from Staniškis and Arbačiauskas, 2009)

<table>
<thead>
<tr>
<th>Indicator</th>
<th>High performance points</th>
<th>Medium performance points</th>
<th>Low performance points</th>
</tr>
</thead>
<tbody>
<tr>
<td>Economic aspects</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Measures to reduce cost</td>
<td>Identification and use of cost- reducing measures are accomplished systematically</td>
<td>Regular cost reducing measures are used, no further innovations.</td>
<td>Cost reduction measures are not used</td>
</tr>
<tr>
<td>Economic contribution to local infrastructure development</td>
<td>Corporation contributes regularly to development of local infrastructure</td>
<td>Corporation participates in a limited amount of contributions</td>
<td>Corporation is not involved in local infrastructure development</td>
</tr>
<tr>
<td>Environmental aspects</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Reduction in energy and water use</td>
<td>New methods daily to reduce water and energy use</td>
<td>Periodic use of methods to reduce water and energy consumption</td>
<td>No energy and water consumption methods</td>
</tr>
<tr>
<td>Recycling</td>
<td>There is a recycling unit at the site of the corporation</td>
<td>Not all waste is recycled at the corporation</td>
<td>Waste is sent to other corporations to be sorted and treated</td>
</tr>
<tr>
<td>Social aspects</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Employees contribution to decision-making</td>
<td>Employees are encouraged to make suggestions</td>
<td>Opinions of employees are taken into consideration</td>
<td>Employee participation is not an option</td>
</tr>
<tr>
<td>Employee training programs</td>
<td>There is constant training of all employees and not selected few</td>
<td>Employees participate in training programs</td>
<td>Employee participation in training is not a priority</td>
</tr>
</tbody>
</table>

Table 2.3 details the qualitative indicators commonly used and their calculation methods.
Table 2.3: An example of quantitative indicators for sustainability assessment in a corporation (Adapted from Staniškis and Arbačiauskas, 2009)

<table>
<thead>
<tr>
<th>Indicator</th>
<th>Calculation Method</th>
<th>Measurement Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>Economic aspects</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Investment in research and local development</td>
<td>Research and development research/total sales</td>
<td>%</td>
</tr>
<tr>
<td>Investment in preventative environmental measures</td>
<td>Investment in preventative measures/total environmental investment</td>
<td>%</td>
</tr>
<tr>
<td>Environmental aspects</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cost of air emission treatment</td>
<td>Cost of air emission treatment/total production cost</td>
<td>%</td>
</tr>
<tr>
<td>Using recycled material</td>
<td>Use of recycled materials/total materials used</td>
<td>tons</td>
</tr>
<tr>
<td>Social aspects</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Working days lost as a result of accidents</td>
<td>Absolute number</td>
<td>Units</td>
</tr>
<tr>
<td>Employees participation in sustainable development</td>
<td>Employees participating/all employees to be trained</td>
<td>%</td>
</tr>
</tbody>
</table>

The reporting of corporate sustainability is a voluntary process with a variety of methods and frameworks which can be used to measure and report efforts of a company. These include the World Business Council for Sustainable Development (WBCSD, 1997) and environmental management systems such as ISO and the GRI. The GRI is one of the most commonly used references for indicators and reporting (Staniškis and Arbačiauskas, 2009; Searcy, 2012). Over 1500 corporations use this method of evaluating and reporting corporate sustainability. In this guideline, there are 79 indicators from the economic, social and environmental aspects of the triple bottom line (GRI, 2006).

The triple bottom line relation of corporate sustainability has been the cause of many indicators in reports being compartmentalized to economy, environment or society (Hahn and Kühnen, 2013; Krajc and Glavic, 2004). This compartmentalized view of corporate sustainability is not holistic and does not capture the inter-linkages between
the three components (Lozano and Huisingh, 2011). The GRI G2 framework encouraged organizations to use more integrated measures in order to better capture corporate sustainability as close to the definition as possible. Azapagic, (2004) developed a framework which integrates the three components of sustainability to create indicators which are more holistic. Lozano (2013) identifies a need to create indicator systems that address the faults that arise with compartmentalized corporate sustainability indicators.

Indicators for corporate sustainability and sustainable development are often compartmentalized into economic, social and environment pillars of sustainability. The creation and implementation of multi-dimensional indicators for the automotive industry is not well researched. There have been numerous calls from GRI and academics such as Lozano (2012) highlighting the need for indicators to be more holistic and not compartmentalized. Using multi-dimensional indicators to evaluate corporate sustainability in the Nelson Mandela Bay automotive industry has not been done and this study aims to close that gap. Corporate sustainability is a concept derived from sustainable development and sustainability therefore a definite need has been identified to create and apply indicators which holistically can be used in industrial operations.

2.5 CONCLUSION

The literature shows that corporate sustainability has evolved from a number of concepts and has borrowed aspects from corporate social responsibility, stakeholder theory and sustainable development with the triple bottom line being the core factor of this definition. Research on the drivers of corporate sustainability has been described in this chapter. The various drivers for corporate sustainability are market share, revenue share, risk management and being an attractive employee to name a few. The information about the drivers for South African corporations is limited and new research is necessary in this field. The research confirms that corporate sustainability is not as well researched in developing nations and in NMB in particular. Research on the business case for corporate sustainability has ambiguous results but is dominated by positive results for employing corporate sustainability. The use of indicators on a local and international level is important for the evaluation of corporate sustainability and the choice of indicators used must be best suitable for the corporation.
With the theoretical background having been set, Chapter Three outlines the methods used for the study and the process that is followed with regards to the collection and analysis of data. With the theory of indicators and The Dunphy model, the following chapter describes how it is applied to this study. This will be a thorough analysis of the research design, the sample and instruments that were used.
CHAPTER 3

RESEARCH METHODOLOGY

3.1 INTRODUCTION

Chapter One specified that the study intends to create an instrument which can be used to evaluate the state of corporate sustainability in the automotive manufacturing corporations in NMB. The previous chapter (Chapter Two) set the theoretical background for the methodology available to measure corporate sustainability. This chapter uses this information to create and apply a methodology to measure corporate sustainability.

In light of the above, this chapter begins by discussing the research plan and the methodologies for creating and calculating the corporate sustainability score of a company. This includes the creation of indicators, the interviews and the data analysis used to create a composite corporate sustainability index. The chapter concludes by discussing some of the limitations of the chosen methodology and gives a prelude of the next chapter by briefly outlining how the data is represented.

3.2 RESEARCH DESIGN

The research followed a quantitative and descriptive approach to evaluate corporate sustainability in the automotive industry in NMB. The descriptive or qualitative aspect of the research involved interpretation from first-hand experience at companies and using descriptive information given by participants to add to the results of the study. The quantitative aspect involved the use of information sourced from interviews applied in formulae to calculate a corporate sustainability index. Descriptive research allows for better understanding rather than the precise measurement or quantification (Zikmund, 2003). Using a descriptive approach allows for greater explanation and is not concerned with precise measurements but with understanding why a system runs in the manner it does (Zikmund, 2003). Using a quantitative method coupled with descriptive approach allowed for the study to reach the desired outcome and answer the research questions.
The various stages the research took were:

- A list of ISO 14001 certified automotive manufacturing sector corporations in NMB was obtained
- Developing the indicators and rating system in order to evaluate corporate sustainability which included selection, grouping, evaluating, standardising of indicators, creating sub-indices and a final composite corporate sustainability rating (see Figure 3.1)
- A pilot study to test the measuring instrument
- Tempering with the indicators used in the pilot study as to dilute them based on the results of the pilot study
- Scheduled interviews with participating companies to obtain the necessary information
- Evaluation of each complying corporation according to chosen indicators
- Capturing and interpretation of the acquired data
- Comparison of all participating corporations
- Determination of emerging themes based on company responses and interviews

3.3 SAMPLING METHOD AND SIZE

The minimum requirements for the corporations were to be registered with ISO 14001 standards. This signifies their efforts and interest in corporate sustainability as they are participating in an environmental management system. As ISO 14001 is its own environmental management systems standard, many of the corporations were evaluating the environmental component of the triple bottom line. This method of sampling is known as purposive sampling or judgmental sampling. This non-probability sampling method is used when the researcher seeks out a particular group of a population (Babbie, 2010), such as ISO 14001 registered companies within the entire automotive manufacturing sector in NMB. The reason for choosing the automotive industry is that this industry is the largest within the manufacturing industry and is one of the main drivers of the local economy.

Out of a total number of 55 ISO 14001 certified manufacturing companies in the automotive sector; twelve companies agreed to participate in the study while eight
declined the invitation to participate citing confidentiality reasons as they were multinational companies and had to get clearance from head office in order to participate in the study. The study questionnaire was posted online for members of the Human Resources (HR) Forum of NMB to participate. Companies part of the NMB Business Chambers were approached and emailed and called and sent numerous reminders to participate in the study. Reasons for the limited level of participation ranged from acknowledging that the corporate sustainability of the company needs improving, not wanting any research to be conducted on corporate sustainability efforts of the company, to confidentiality especially from the larger multinational corporations. Low responses are often a problem in research that deals with information on operations of a company. One of the main objectives of the study was to create and apply an indicator system that can be used to create a composite index; this was achieved and applied to the twelve participating companies. The purpose of the questionnaire was to supplement and apply the composite index, thus low responses did not affect the quality of the study. As the concept of corporate sustainability involves a multi-disciplines approach, different members of each company were targeted. Members belonging to human resources, supply chain management and safety, health and environmental (SHE) officers, were targeted in each company to participate in interviews since they were the ones best positioned to answer to the issues of corporate sustainability or ISO 14001 sought by the research.

3.4 CREATING AN INDICATOR SYSTEM

The main aim of operational indicators was to evaluate the corporate sustainability of a company using the measurable aspects of the three pillars of sustainability which are environment, society and economy (See Chapter 2, section 2.5.1). The design of the indicators was in such a manner that it highlighted the areas of the company that need attention and showed the areas that are making progress towards corporate sustainability. The indicators which were selected were based on the theory discussed in Section 2.4.3 with common indicator examples found in Tables 2.2 and 2.3. When indicators are meaningful, they are helpful for measuring this progress and ultimately decision-making. The indicator system used in GRI was used as a guide for the creation of indicators. All data used was from the financial year of 2013, a one year time frame.
3.4.1 Socio-economic component

The socio-economic component evaluates the impact of the company on local economy and the positive impacts on the community and the relevant stakeholders. The main purpose of the indicators found in this component is to evaluate the contribution of the company to the development of the local economy and the people of the NMB. This component is achieved by measuring the economic performance of a company in relation to social indicators. This information is usually available from annual financial reports and from human resources. There are six indicators under this component and all are representative of socio-economic aspects. As discussed in section 2.4.3, the measurement of impact of a company on a socio-economic aspect involves many factors. Some of which are commitment to local development, empowering marginalised groups and ensuring health and safety of workers. The below indicators are representative of those aspects.

- Percentage of suppliers that are from the NMB

This indicator not only shows a company's commitment to the development of the local economy, it also shows the company's goal of decreasing their carbon footprint by sourcing their suppliers locally so that indirect emissions are reduced. Porter and Kramer, 2011, term this the creation of shared value where local suppliers are used and companies advise local companies on the type of product needed. Companies may go further by investing in local suppliers to increase productivity and optimise productivity. This aspect is measured as a percentage.

- Percentage of women to men of direct and indirect employees

This is a measure of the company's commitment to gender equity which is an essential part of corporate sustainability. Empowering women is also related to uplifting the standard of living of many communities. In the automotive industry, which is usually dominated by males, progress towards gender equality is needed. The International Finance Corporation emphasises the need for embedding gender in sustainability reporting and practicing gender equality in management of companies (GRI, 2009). This indicator is measured as a percentage.
• **Work-related lost time due to work-related injury rate**

  This is calculated as the number of days lost to illness or accident. Multiply by 100, divide by total possible days attendance in the relevant period. This indicates the rate per 100 employees. Time lost due to injuries affects the productivity levels of a company in a negative way. Also, a high accident rate is indicative of a weak health and safety system or low training of employees (VW, 2011). This figure is divided by the average annual operating house in the South African automotive industry defined by the Department of Labour (2008), which are 4 168 hours per annum.

• **Average sick leave used per employee per year**

  High numbers in sick leave usage indicates a problem with employees and is a problem for the company because efficiency levels and production targets may not be met due to staff shortage thus affecting the sales of the company.

• **Number of suppliers in supply chain screened for Broad Based Black Economic Empowerment (BBBEE)-compliance**

  When a company goes as far as screening their suppliers, it shows their commitment to economic inclusion of those who were previously disadvantaged. Ensuring previously disadvantaged members of the community receive adequate chances to participate in the formal economy is an essential part of corporations impacting positively in the local community they are situated in.

• **Presence of a HIV/AIDS consulting clinic on site**

  It is not only important to have a HIV/AIDS clinic on site for employees to make use of but to ensure the clinic is available for use for the employees with trained personnel to treat and counsel for any HIV/AIDS-related questions or ailments. Employees should be encouraged to make use of this facility to ensure the health of employees is taken care of. The overall medical wellbeing of employees has an effect on sick days used and ultimately will result in a loss for the company.
3.4.2 Socio-environmental component

The impacts of the company on the environment and how it affects society are described under the socio-environmental component. This component demonstrates a company’s ability to positively impact the environment while at the same time positively impact the social aspect of the triple bottom line. Under this component there are three indicators. As discussed in section 2.4.3, the quantifying of the positive and/or negative impact of a company on the socio-environment aspect involves many factors. Some of these include awareness programmes for employees, the company implementing an environmental management system and a company committing to reducing waste. These can be seen in the below indicators which were used to measure the socio-environmental aspect.

- **Percentage of employees participating in environmental training**

  A high percentage of employees trained in any form of environmental, (recycling, water use, energy use, waste); training ensures that there is efficiency in the business. This has a positive impact on the environment, the financial savings and on employees. When a company is invested in its human capital and in sustainability training, there is an increase in efficiency and a better transition towards achieving their goals in terms.

- **Percentage of suppliers with Environmental Management System (EMS) (containing environmental aspects)**

  This shows the commitment of the company to having a green supply chain as it is not only concerned with its own CS but also that of where the products come from and if the supplier is mindful of the environment.

- **Percentage of the final product which is recyclable**

  This indicator deals with the company’s efforts to minimise environmental impacts by investigating the percentage of the product which can be recycled and/or reused thus lessening impacts on the environment and informing employees about recycling.
3.4.3 Enviro-economic component

The enviro-economic component deals with the company’s impact on the environment relative to its financial performance. This component deals with the impacts the operations of the company have on the environment and its efforts to reduce the negative impacts on the environment. It explores the relationship between economic growth and impacts on the environment by using intensity indicators. Searcy, Karapetrovic, and McCartney, (2006) argue that economic growth results in a more intensified use of resources. This includes more waste, intense use of energy and other natural resources. On the other side of the coin, there are those who argue that environmental improvement comes with economic growth as there are more resources to implement sustainability measures (Heslin and Ochoa, 2008). As discussed in section 2.4.3, the quantifying of the positive and/or negative impact of a company on the enviro-economic aspect involves many factors and some of these are a commitment to reduction of waste and resource use which could result in a financial saving. There are two indicators under this component.

- Total amount of water used per employee

This indicator represents the water consumption per employee. Over time this indicator can be used to measure progress in energy efficiency of a company. As companies find ways to be more efficient in terms of energy consumption, this figure will decrease, showing a positive step towards CS. This indicator can be regarded as three-dimensional as not only does it affect society and environment component of corporate sustainability, it also has an impact on the economy component of the corporate sustainability of a corporation.

- Total energy used per employee

This indicator represents the energy consumption per employee. Over time this indicator can be used to measure progress in energy efficiency of a company. As companies find ways to be more efficient in terms of water consumption, this figure will decrease, showing a positive step towards CS. This indicator can be regarded as three-dimensional as not only does it affect society and the environment, it also has an effect on the money spent on this resource by a company.
3.4.4 Current trends in corporate sustainability

The current trends section of the indicators is one of importance as it represents indicators that are the leaders in corporate sustainability. The cutting edge indicators are representative of the next level or companies which are involved in corporate citizenship as discussed in Chapter Two.

- **Presence of an environmental risk assessment for the company**

  Having an environmental risk assessment plan demonstrates a company’s diligence to assessing potential risk that may harm humans or the environment. This is a positive, innovative step towards corporate sustainability.

- **Presence of employee sustainability engagement outside the company**

  Engaging in employee sustainability demonstrates a company’s investment in its human capital and the environment. Corporate sustainability is not only practices during work hours, but it is taken a step further to communities. As companies encourage employees to be sustainable beyond the work environment, this results in corporate sustainability being engraved in company policy and employee communities. This goes above and beyond compliance.

- **Presence of water, resource and energy scarcity risk management plans in place in the company**

  Having a risk management plan for energy, water and resources is an essential part of a corporate sustainability company. Risk management plans involve planning for uncertainty in water, energy and resource, quantifying these risks and drafting a management plan to reduce the strain faced by a company should the availability of these resources be uncertain. NMBM and South Africa as a whole is a water scarce region. This region has been hit by drought with dam water levels being low (2010) and was declared a drought disaster area as dam capacity fell to below 36%. With this in mind, water scarcity risk management plans are essential for companies to have. Having a water scarcity risk management plan in place demonstrates that the company is thinking ahead and prepared for this kind of disaster. Energy is also a problem in South Africa and having risk management plans is essential. This is a three-
dimensional indicator as the scarcity of water not only affects the company but also the community it is in and its employees. Further any halt in production as a result of a lack of these resources will affect in some way or another, the financial variable of a company.

- **Greenhouse gas emissions of suppliers**

  This indicator shows a company goes beyond ensuring they adhere to the concept of corporate sustainability but goes as far as monitoring the impacts of their supply chain. This is a cutting-edge indicator undertaken by a few companies who have integrated corporate sustainability into their business strategy and vision.

  The chosen indicators for evaluating corporate sustainability are shown in Table 3.1. In order to develop these indicators, an expert in sustainability indicators was consulted.
Table 3.1: Multidimensional indicators to evaluate corporate sustainability in the NMB automotive industry

<table>
<thead>
<tr>
<th>Component</th>
<th>Indicator</th>
<th>Measurement</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Socio-economic</strong></td>
<td>Percentage suppliers from NMBM</td>
<td>% (Number of suppliers from NMBM/Total number of suppliers)*100</td>
</tr>
<tr>
<td></td>
<td>Ratio of women to men of direct and indirect employees</td>
<td>Ratio</td>
</tr>
<tr>
<td></td>
<td>Work-related lost time due to work-related injury</td>
<td>% (Number of hours lost to illness or accident multiply by 100, divide by total possible hours attendance in a year)</td>
</tr>
<tr>
<td></td>
<td>Average sick leave used per employee</td>
<td>Total number of sickness absence days (12 months period)/Average total number of staff</td>
</tr>
<tr>
<td></td>
<td>Number of suppliers in supply chain complying with BBBEE</td>
<td>All (5) Most (4) Half (3) Few (2) None (1)</td>
</tr>
<tr>
<td></td>
<td>Presence of a HIV/AIDS consulting clinic on site</td>
<td>Yes (3) In the process of building one (2) No (1)</td>
</tr>
<tr>
<td><strong>Socio-environmental</strong></td>
<td>Percentage of suppliers with any kind of EMS (EMS must have aspects)</td>
<td>% (Number of suppliers with EMS/Total number of suppliers)*100</td>
</tr>
<tr>
<td></td>
<td>Percentage of final product that can be reused and/or recycled</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Greenhouse gas emissions by weight</td>
<td>Measured (3) Will be measured starting 2014 (2) Not measured (1)</td>
</tr>
<tr>
<td><strong>Enviro-economic</strong></td>
<td>Total amount of water used per employee</td>
<td>M³ per employee (m³ / per employee (salaried and wage))</td>
</tr>
<tr>
<td></td>
<td>Total energy per employee</td>
<td>kWh per employee used (kWh / per employee (salaried and wage))</td>
</tr>
<tr>
<td><strong>Current trends in CS</strong></td>
<td>Is there an environmental risk assessment for the company?</td>
<td>Yes (3) Will be implemented in a year (2) No (1)</td>
</tr>
<tr>
<td></td>
<td>Is there any employee sustainability engagement outside the company?</td>
<td>Yes (3) Will be implemented in a year (2) No (1)</td>
</tr>
<tr>
<td></td>
<td>Are there water scarcity risk management plans in place?</td>
<td>Yes (3) Will be implemented in a year (2) No (1)</td>
</tr>
<tr>
<td></td>
<td>Are there any resource scarcity management plans in place?</td>
<td>Yes (3) Will be implemented in a year (2) No (1)</td>
</tr>
<tr>
<td></td>
<td>Are there any energy scarcity management plans in place?</td>
<td>Yes (3) Will be implemented in a year (2) No (1)</td>
</tr>
<tr>
<td></td>
<td>Are emissions of company suppliers known or measured?</td>
<td>Yes (2) Will be implemented in a year (2) No (1)</td>
</tr>
</tbody>
</table>
The qualitative indicators are subjectively rated on a basic score of 1-5 or 1-3 depending on a number of responses available for the respondent to complete. An example is the indicators in the current trends component where there are ‘yes’, ‘no’ and ‘will be implemented next year’ responses available. A ‘yes’ is a positive step towards corporate sustainability; this warrants a score of 3 meaning the company has met a level of performance that is acceptable however, further improvements are required. A ‘will be implemented next year’ warrants a score of 2, meaning there is an effort towards meeting the indicator and a ‘no’ warrants a score of 1 as indicator has not been met and no efforts to meet the indicator are in place.

The indicators with five responses are scored from 1-5 where 5 represents the company as a leader in its field when it comes to this element and is an example to other companies, while 4 indicates there is an advanced level of performance with regards to the specific element. There is best practice for element 3, meaning the company has met a level of performance that is acceptable, however further improvements are required. A commitment to improvement is present in the company for the specific element 2; there is primal performance. The element is still undeveloped or is recorded on paper as complied to but in practice has not been achieved and 1 is the lowest level of performance (Bartlett, et al., 2001). This is a failure to meet the specific element being assessed. Indicators that are unknown as a result of not being measured are regarded as the lowest score. Lack of measuring an indicator results in not being able to monitor and is reflective of a lack of effort towards corporate sustainability. It must be noted that the use of the Likert Scale is a very subjective and basic way of quantifying responses.

The creation of an indicator system is a subjective process with the information gathered from the literature; expert interviews and the perspective from the industry. No perfect indicators exist for measuring corporate sustainability, but the main criteria of a good indicator were covered as closely as possible in order to ensure the results amongst companies are not uniform but are representative of their progress towards corporate sustainability. It must be noted that no company will reach complete corporate sustainability but corporate sustainability is a goal to work towards and it is about the process of getting as close to it as possible. The above indicators were designed based on the principles of a good indicator and the indicators which can be
used to best reflect the state of corporate sustainability of a company. The results can be combined into a corporate sustainability index for comparison amongst companies in the automotive industry or can be used as a baseline to compare corporate sustainability efforts of a company over time. The indicators created are measurable, data is easily available, is current and will reflect the state of corporate sustainability of a company and can be used to benchmark corporate sustainability efforts in the automotive industry (NESC, 2002).

3.5 PRE-FIELD WORK AND INTERVIEWS

Pre-field work activities before the interviews included expert advice from a company which creates indicators and measures corporate sustainability for a number of companies within the NMB. The company is one that is an expert in the field of eco standards and was consulted when the indicators were created. During this meeting the aim of the study and the main research questions were discussed. The aforementioned discussions led to in-depth discussion about corporate sustainability and how indicators should be multi-dimensional in order to be more representative of the concept of corporate sustainability. The advice received was to measure corporate sustainability in a multidimensional approach which led to the multidimensional design of the indicators used in the study. This advice was used in the creation of the indicators mentioned in the previous section.

Pre-field work activity also involved visiting four automobile companies with the judges of the local exporters club. These visits allowed for acclimatisation with the industry and to make contacts with potential participants of the study. Once the advice from the eco standards company was received, a thorough review of literature in order to familiarise the researcher with the various indicators and methods used was done. This assisted with the selection of suitable indicators for the automotive manufacturing sector in NMB. The test indicators which were used on the pilot study were created based on literature review and advice from the eco standards company. Following this, the instrument was applied to a pilot study to test its ability to measure corporate sustainability. Following the pilot study, the instrument was tweaked and adapted in order to improve it. Interviews were then set up with managers of human resources, health and safety, procurement, supply chain and environmental divisions of corporations in the automotive manufacturing sector.
The interviews were scheduled from December 2013- August 2014. Prior to the interview schedules, the theoretical research, creation of indicators and the pilot study were conducted, all in the period from January-November 2013. The assumption that all information provided by respondents was correct was made.

Prior to releasing the questionnaire and conducting semi-structured interviews, the indicators which were created were tested on a pilot study company. This was done in order to determine whether or not the indicators are practical enough to use in measuring corporate sustainability. Based on the results of the pilot study, where two companies were used, indicators were refined in order to accommodate the real, (not theoretical), state of corporate sustainability as the original indicators were found to be measuring an advanced stage of corporate sustainability.

Contact was made with a member of the Business Chamber who was in the environmental compliance division of NMB and those of the HR Forum of NMB. Interviews were used to gather the necessary data. By using interviews, the researcher unveils the participant’s views on selected topics. Interviews provide in-depth data which can be used with questionnaires to retrieve the necessary data (Rossman, 2006). Semi-structured interviews were administered with all the participating companies (See Appendix A). The questions asked during the interview sessions were based on the indicator system that was created and were used to obtain the necessary information to calculate the various indicators (see Table 3.1). In addition to questionnaires being distributed via email, the online tool Survey Monkey was used in order to enable ease of responses and ease of transferring the questionnaire between different departments that need to complete the form for each company by forwarding the URL to the survey.

### 3.6 ETHICAL CONSIDERATIONS

It is important to note that ethical issues will invariably arise in conducting a study which involves a qualitative aspect.

Therefore, the researcher will treat any sensitive information divulged in the course of the various interviews with the utmost confidentiality. The purpose of the study and how the results will be utilized was fully explained to the respondents. All the
respondents were informed that the results of the study will be anonymous and under no circumstances will the results of the corporate sustainability evaluation be linked to the company name. The NMMU ethics committee provided ethical clearance prior to interviews for the study being conducted.

3.7 DATA ANALYSIS

The proposed mathematical formulae for evaluating the corporate sustainability of the various corporations aggregate the indicators of each component to finally form a composite corporate sustainability index ($I_{ccs}$). As discussed in Chapter Two, corporate sustainability is viewed as a branch of sustainable development which is derived from the term sustainability. Indicators used in measuring corporate sustainability are often diverse thus a composite index can be used to measure corporate sustainability. Corporate indices are good tools for decision making in the sustainability field. Common indices which are used for sustainability include the DJSI which was discussed in section 2.3.

In order to compose a composite index, a hierarchy of the composition of indicators is formed. As can be seen in Figure 3.1, the steps to creating composite corporate sustainability indicators involves a number of stages; educated selection of indicators which give an overview of the entire concept of corporate sustainability, grouping the indicators to the two-dimensional components, evaluating if the impact of the indicator is positive or negative, weighting the indicators according to importance, standardising the indicators, calculating sub-indices and adding them to finally reach a composite corporate sustainability index which can be used to compare companies. The information generated from the semi-structured interviews generated qualitative and quantitative data. All of the below steps must be conducted in order to create an index which will allow for the cross comparison of corporate sustainability performance of the participating companies. This index not only allows for indicators with different units to be aggregated it also allows for different companies to be compared based on sub index scores of the sub-indices as well as the final index score.

The steps shown in Figure 3.1 are explained in the proceeding sections.
3.7.1 Evaluate the indicators

Evaluating the chosen indicators is the next step following grouping. In the step, each group \( j \) of indicators \( i \) is evaluated according to the type of impact on sustainability, whether it is negative or positive. Evaluating entails determining if an increase in an indicator value has a positive or negative impact on corporate sustainability. If an indicator's increasing value has a positive impact on sustainability, this is represented by \( I_{A,ji}^{+} \) and if the increasing value has a negative impact on sustainability, it is represented by \( I_{A,ji}^{-} \). An example is, an increase in diversity and equality has a positive impact of corporate sustainability while an increase in emissions has a negative impact on corporate sustainability. Table 3.2 represents all the alphanumeric characters and their meaning which were used in calculating the composite corporate sustainability index.
Table 3.2: The alphanumeric characters of the composite corporate sustainability index

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>(j)</td>
<td>group of indicators in a component (e.g. Socio economic component)</td>
</tr>
<tr>
<td>(i)</td>
<td>indicators</td>
</tr>
<tr>
<td>(I^+)</td>
<td>indicator whose increasing value has positive impact on corporate sustainability</td>
</tr>
<tr>
<td>(I^-)</td>
<td>indicator whose increasing value has a negative impact on corporate sustainability</td>
</tr>
<tr>
<td>(I^+_{\text{N}})</td>
<td>normalised indicator whose increasing value has a positive impact on corporate sustainability</td>
</tr>
<tr>
<td>(I^-_{\text{N}})</td>
<td>normalised indicator whose increasing value has a negative impact on corporate sustainability</td>
</tr>
<tr>
<td>(I_{\text{min}})</td>
<td>indicator of negative performance with minimum value of all companies compared</td>
</tr>
<tr>
<td>(I_{\text{max}})</td>
<td>indicator of negative performance with minimum value of all companies compared</td>
</tr>
<tr>
<td>(W)</td>
<td>weight of indicator</td>
</tr>
<tr>
<td>(I_{\text{en}})</td>
<td>corporate sustainability sub-index for socio-environmental component</td>
</tr>
<tr>
<td>(I_{\text{sec}})</td>
<td>corporate sustainability sub-index for socio-economic component</td>
</tr>
<tr>
<td>(I_{ee})</td>
<td>corporate sustainability sub-index for enviro-economic component</td>
</tr>
<tr>
<td>(I_{ct})</td>
<td>corporate sustainability sub-index for current trends</td>
</tr>
<tr>
<td>(I_s)</td>
<td>current trends sub-index</td>
</tr>
<tr>
<td>(I_{cs})</td>
<td>corporate sustainability index</td>
</tr>
</tbody>
</table>

3.7.2 Weighting the indicators

Once the indicators were evaluated, the next step was to apply a weighting method. There are a number of weighting methods which can be used when aggregating indicators and creating an index. Some of these weighting methods are from statistical models and others from participatory models. Subjective weighting was used in this study. This method is based on the individual opinion of an expert in a field putting a value of importance to an indicator relative to all the other indicators. This study assumes a sector weighting for all indicators.

The Analytical Hierarchy Process (AHP) model was used to determine subjective weights of the indicators. Indicators are assigned importance ratings relative to the other indicators in that component. This means that indicators in the socio-economic sector have been weighted relative to all indicators in this group, indicators in the socio-environmental have been weighted relative to the indicators within the components and so it is for the other two components (Kranjic and Glavic, 2004). The value of importance assigned to an indicator was based on subjective ratings by the researcher on a Likert type scale of 1-9 where one means the relative importance between two
indicators is equal and 9 is the indicator is 9 times more important than the other. The results of the weighting of each indicator can be seen in Chapter Four. For the four components of corporate sustainability, these were given equal weighting as in terms of the definition, all four components should contribute equally to overall corporate sustainability and one not have higher importance than another. Once the weight of each indicator was known, the normalisation procedure was able to be done.

3.7.3 Standardising the indicators

The indicators were standardised in order to aggregate values of different units. Standardising indicators is a process that allows for the indicators to be converted to a number between 0 and 1 so that the values are dimensionless and the researcher can compare values that are measured in different units (Kranjic and Glavic, 2004). It is evident from the list of indicators presented in Table 3.1 that the unit of measurement for the indicators differs. Thus, in order to compare values and aggregated them into a composite index, the indicators need to be standardised. The equation used for standardising indicators was:

\[
I_{N,i}^+ = \frac{(I_{A,i}^+ - I_{min,i}^+)}{I_{max,i}^+ - I_{min,i}^+}
\]

(Equation 1)

Where \(I_{N,i}^+\) is the standardised indicator for the indicators which add positive value towards corporate sustainability for a component (j) of corporate sustainability.

Evaluating the indicators which result in negative impacts towards corporate sustainability the equation used was:

\[
I_{N,i}^- = 1 - \frac{(I_{A,i}^- - I_{min,i}^-)}{I_{max,i}^- - I_{min,i}^-}
\]

(Equation 2)

3.7.4 Calculating sub-indices and corporate sustainability index

Following the standardising of the indicators, the importance ratings (weights) multiplied by the standardised values formed the values for the sub-index for each indicator. These values were then aggregated for each component per company and formed the sub-index score per component of corporate sustainability. The following equation was used:

\[
I_{s,j} = \sum_{j}^{n} W_{j} I_{N,j}^+ + W_{j} I_{N,j}^-
\]

(Equation 3)
Where $I_{s,j}$ is the corporate sustainability index, $W_j$ is the weight of the indicator.

Once the sub-indices were calculated, these were aggregated to form the final corporate sustainability score for each company using the following equation:

$$ I_{cs} = \sum_{j}^{n} W_j I_{sj} $$

(Equation 4)

### 3.8 CONCLUSION

All the necessary methods to evaluate the state of corporate sustainability in the automobile industry in the NMBM were discussed in this chapter. This study followed the theoretical framework outlined in Chapter 2 which discusses the origin of corporate sustainability and links corporate sustainability to the three pillars of sustainability which are economy, society and the environment. Two-dimensional indicators or indicators that overlap and represent not only one pillar but two or more, were created and interview questions were created based on these indicators. These indicators represented socio-economic, enviro-economic and socio-environmental factors. The information was standardised and used to create a composite index.

The resulting composite index enabled the researcher to analyse data so that the research questions and objectives can be answered. The results are presented in the next chapter.
CHAPTER 4

RESEARCH RESULTS AND DISCUSSION

4.1 INTRODUCTION

The previous chapter outlined the research methodology used to gather information and analyse data. The results derived from the study’s data collection are presented and analysed in this chapter. Twelve companies were evaluated according to socio-economic, socio-environmental, enviro-economic and current trends in corporate sustainability. This chapter is split into six sections. The first section presents the results of the selection of indicators. The second section details the results of the weighting, standardising and creation of sub-indices and finally the corporate sustainability rating. The third section discusses the results of the corporate sustainability index. Following this discussion, the fourth section draws lessons of best practice from the twelve companies. The fifth section draws emerging themes from the creation of indicators and from the results of the corporate sustainability index. Finally, the sixth chapter discusses the limitations to the study.

The methodology used in the study was designed to address the research objectives listed in Chapter 1 which are:

- To determine multi-dimensional indicators that are refined enough to ascertain differences in corporate sustainability scores of companies (that have already attained a minimum score of corporate sustainability or of ISO 14001 registered companies)
- To document the key problems associated with adopting multi-dimensional indicators within the automotive industry in Nelson Mandela Bay
- To create a corporate sustainability index that can be used to evaluate and compare the automotive industry corporations according to their socio-economic, socio-environmental, enviro-economic and current trends performance
- To apply this index on selected companies to evaluate their corporate sustainability
To identify which ISO 14001 certified corporations in the NMB automotive industry are leaders in corporate sustainability using the corporate sustainability indicators and index and to draw lessons and best practice from leading companies

4.2 CREATING MULTI-DIMENSIONAL INDICATORS

This section reports on the results of the creating of the multi-dimensional indicators which were used to calculate the corporate sustainability ratings of the twelve companies. The rationale behind the indicators chosen is discussed in Chapter Three. The result of the chosen indicators is presented in Table 4.2. Here, a mix of indicators which measure more than one dimension of corporate sustainability is selected.

Conventionally, the social, environmental and economic performance of a corporation in total makes up the corporate sustainability ratings of a company. Indicators from these three dimensions should be simple, readily available, practical, reliable, easy to understand and important to a company’s corporate sustainability goals. Indicators should be tailor-made for an organisation and/or sector.

Indicators can be one, two, and three dimensional in nature.

Sikdar, 2003, divided indicators into three classes:

- One-dimensional indicators which measure one dimension of sustainability: economic or social or environment
- Two-dimensional indicators which measure socio-environmental; socio-economic and environmental ecological
- Three-dimensional indicators which measure all three dimensions of sustainability.

Corporate sustainability is a holistic concept where the three dimensions of the triple bottom line (TBL) intersect. Corporate sustainability indicators can only accurately represent the multi-faceted concept if they integrate all the dimensions to form indicators that speak to all three dimensions simultaneously (Lozano, 2013). The current corporate sustainability reporting guidelines compartmentalise indicators to one of the three dimensions of the TBL. The problem with this strategy is that it does
not take into consideration the associations between the dimensions whether they are positive or negative (Lozano, 2013). These one-dimensional indicators are static and can be larger in number which from a practical view makes application difficult. It is therefore desirable to have a small number of indicators for practicality (Martins, 2007). Researchers such as Lozano (2013); Azapagic (2004) and Fonseca et al. (2013), have argued that a set of indicators which is three-dimensional, which means to discard compartmentalising indicators into three separate dimensions, but to integrate indicators to form a holistic picture of the state of corporate sustainability in a company are more desirable to better measure corporate sustainability. Integrated indicators are necessary to represent the true meaning of corporate sustainability as the concept itself has relationships and interactions between dimensions which are not represented by compartmentalised indicators. Theoretically, these would be the perfect set of indicators; however, even these indicators do not define the specific relationships between the integrated dimensions. Having an indicator with all three dimensions represented in them only recognises that there is a synergy between them but does not define what that synergy is. Another problem Azapagic (2004) found with integrated indicators is they do not represent how internal performance relates to the external environment. Azapagic (2004) created a framework of indicators for the mining industry which followed the guidelines of the GRI. Her framework went a step further and had a fourth dimension which represented indicators which integrated two or more dimensions of the TBL in order to have a more holistic representation of the state of sustainability of the mining and minerals industry. The indicators are a mix of qualitative and quantitative data as aspects such as social performance are better represented in qualitative terms.

The proposed framework of this study originally used indicators which were multidimensional; however after conducting a pilot, the indicators were modified to accommodate companies not willing or able to provide information for some of the indicators such as net income of the company and indicators related to board of directors for multinational companies was an issue as their B-BEE ratings would be lower. The indicators presented in Table 4.1 were subsequently discarded.
**Table 4.1: Indicators which were discarded after the result of the pilot study**

<table>
<thead>
<tr>
<th>Indicator</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Direct greenhouse gas emissions (Weight)/ per unit sales</td>
<td></td>
</tr>
<tr>
<td>Total amount saved from recycling efforts</td>
<td></td>
</tr>
<tr>
<td>Total amount of water used (m3)/unit value added (R)</td>
<td></td>
</tr>
<tr>
<td>Total energy used (kWh)/unit value added (R)</td>
<td></td>
</tr>
<tr>
<td>Total solid waste disposed (kg)/ Unit value added (R)</td>
<td></td>
</tr>
<tr>
<td>Total environmental protection Expenditure /total net income(R)</td>
<td></td>
</tr>
<tr>
<td>Total donated to community development (R)/ Net income (R)</td>
<td></td>
</tr>
<tr>
<td>Hours of sustainability training per year per employee</td>
<td></td>
</tr>
<tr>
<td>Share of blacks/women in board of directors</td>
<td></td>
</tr>
<tr>
<td>Product life cycle assessment</td>
<td></td>
</tr>
<tr>
<td>Supply chain management</td>
<td></td>
</tr>
</tbody>
</table>

The original indicators which were used in the pilot study but could not be part of the final indicator list and used for the study because;

- Companies did not want to disclose financial information for the study
- Indicators were not measured or quantified in the company which is an indication of the state of corporate sustainability itself because companies do not measure or cannot quantify certain indicators such as percentage recycled
- Three-dimensional indicators are difficult to design. The relationships between the dimensions of sustainability are difficult to define and measure
- Unwillingness of some companies to respond to certain indicators would result in a lower number of participants in the study
- Two-dimensional indicators are steps forward towards state of the art indicators which capture inter linkages between dimensions of CS.

The resulting indicators (Table 4.2) are indicators that are two-dimensional which means they represent more than one component of the TBL of sustainability. In this table, they are presented in terms of an increase in the value having a positive impact
on corporate sustainability or an increase in the indicator having a negative impact on corporate sustainability.

The results of the pilot study showed that the two companies were not willing to share financial information, did not clearly measure some aspects and did not have concern for their suppliers beyond the required international standards. In addition the chosen companies were not willing to give and/or did not measure four of the original indicators namely; Total amount saved from recycling efforts, Hours of sustainability training per year per employee, Total environmental protection Expenditure /total net income and Product life cycle assessment. The pilot study also prepared the researcher for the long response time of companies. Following these results the indicators were refined and are presented in Table 4.2. The indicators of positive impact and those of negative impact were explained in Section 3.7.1 where the indicators were evaluated.

### Table 4.2: Evaluating the indicators according to positive or negative impact towards CS

<table>
<thead>
<tr>
<th>Component</th>
<th>Indicators of positive impact</th>
<th>Indicators of negative impact</th>
</tr>
</thead>
<tbody>
<tr>
<td>Socio-economic</td>
<td>Percentage suppliers from NMBM, Percentage of men to women of direct and indirect employees, Number of suppliers in supply chain complying with BBBEE, Presence of a HIV/AIDS consulting clinic on site</td>
<td>Work-related lost time due to work-related injury, Average sick leave used per employee</td>
</tr>
<tr>
<td>Socio-environmental</td>
<td>Percentage of suppliers with any kind of EMS (EMS must have aspects), Percentage of final product that can be reused and/or recycled, Greenhouse gas emissions by weight</td>
<td></td>
</tr>
<tr>
<td>Component</td>
<td>Indicators of positive impact</td>
<td>Indicators of negative impact</td>
</tr>
<tr>
<td>--------------------</td>
<td>------------------------------------------------------------------------------------------------</td>
<td>---------------------------------------------------------------------</td>
</tr>
<tr>
<td>Enviro-economic</td>
<td></td>
<td>Total amount of water used per employee, Total energy per employee</td>
</tr>
<tr>
<td>Current trends in CS</td>
<td>Is there an environmental risk assessment for the company?</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Is there any employee sustainability engagement outside the company?</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Are there water scarcity risk management plans in place?</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Are there any resource scarcity management plans in place?</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Are emissions of company suppliers known or measured?</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Are there any energy scarcity management plans in place?</td>
<td></td>
</tr>
</tbody>
</table>

### 4.3 CREATING A COMPOSITE INDEX

Tables 4.3 to 4.6 (which can be seen in Appendix B), depict the results from the interviews and questionnaires administered to each of the companies. The indicators were grouped according to four components of corporate sustainability which were modified from the traditional model of sustainable development. Tables 4.3 to 4.6 depict the data and the unit of measurement and constitute the first step in the creation of a composite index. Six socio-economic, three socio-environmental, two enviro-economic and five current trends indicators were aggregated to form corporate sustainability sub-indices for the twelve selected companies. These sub-indices were aggregated to form the final corporate sustainability index for each of the companies as presented in Table 4.7 (which can be seen in Appendix B). The indicators were measured in different units therefore in order to measure and compare if it was necessary to standardise the indicators to make them dimensionless and bind them between 0 and 1.
Evaluating the indicators on whether they contributed positively or negatively towards corporate sustainability (as discussed in Chapter 3) was done and the results can be seen in Table 4.2. Indicators with a ‘+’ sign denotes an increase in the value for the indicator is beneficial for corporate sustainability and where ‘−’ results in a negative impact towards corporate sustainability. An increase in value for four indicators would result in a negative impact on corporate sustainability and an increase in values for thirteen indicators would result in positive consequence for corporate sustainability.

The indicator performance of each company for each indicator can be seen in Tables 4.3 to 4.6. Here, one may compare the performance of individual indicators across companies to detect where companies which indicators show the company has strong performance in and which indicators a company show needs improvements. An example of this is the indicator ‘percentage of women to men of direct and indirect employees’. For Company 10, the score from the questionnaire was 61.5% where the score for Company 1 was 7.7%. When these companies are compared, there is a stark difference in the gender ratio of employees in the company (Table 4.3). The questionnaire responses for the socio-environmental indicators (Table 4.4) show a high percentage of recyclable material across the companies barring one of the companies which had 100% of their product end up in landfill. For the enviro-economic indicators (Table 4.5), one can see differences between amount of energy and the amount of water used per employee between the companies with Company 1 having the highest value of 297 815 m³ per employee per.

The current trends questionnaire responses (Table 4.6) show responses of the companies to questions about indicators which are cutting-edge in measuring corporate sustainability. None of the companies knew the emissions of their suppliers and this is the reason for the lowest rating of 1. The responses further show that many of the companies undertake some form of risk assessments with the risk assessments with the lowest scores being the water risk assessment.

Once the questionnaire responses were captured, the weights of each individual indicator were determined by the researcher. The weights of the indicators were determined according to the AHP method as discussed in Chapter 3. The results of the weights can be seen in Table 4.7 for the socio-economic, Table 4.8 for the socio-environmental, Table 4.9 for the enviro-economic and Table 4.10 for the current trends.
The relative weights highlight that some indicators carry more importance in a component in comparison to the other indicators in that same component of corporate sustainability. In the socio-economic component the indicator with highest importance rating was the percentage of suppliers from NMB while the lowest was the presence of an HIV/AIDS clinic on site (Table 4.7). Sourcing suppliers locally shows a commitment to local economic growth and lowering costs and emissions from transport while HIV/AIDS testing and counselling facilities are prevalent in the NMBM where there is at least one clinic present in every suburb and township. Values presented in these tables (Tables 4.7 to 4.10, which can be seen in Appendix B) represent the results of the weights multiplied by the standardised value of the indicator. These values are used to calculate the sub-index for the company.

In the socio-environmental category the indicator with the highest importance rating was the greenhouse gas emissions measured while the lowest rated in the group was the percentage of suppliers with an EMS (Table 4.8) while the greenhouse gas emissions of a company were given the highest importance rating of 0.687. It is important to note that all weighting values for each component must add up to 1.

In the enviro-economic group, both indicators were weighted equally and in the current trends component the highest rated indicator was knowledge of supplier greenhouse gas emissions as this indicator is regarded as one of the most cutting-edge measurements for corporate sustainability.

The highest importance rating for the current trends component in terms of current trends in corporate sustainability was the knowledge of greenhouse gas emissions of suppliers with a rating of 0.305. The second highest importance rating was attributed to the water and energy risk assessments. The importance rating for these indicators in relation to the other current trends indicators was 0.247 (Table 4.10). The lowest importance rating was the sustainability engagement of the employees outside the working environment by the company. This low weight for this indicator is not to say it is not important; however in relation to the other indicators in this component it has the lowest importance rating.

In both Tables 4.7- 4.10, all four components of corporate sustainability were weighted equally as all four of them contribute equally towards corporate sustainability. This is
in support of the holistic view of corporate sustainability and sustainable development where all aspects should have equal weights and none should be considered more important than the other.

The normalised values multiplied by the importance rating (weight) of the indicator were used to calculate the sub-indices (Tables 4.7 to 4.10 in Appendix B). Following the calculation of the sub-indices, the final step was the calculation of the overall corporate sustainability score for each company (Table 4.11), on the following page.

The results of the corporate sustainability index allow for stakeholders to easily interpret the data, it also highlights the companies with highest performance and allows the research to draw conclusions as to why these companies scored high in each category and with the overall corporate sustainability rating based on the corporate sustainability score and the interviews. Thus a mix of quantitative and qualitative data is very useful in understanding emerging themes in the data. The higher the values of the sub-indices and overall corporate sustainability index, the better the score of the company in relation to the other companies.
Table: 4.11: Corporate sustainability composite index ($I_{CS}$) and sub-indices for socio-economic ($I_{SEC}$), socio-environmental ($I_{SEN}$), enviro-economic ($I_{EE}$), and current trends ($I_{CT}$) for the year 2013

<table>
<thead>
<tr>
<th>Index</th>
<th>Company 1</th>
<th>Company 2</th>
<th>Company 3</th>
<th>Company 4</th>
<th>Company 5</th>
<th>Company 6</th>
<th>Company 7</th>
<th>Company 8</th>
<th>Company 9</th>
<th>Company 10</th>
<th>Company 11</th>
<th>Company 12</th>
</tr>
</thead>
<tbody>
<tr>
<td>$I_{SEC}$</td>
<td>0.2205</td>
<td>0.3564</td>
<td>0.5982</td>
<td>0.2016</td>
<td>0.6060</td>
<td>0.5350</td>
<td>0.5169</td>
<td>0.6512</td>
<td>0.6846</td>
<td>1.0614</td>
<td>0.5609</td>
<td>0.4002</td>
</tr>
<tr>
<td>$I_{SEN}$</td>
<td>0.8537</td>
<td>0.0000</td>
<td>0.1452</td>
<td>0.8422</td>
<td>0.9252</td>
<td>0.5681</td>
<td>0.1940</td>
<td>0.1940</td>
<td>0.8610</td>
<td>0.2244</td>
<td>0.9003</td>
<td>0.9003</td>
</tr>
<tr>
<td>$I_{EE}$</td>
<td>0.0000</td>
<td>0.6728</td>
<td>0.8496</td>
<td>0.8496</td>
<td>0.9139</td>
<td>0.9595</td>
<td>0.9956</td>
<td>0.9914</td>
<td>0.9951</td>
<td>1.0000</td>
<td>0.9784</td>
<td>0.9894</td>
</tr>
<tr>
<td>$I_{CT}$</td>
<td>0.0295</td>
<td>0.1530</td>
<td>0.5185</td>
<td>0.0360</td>
<td>0.6590</td>
<td>0.1530</td>
<td>0.6950</td>
<td>0.4480</td>
<td>0.6590</td>
<td>0.1060</td>
<td>0.4480</td>
<td>0.6950</td>
</tr>
<tr>
<td>$I_{CS}$</td>
<td>0.2760</td>
<td>0.2956</td>
<td>0.5279</td>
<td>0.4824</td>
<td>0.7760</td>
<td>0.5539</td>
<td>0.6003</td>
<td>0.5712</td>
<td>0.7999</td>
<td>0.5980</td>
<td>0.7219</td>
<td>0.7462</td>
</tr>
</tbody>
</table>
4.4 CORPORATE SUSTAINABILITY PERFORMANCE

This section discusses the results of the corporate sustainability index. As previously mentioned, the corporate sustainability of the twelve companies was assessed using various indicators under the four components of corporate sustainability (See Chapter 3).

Figure 4.1: Sub-index for the socio-economic performance for twelve companies in the automotive industry

In terms of the socio-economic performance, Company 10 scored the highest score amongst the twelve companies (Figure 4.1). During the data collection exercise with this company they expressed a great value in their human capital and investing in their employees. This is reflected in the company’s low sick day use per employee and low work lost-related time. Investing in health and safety of employees enables lower loss of work-related time due to on-duty injury. In addition, Company 10 is the only company to have all their suppliers from the Nelson Mandela Bay Municipality, this is indicative of their commitment to local company empowerment and reduction of transportation costs and emissions from importing supplies from other provinces or countries. Investing in human capital brings returns to companies and increases productivity of the company. There are stark differences between the highest scoring company and the lowest. For the socio-economic component, the lowest scoring company was Company 4. Another low scoring company worth mentioning is Company 2 with a score of 0.2. During the interview session with Company 4, it was noted information for the
socio-economic indicators was either not measured or it was not readily available. As mentioned in Chapter 2, leaders in corporate sustainability not only measure and check regularly elements of corporate sustainability but they report on the measuring process as well (Agbonkhese, 2006). Amongst the inputs from the twelve participating companies, eight of the twelve have scores which are above the 0.5 mark. The link between measuring and recording information for indicators and level of corporate sustainability a company has reached can be seen here with the example of Company 2 where it lacked the information required by the indicators. This is much the same with Company 1, which lacked information that was required. Information such as the number of suppliers from the NMBM should readily be available from supply chain, however many of these companies were not actively recording and/or noting this information.

![Figure 4.2: Sub-index for the socio-environmental performance for twelve companies in the automotive industry](image.png)

**Figure 4.2: Sub-index for the socio-environmental performance for twelve companies in the automotive industry**

Very high disparities in the socio-environmental indicators can be seen amongst the 12 companies (Figure 4.2). The lowest performing company is Company 2. Most companies have high scores in this component as a result of the high percentage of the products produced being recyclable. Company 2’s low socio-environmental score is compounded by the fact that the products produced in the company all land up in landfill sites, none are currently being recycled. The measuring of greenhouse gas emissions is an important indicator particularly for companies in NMB as currently there is a low emissions development project which will run until September 2015 earmarked
for small and medium-sized municipalities including NMB. The project promotes low carbon emissions in a bid to attract investment, reduce energy costs and increase efficiency in the long term (Botes, 2013). Thus many of the companies measure and report on their own greenhouse gas emissions.

![Figure 4.3: Sub-index for the enviro-economic performance for twelve companies in the automotive industry](image)

The sub-index scores for the corporate sustainability rating for the enviro-economic section for the twelve companies are generally uniform. This is generally because (i) companies all measure water and electricity usage and (ii) aside from measuring, companies have energy and water-saving policies in place to reduce the use of these resources. This was the case for ten of the twelve companies. Traditionally, the most reported on indicators are those related to resource use and environmental impacts. Indicators in this component are well documented in literature (Searcy, 2012). The standardised value for Company 1 was equal to the mean of the population, thus the score is zero. Thus, the other companies performed better than Company 1 for this component. The reason for the high resource use was discussed during the interview. The reason was the company produced high resource-intensive products to automotive creators in the NMBM and around South Africa. The specific product the company produced was noted as the reason for high resources use.
The current trends sub-index scores for the 12 companies show significant disparities. The highest performing company was Company 7 with a score of 0.69, which had resource, water, energy and environmental risk assessments done for the company. Further, this company engaged employees outside of work environment on issues of sustainability. The lowest performing companies were Company 1 and Company 4. These companies lacked risk assessments and employee engagement. Ultimate sustainability involves corporate citizenship (See Chapter 2.4). Engaging employees outside of work in issues of sustainability allows for the company to contribute to sustainability beyond the work environment and to be part of the community. Another indicator which is representative of ultimate corporate sustainability is the engagement of the supply chain on issues of corporate sustainability. None of these companies measured or knew the emissions of their suppliers. Going beyond the operations of the company and getting involved in the supply chain corporate sustainability is the current trend for corporate sustainability (Agbonkhese, 2006). Another current trend in corporate sustainability is sustainability reporting. Barring the multinational companies, none of the participating companies have sustainability reporting for the local branches which are publically available. A key factor of corporate sustainability is transparency so all stakeholders can see and be a part of affairs of the company.
Figure 4.5: Composite corporate sustainability index for 12 companies in the NMBM automotive manufacturing sector

The overall corporate sustainability rating shows Company 9 as the leader of the pack with a score of 0.79 (Figure 4.5). This company’s commitment to risk assessments, investments in local suppliers and almost equal appointment of men and women in the company are some of the reasons they have the highest corporate sustainability index score. Likewise Company 7 shares the same characteristics as Company 9 and has been rated the second best performer amongst the twelve companies. The lowest performing companies in the group were Companies 1 and 2. These companies can be classified as compliance-based companies which do not go beyond the minimum requirements. Lack of information and monitoring are significant problems as it shows the companies are not monitoring their resource use or their efforts towards corporate sustainability.

The fourth stage of the Dunphy scale shows corporations going a step beyond compliance to ensure the company performance improves. The environmental and human health safety for employees is improved, energy and resource use are reduced, recycling is used and meeting international standards such as GRI is part of this step. The corporation benefits from cost reduction and better employee involvement and productivity. This was the case for the highest scoring company where they went above compliance and had better efforts to ensure corporate sustainability.
The lowest performing companies can be classified as level three of the Dunphy scale. The definition for these companies is: the third level is when corporations comply with rules and regulations. Typical activities of this stage include reviewing the current laws and regulations, a measurement and monitoring system is developed and a risk management system is drawn up. The corporation benefits from the minimization of risks and better relationship with stakeholders.

![Four Components of Corporate Sustainability](image)

**Figure 4.6: Overall CS for each component for all companies**

The overall performance for each of the components of corporate sustainability can be seen in Figure 4.6. The best performing of all four components is the enviro-economic, followed by the socio-environmental and the current trends component is the lowest component. This result is expected as the current trends components include the latest global trends in corporate sustainability which corporations in the NMB have not yet reached this level of corporate sustainability. General findings from the interviews conducted and from the questionnaire are that the companies comply with ISO 14001 standard in order to comply with the relevant laws, in order to be considered by large multinational companies as suppliers and in order to export their products to other countries. Thus many of the corporations are at level 3 of the Dunphy stage is compliance and minimum requirements. There was very little desire or effort shown towards integrating corporate sustainability in the company visions beyond the ISO 14001 check box.
4.5 CORPORATE SUSTAINABILITY LESSONS AMONGST 12 AUTOMOTIVE INDUSTRY COMPANIES

One of the objectives of the study was to draw best practice from the highest performing companies and highlight key issues in the lowest performing companies.

An article from the Corporate Sustainability Newswire (2015) listed 10 characteristics of the world’s best CS programmes:

- CS is embedded in company mission statement;
- The corporation recognises long term impacts to society and the environment;
- Senior management is involved and guides CS programmes in the corporation;
- The corporation and employees internally and externally aspire to be the best at CS;
- The business case for CS is articulated clearly;
- CS champions are rewarded;
- Engagement with stakeholders are sincere and lead to effective implementation of any changes necessary;
- Indicators used to measure CS are of international standards;
- Corporation has a long term view and
- Corporation reports transparently on its CS performance

Based on responses to the questionnaire from the best performing corporations and on the above list of characteristics of corporations that are leaders in corporate sustainability, the lessons of best practice from the 12 companies that participated in the study include:

- Investing in employees so that they are aware of the concept and philosophy of corporate sustainability in order to integrate it into everyday business practice rather than it being a top-down prescription
- Setting goals, recording and monitoring progress towards goals such as reduction in resource use. It was found while conducting the study that the companies who recorded and monitored key performance areas were able to keep track of their current use and set goals for reducing resource use. Lack of
recording and monitoring was found in the companies that were the lowest performing.

- Corporate sustainability being more than a minimum requirement for ISO 14001, but rather moving beyond this standard and incorporating innovative ideas from employees to improve corporate sustainability in the company. The high scoring companies in the study went beyond compliance and aimed to incorporate corporate sustainability in their business.
- Measuring and recording system that is updated regularly
- Measuring indicators beyond the environmental and health and safety components of a company; many companies that participated in the study were able to provide values for work lost hours and sick leave use
- Not viewing indicators as separate items but knowing that they are connected. An example of this is investment in safety of employees to reduce lost work time due to on-site accidents. Lost work time ultimately affects productivity and efficiency and thus will affect financial aspects of the company.

The key issues from the participating companies included:

- Lack of monitoring and recording of key performance indicators
- Lack of transparency regarding certain indicators
- Compliance with laws being the biggest driver and not going above and beyond compliance
- Smaller companies lack funding and resources to implement corporate sustainability strategies as the lower scoring companies are the smallest

4.6 EMERGING THEMES

The emerging themes with regards to indicator creation and measuring corporate sustainability, (based on the interviews conducted), from the results of the data are discussed in this section.

Based on the interviews conducted, it was found that there was lack of information available to managers which participated about the latest trends of corporate sustainability. Managers were aware of the principles of ISO 14001, however the depth of knowledge about measuring beyond this was lacking for most of the companies.
There was a disjoint between management and line employees. Environmental, health, safety and general sustainability issues were addressed from a top-down approach which means managers set the rules on what needs to be done; however employees on the ground are not knowledgeable about the reasons and the exact processes that need to be followed. Integrating corporate sustainability into company strategy and making sure employees are knowledgeable about the concept is essential for improvements in corporate sustainability of a company.

Consumer awareness is one of the main drivers of corporate sustainability for some companies in countries like Germany and Sweden, however, as a result of the different socio-economic dynamics of South Africa, employees and managers do not prioritise corporate sustainability as a concept which must be applied, and management prioritises the income to the business.

Companies measure environmental aspects predominantly and the socio-economic aspect is one that has strong presence in companies. This is manifested by the presence of unions in the companies and strong emphasis on measuring health and safety of employees to minimise company risks.

4.7 CHAPTER SUMMARY

Data collected for this study indicates that the instrument created to measure corporate sustainability can be applied to companies and it is refined enough to pick out differences amongst companies, not only in terms of the composite index but the sub-indexes for the individual components of corporate sustainability. The results of applying the indicators to two companies as a pilot study showed that these companies do not measure corporate sustainability in an advanced manner, thus indicators had to be removed to adapt the instrument. Although the original set of indicators was not used, the indicators that were used are still a step up from using traditional indicators that measure sustainability as these indicators were sector- specific and multidimensional. This process demonstrated the difficulties in creating and applying three-dimensional indicators. The results show that based on indicators which were excluded, corporate sustainability is in its infancy based on inputs from the different companies.
Applying the measuring instrument on twelve companies’ overall score show the enviro-economic component as the best performing. In terms of the sub-indices for the composite index there were varying results in the performance of each company depending on the information provided for the indicators. Reasons for companies scoring low were that companies not measuring and recording information on those specific indicators and low efforts to ensure better resource use. Applying the indicator system showed the instrument can pick out differences in the corporate sustainability score of companies not only in terms of the final composite rating but the sub-indices as well.

Based on the research results, this study has successfully met all the objectives outlined in Chapter 1 and one can see the difficulty in indicator creation, indicator refinement, applying the indicators, drawing lessons from company performance and discussing the emerging themes.
CHAPTER 5
SYNTHESIS

5.1 INTRODUCTION

With the research objectives in mind, this study aimed to develop a measuring instrument that would reflect the state of corporate sustainability. This instrument would then be applied and refined based on the results of the application of the instrument. In this chapter, a review of the methodology that was used as well as the results are presented. An overview and the main findings of the study will be discussed in this chapter. The limitations of the study and recommendations for future studies will also be discussed.

5.2 SUMMARY

The main findings of this study will be synthesised with reference to the objectives outlined in Chapter One. The discussion of the main findings will include:

- discussion around the formulation of a methodology that would establish a cutting-edge measuring instrument
- creation of an instrument to measure corporate sustainability
- the main findings of the application of the instrument to local corporations in the automotive manufacturing sector
- best practice lessons which can be drawn from the companies and
- critically evaluate the research findings and recommendations for future studies

The study began with an in-depth theoretical background of corporate sustainability and the various methods available to measure the concept in Chapter Two. From the review of literature it is clear that the concept of corporate sustainability is one that is evolving. Further, the tools and frameworks used to measure the concept were discussed and the best indicators and methodology to measure corporate sustainability were chosen and used in this study.

One of the objectives of the study was to create multi-dimensional indicators and a composite index which is refined enough to measure differences between the corporate sustainability performances of companies. The concept of corporate
sustainability was discussed in Chapter Two and this allowed for the researcher to unpack this concept into four components and further unpack the components to seventeen indicators (Table 3.1).

Creating multi-dimensional indicators comes with difficulties. As a result of corporate sustainability the concept involving more than one component, (as defined in this study it involves four components), a more holistic measurement system was necessary to better capture this concept. This was a step away from the traditional compartmentalization of indicators that are used. The problems with compartmentalized indicators were discussed in Chapter Two. The main problems were that compartmentalized indicators are not a holistic representation of corporate sustainability. This study succeeded in creating indicators which represented more than one component of corporate sustainability chosen from socio-economic, socio-environmental, enviro-economic and current trends.

Following the creation of indicators, the instrument was applied to companies as a pilot study. The results of the pilot study allowed the researcher to modify the instrument to get better responses from corporations. Modifications included the removal of indicators where no responses were received because of confidentiality such as financial information of the corporation. Once the instrument was amended it was applied to more corporations. Applying the composite index involved a number of steps. Once the indicators to be used were decided on, the indicators were translated into a questionnaire survey and interview schedules which was then applied in a pilot study of two different companies. The results from the pilot study showed that the participating companies were not able to provide data for three-dimensional indicators. This resulted in the researcher having to tamper with the indicators and to adjust them to be suitable to gather information amongst companies. This however meant that the indicators were no longer three- dimensional, but were now two-dimensional. The current indicators are not representative of the ultimate set of indicators to corporate sustainability but are however an improvement from the conventional compartmentalized indicators.

Applying the instrument to twelve companies in the automotive manufacturing sector allowed the researcher to view the overall corporate sustainability performance for each company and the corporate sustainability performance for the socio-economic,
socio-environmental, enviro-economic and current trends components. The application of the instrument showed that there were indicators viewed as more important than others in a component and these had a higher weighting score than others. For the socio-economic component, the indicator ‘percentage of suppliers from the Nelson Mandela Bay Municipality was deemed as most important in the component. For the socio-environmental component the measurement of the amount of greenhouse gas emissions of a company is rated as the most important; both indicators were weighted equally in the enviro-economic component and the most important indicator for current trends was the knowledge of the greenhouse gas emissions of supplier. Once the weight of indicators was assigned this was multiplied by the normalised values to get the sub-indices for each component per company. The results from the sub-indices were then aggregated to form the final corporate sustainability sub-index for each of the twelve companies.

Following the analyses of the results from the participating corporations, the results were displayed and discussed. The results of applying the instrument on twelve companies in the NMB automotive industry can be seen in Chapter Four. In Chapter Two, the theoretical background was set and the various stages of corporate sustainability were discussed (Figure 2.6). The best performing company overall was Company nine. Company nine was the leader amongst the twelve companies for various reasons including:

- High ratio of men to women
- Investment in local suppliers and
- High performance in current trends component

The instrument was able to pick out differences in the corporate sustainability performance not only overall but for the four components of corporate sustainability. Table 4.1 shows a summary of the corporate sustainability performance scores for each company for each component of corporate sustainability.

The lowest performing company was found to be Company one which had a composite index score of 0.28. Reasons for this company scoring so low included:
• Lack of measuring indicators beyond ISO14001 requirements
• High resource use and
• No innovation when it comes to corporate sustainability. As a result the current trends scores are some of the lowest in the entire group.

The general observations from the companies were that the larger companies backed by multinationals had more resources available to implement corporate sustainability. Based on the current trends scores and the interviews it must be noted that companies were not on par with international leaders of corporate sustainability and corporate sustainability efforts were still very primal barring two companies which were more innovative beyond measuring ISO 14001 and other health and safety standards.

Company 9, which had the highest index score was found to be at stage 4 of the Dunphy stages of corporate sustainability (Figure 2.6). Although this is one stage away from market winners which demonstrate ultimate sustainability, it must be noted that there are many milestones to reach between each of the five stages of corporate sustainability so this rating of being in stage four by no means indicates that Company 9 is close to reaching ultimate sustainability. This rating means that this company has gone beyond reluctant acceptance and has in some way implemented measures of corporate sustainability that are beneficial to the business and it could take many years before a company progresses to the next stage of the Dunphy stages of corporate sustainability.

Lessons can be drawn from the inputs of the 12 participating companies. The main lesson which was drawn from participation corporations was to always measure and record information for key performance indicators. This is the first step towards corporate sustainability. Leading companies went beyond measuring information for ISO 14001 but were innovative to include key performance areas beyond this standard that would help the business to be functional should there be energy, water or resource shortages. Risk assessments are very important. An investment in company employees, educating them on corporate sustainability issues so that they are aware and can better implement corporate sustainability strategies. Corporate sustainability needs to be embedded in management and business structures and should not follow a top- down approach but should be embraced by employees especially those who will be implementing the resource-saving and many of the other key performance
indicators of a company. Companies should be aware that indicators of corporate sustainability are ultimately more than one-dimensional. An indicator should measure more than one aspect of corporate sustainability. As mentioned in Chapter Four some of the factors which influenced the score of a company included the size of the company and whether it is a multinational or not. This is much like the study by Lorenco and Branco (2014) which looked at the determinants of corporate sustainability performance in emerging markets with Brazil being a case study. This study found that size, profitability and ownership concentration had an influence on the corporate sustainability performance of companies.

5.3 LIMITATIONS TO THE STUDY

The research had the following limitations:

- As mentioned in Chapter Two, there is no perfect set of indicators that can evaluate corporate sustainability. The creation of indicators is a subjective process. The researcher selects the indicators that would best assess corporate sustainability for that particular industry. Knowing that no company will reach ultimate corporate sustainability where the company has zero negative impacts on environment and society, and only positive economic impacts, corporate sustainability is about the journey of improvement and not a particular goal; this is why there are some difficulties with measuring corporate sustainability.

- The size of the companies has an impact on the funding available to implement corporate sustainability. Based on the interviews and the index created, larger companies have an advantage as they have more funding available for technological innovations, social investment and general corporate sustainability strategies.

- Based on theory of characteristics of leaders in CS, companies which have been ISO 14001 certified for longer have an advantage over recently certified companies as they have had more time to adapt, change and implement strategies for continual improvement with regards to corporate sustainability.

- The study does not measure progress of the companies over time. If a longitudinal snapshot of corporate sustainability over time could be done it would be useful to gauge improvements in companies.
The weights used for the indicator were determined by the researcher based on interviews and observations in the automotive manufacturing sector. This is a subjective method of assigning weights.

The corporate sustainability index, when used solely, fails to paint an overall picture of individual indicators. It aggregates a number of indicators into one index and does not have information on the performance of a company on individual indicators.

5.4 RECOMMENDATIONS FOR FUTURE RESEARCH

In order to overcome the limitations outlined in Chapter Four and to further contribute to the discourse around corporate sustainability in NMB, the following recommendations are made by the researcher:

- In-depth understating of the relationship between the economy, environment and social components of corporate sustainability.
- Measuring corporate sustainability should be done using multidimensional indicators as opposed to compartmentalized indicators in order to better capture the holistic nature of the concept.
- The weighting method for assigning importance values could be determined by a panel of experts which has knowledge of the sector.
- As a result of companies measuring corporate sustainability from different departments, the questionnaire for the research had to be passed along different departments such as human resources, supply chain, health and safety and environmental department. Companies should look to have one department managing corporate sustainability issues where all information is collated and monitored.
- Although the indicators used in this study were multi-dimensional, the relationship between these indicators was not measured nor was it discussed. This is an area for future studies where the relationship between multi-dimensional indicators can be measured.
5.5 CONCLUDING REMARKS

The study has met the objectives stated in Chapter One. This study has succeeded in a thorough literature review, the creation of indicators which are refined enough to pick out differences in corporate sustainability scores amongst companies, applying the instrument and drawing lessons from the interview process and leaders of twelve participating companies.

The importance of corporate sustainability, especially in an African context, cannot be overstated. This study has shown that multi-dimensional indicators can be used to measure corporate sustainability. Further, this study has shown that corporate sustainability is still in its infancy, meaning that the participating companies are measuring ISO14001 standards but do not go beyond this. A renewed effort from companies is required to ensure better efforts towards corporate sustainability throughout NMB. No instrument will be the perfect instrument to measure corporate sustainability. The instrument created in the study is useful and can be used for decision-making purposes and can be used by companies to improve their corporate sustainability effort.


REFERENCE LIST


Global Compact Lead. Available at: https://www.unglobalcompact.org/HowToParticipate/Lead/lead_resources.html [ Accessed 12 January 2014]


Appendix A: Corporate sustainability questionnaire

Interview questions

The aim of this study is to evaluate the state of corporate sustainability in the Nelson Mandela Bay by using selected indicators and compiling a composite corporate sustainability index score. This study is purely for academic research purposes (Masters Geography, Faculty of Science, Department of Geosciences, NMMU under the supervision of Dr Anton de Wit). This study is about highlighting ways in which to improve corporate sustainability.

Participation is completely voluntary. There are no known or anticipated risks to your participation in this study and one may terminate participation at any time. If you would, like the findings of this research will be shared with you and this research will not make mention of any names, your company results will remain anonymous. **All questions are based on an annual basis for the year 2013 and all data should be given from this year.**

1. **Human Resources Department**

1.1 How many employees are in the company (salaried and wage)?


1.2 How many female employees are in the company (salaried and wage)?


1.3 What is the total number of sick days used for all employees of the company?


1.4 How much was invested to any local charity or community development (bursaries, community buildings, community outreach programs) in Rands?

2. **Supply Chain/Purchasing Department**

2.1 What is the total number of suppliers?

2.2 What is the total number of suppliers from the NMBM?

<table>
<thead>
<tr>
<th>0-20%</th>
<th>21-40%</th>
<th>41-60%</th>
<th>61-80%</th>
<th>81-100%</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
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</table>

2.3 How many suppliers in the supply chain comply with BBBEE ratings?

<table>
<thead>
<tr>
<th>0-20%</th>
<th>21-40%</th>
<th>41-60%</th>
<th>61-80%</th>
<th>81-100%</th>
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<tbody>
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</table>

2.4 How many suppliers in the supply chain have an Environmental Management System?

3. **Health and Safety**

3.1 How many working hours were lost due to on site accidents?

<table>
<thead>
<tr>
<th>0-20%</th>
<th>21-40%</th>
<th>41-60%</th>
<th>61-80%</th>
<th>81-100%</th>
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</table>
3.2 Is there a health clinic on site?

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<tr>
<th>Yes</th>
<th>No</th>
<th>In the process of building one</th>
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3.3 What is the total number of employees that participated in any form of environmental training?

3.4 Are there water scarcity risk management in place in the company?

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<thead>
<tr>
<th>Yes</th>
<th>No</th>
<th>Will be implemented in the next year</th>
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</thead>
</table>

3.5 What is the percentage of the final products which can be recycled or reused?

3.6 Are greenhouse gas emissions of the company measured?

<table>
<thead>
<tr>
<th>Yes</th>
<th>No</th>
<th>Will be measured next year</th>
</tr>
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</table>

3.7 What is the total amount of water used (m3) in the company (Admin and production)?

94
3.8 What is the total amount of energy used (kWh) in the company (Admin and production)?

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<td>Will be implemented in the next year</td>
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3.9 Are there any resource scarcity management plans in place?

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<td>Will be implemented in the next year</td>
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3.10 Are there any energy scarcity management plans in place?

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<td>Will be implemented in the next year</td>
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3.11 Is there any employee sustainability engagement outside the company?

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<td>Will be implemented in the next year</td>
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</table>

3.12 Are there emissions of suppliers known?

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<tbody>
<tr>
<td></td>
<td></td>
<td>Will be implemented in the next year</td>
</tr>
</tbody>
</table>

3.13 Are there environmental risk assessments for the company?

<p>| | | |</p>
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<thead>
<tr>
<th></th>
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<tr>
<td></td>
<td></td>
<td>Will be implemented in the next year</td>
</tr>
</tbody>
</table>
## Appendix B: Results of the creation of a CS index

### Table 4.3: Socio-economic indicators for the year 2013

<table>
<thead>
<tr>
<th>Indicator</th>
<th>Unit</th>
<th>Company 1</th>
<th>Company 2</th>
<th>Company 3</th>
<th>Company 4</th>
<th>Company 5</th>
<th>Company 6</th>
<th>Company 7</th>
<th>Company 8</th>
<th>Company 9</th>
<th>Company 10</th>
<th>Company 11</th>
<th>Company 12</th>
</tr>
</thead>
<tbody>
<tr>
<td>Percentage suppliers from NMBM +</td>
<td>%</td>
<td>0.0</td>
<td>34.5</td>
<td>4.9</td>
<td>9.1</td>
<td>31.0</td>
<td>19.0</td>
<td>34.5</td>
<td>90.0</td>
<td>29.2</td>
<td>100.0</td>
<td>60.0</td>
<td>2.0</td>
</tr>
<tr>
<td>Percentage of women to men of direct and indirect employees +</td>
<td>%</td>
<td>7.7</td>
<td>18.9</td>
<td>75.3</td>
<td>17.8</td>
<td>45.3</td>
<td>39</td>
<td>33.7</td>
<td>28.6</td>
<td>42.4</td>
<td>61.5</td>
<td>30.8</td>
<td>34.8</td>
</tr>
<tr>
<td>Number of suppliers in supply chain complying with BBBEE +</td>
<td>rating</td>
<td>2.0</td>
<td>1.0</td>
<td>4.0</td>
<td>2.0</td>
<td>4.0</td>
<td>1.0</td>
<td>1.0</td>
<td>4.0</td>
<td>5.0</td>
<td>4.0</td>
<td>4.0</td>
<td></td>
</tr>
<tr>
<td>Presence of a HIV/AIDS consulting clinic on site +</td>
<td>rating</td>
<td>3.0</td>
<td>3.0</td>
<td>3.0</td>
<td>1.0</td>
<td>3.0</td>
<td>3.0</td>
<td>1.0</td>
<td>3.0</td>
<td>1.0</td>
<td>3.0</td>
<td>3.0</td>
<td></td>
</tr>
<tr>
<td>Work-related lost time due to work-related injury -</td>
<td>% per 100 employees</td>
<td>6.3</td>
<td>28.4</td>
<td>0.0</td>
<td>0.02</td>
<td>0.0</td>
<td>2.7</td>
<td>0.4</td>
<td>0.0</td>
<td>0.0</td>
<td>0.2</td>
<td>42.8</td>
<td>1.2</td>
</tr>
<tr>
<td>Average sick leave used per employee -</td>
<td>Days/employees</td>
<td>4.9</td>
<td>3.9</td>
<td>7.4</td>
<td>3.9</td>
<td>4.6</td>
<td>3.9</td>
<td>3.9</td>
<td>5.0</td>
<td>0.5</td>
<td>0.1</td>
<td>2.3</td>
<td>6.0</td>
</tr>
</tbody>
</table>
Table 4.4: Socio-environmental indicators for the year 2013

<table>
<thead>
<tr>
<th>Indicator</th>
<th>Unit</th>
<th>Company 1</th>
<th>Company 2</th>
<th>Company 3</th>
<th>Company 4</th>
<th>Company 5</th>
<th>Company 6</th>
<th>Company 7</th>
<th>Company 8</th>
<th>Company 9</th>
<th>Company 10</th>
<th>Company 11</th>
<th>Company 12</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of suppliers with any kind of EMS (EMS must have aspects) +</td>
<td>rating</td>
<td>2</td>
<td>1</td>
<td>3</td>
<td>1</td>
<td>4</td>
<td>4</td>
<td>1</td>
<td>1</td>
<td>5</td>
<td>5</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Percentage of final product that can be reused and/or recycled +</td>
<td>%</td>
<td>76</td>
<td>0</td>
<td>55</td>
<td>93</td>
<td>86</td>
<td>100</td>
<td>100</td>
<td>50</td>
<td>76</td>
<td>100</td>
<td>100</td>
<td>100</td>
</tr>
<tr>
<td>Greenhouse gas emissions by weight measured +</td>
<td>rating</td>
<td>3</td>
<td>1</td>
<td>1</td>
<td>3</td>
<td>3</td>
<td>2</td>
<td>1</td>
<td>1</td>
<td>3</td>
<td>1</td>
<td>3</td>
<td>3</td>
</tr>
</tbody>
</table>

Table 4.5: Enviro-economic indicators for the year 2013

<table>
<thead>
<tr>
<th>Indicator</th>
<th>Unit</th>
<th>Company 1</th>
<th>Company 2</th>
<th>Company 3</th>
<th>Company 4</th>
<th>Company 5</th>
<th>Company 6</th>
<th>Company 7</th>
<th>Company 8</th>
<th>Company 9</th>
<th>Company 10</th>
<th>Company 11</th>
<th>Company 12</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total amount of water used per employee -</td>
<td>M³/employee</td>
<td>297815.0</td>
<td>138.6</td>
<td>30167.0</td>
<td>30167.0</td>
<td>150.2</td>
<td>169.3</td>
<td>181.1</td>
<td>1200.0</td>
<td>424.0</td>
<td>69.0</td>
<td>110.3</td>
<td>1413.9</td>
</tr>
<tr>
<td>Total amount of energy used per employee -</td>
<td>Kwh/employee</td>
<td>101189.0</td>
<td>66196.3</td>
<td>20216.0</td>
<td>20216.0</td>
<td>17406.0</td>
<td>8180.5</td>
<td>863.2</td>
<td>1359.6</td>
<td>882.6</td>
<td>7.7</td>
<td>4373.0</td>
<td>1696.8</td>
</tr>
</tbody>
</table>
Table 4.6: Current trends in CS for the year 2013

<table>
<thead>
<tr>
<th>Indicator</th>
<th>Unit</th>
<th>Company 1</th>
<th>Company 2</th>
<th>Company 3</th>
<th>Company 4</th>
<th>Company 5</th>
<th>Company 6</th>
<th>Company 7</th>
<th>Company 8</th>
<th>Company 9</th>
<th>Company 10</th>
<th>Company 11</th>
<th>Company 12</th>
</tr>
</thead>
<tbody>
<tr>
<td>Is there an environmental risk assessment for the company? +</td>
<td>rating</td>
<td>1</td>
<td>1</td>
<td>2</td>
<td>1</td>
<td>3</td>
<td>1</td>
<td>3</td>
<td>3</td>
<td>3</td>
<td>3</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>Is there any employee sustainability engagement outside the company? +</td>
<td>rating</td>
<td>1</td>
<td>1</td>
<td>3</td>
<td>3</td>
<td>1</td>
<td>1</td>
<td>3</td>
<td>3</td>
<td>1</td>
<td>1</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>Are there water scarcity risk management plans in place? +</td>
<td>rating</td>
<td>1</td>
<td>2</td>
<td>2</td>
<td>1</td>
<td>3</td>
<td>2</td>
<td>3</td>
<td>1</td>
<td>3</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Are there any resource scarcity management plans in place? +</td>
<td>rating</td>
<td>1</td>
<td>1</td>
<td>3</td>
<td>1</td>
<td>3</td>
<td>1</td>
<td>3</td>
<td>3</td>
<td>3</td>
<td>1</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>Are emissions of company suppliers known or measured? +</td>
<td>rating</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Are there any energy scarcity management plans in place? +</td>
<td>rating</td>
<td>2</td>
<td>2</td>
<td>3</td>
<td>1</td>
<td>3</td>
<td>2</td>
<td>3</td>
<td>3</td>
<td>3</td>
<td>1</td>
<td>3</td>
<td>3</td>
</tr>
</tbody>
</table>
Table 4.7: Weight x standardised values of the socio-economic indicators for the year 2013

<table>
<thead>
<tr>
<th>Indicator</th>
<th>Weight</th>
<th>Company 1</th>
<th>Company 2</th>
<th>Company 3</th>
<th>Company 4</th>
<th>Company 5</th>
<th>Company 6</th>
<th>Company 7</th>
<th>Company 8</th>
<th>Company 9</th>
<th>Company 10</th>
<th>Company 11</th>
<th>Company 12</th>
</tr>
</thead>
<tbody>
<tr>
<td>Percentage suppliers from NMBM +</td>
<td>0.383</td>
<td>0.000</td>
<td>0.132</td>
<td>0.019</td>
<td>0.035</td>
<td>0.119</td>
<td>0.073</td>
<td>0.132</td>
<td>0.345</td>
<td>0.112</td>
<td>0.383</td>
<td>0.230</td>
<td>0.008</td>
</tr>
<tr>
<td>Percentage of men to women of direct and indirect employees +</td>
<td>0.202</td>
<td>0.000</td>
<td>0.060</td>
<td>0.363</td>
<td>0.054</td>
<td>0.202</td>
<td>0.168</td>
<td>0.140</td>
<td>0.112</td>
<td>0.186</td>
<td>0.289</td>
<td>0.124</td>
<td>0.146</td>
</tr>
<tr>
<td>Number of suppliers in supply chain complying with BBBEE +</td>
<td>0.075</td>
<td>0.019</td>
<td>0.000</td>
<td>0.056</td>
<td>0.019</td>
<td>0.056</td>
<td>0.056</td>
<td>0.000</td>
<td>0.056</td>
<td>0.075</td>
<td>0.056</td>
<td>0.056</td>
<td></td>
</tr>
<tr>
<td>Presence of a HIV/AIDS consulting clinic on site +</td>
<td>0.025</td>
<td>0.025</td>
<td>0.025</td>
<td>0.025</td>
<td>0.000</td>
<td>0.025</td>
<td>0.025</td>
<td>0.025</td>
<td>0.025</td>
<td>0.000</td>
<td>0.025</td>
<td>0.025</td>
<td></td>
</tr>
<tr>
<td>Work-related lost time due to work-related injury -</td>
<td>0.135</td>
<td>0.115</td>
<td>0.045</td>
<td>0.135</td>
<td>0.006</td>
<td>0.135</td>
<td>0.127</td>
<td>0.134</td>
<td>0.135</td>
<td>0.135</td>
<td>0.000</td>
<td>0.131</td>
<td></td>
</tr>
<tr>
<td>Average sick leave used per employee -</td>
<td>0.180</td>
<td>0.062</td>
<td>0.094</td>
<td>0.000</td>
<td>0.094</td>
<td>0.069</td>
<td>0.086</td>
<td>0.086</td>
<td>0.059</td>
<td>0.170</td>
<td>0.180</td>
<td>0.126</td>
<td>0.035</td>
</tr>
</tbody>
</table>
**Table 4.8: Weight x standardised indicators of the socio-environmental indicators for the year 2013**

<table>
<thead>
<tr>
<th>Indicator</th>
<th>Weight</th>
<th>Company 1</th>
<th>Company 2</th>
<th>Company 3</th>
<th>Company 4</th>
<th>Company 5</th>
<th>Company 6</th>
<th>Company 7</th>
<th>Company 8</th>
<th>Company 9</th>
<th>Company 10</th>
<th>Company 11</th>
<th>Company 12</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of suppliers with any kind of EMS (EMS must have aspects) +</td>
<td>0.077</td>
<td>0.25</td>
<td>0.00</td>
<td>0.50</td>
<td>0.00</td>
<td>0.75</td>
<td>0.75</td>
<td>0.00</td>
<td>0.00</td>
<td>1.00</td>
<td>1.00</td>
<td>0.25</td>
<td>0.25</td>
</tr>
<tr>
<td>Percentage of final product that can be reused and/or recycled +</td>
<td>0.194</td>
<td>0.76</td>
<td>0.00</td>
<td>0.55</td>
<td>0.80</td>
<td>0.93</td>
<td>0.86</td>
<td>1.00</td>
<td>1.00</td>
<td>0.50</td>
<td>0.76</td>
<td>1.00</td>
<td>1.00</td>
</tr>
<tr>
<td>Greenhouse gas emissions by weight measured +</td>
<td>0.687</td>
<td>1.00</td>
<td>0.00</td>
<td>0.00</td>
<td>1.00</td>
<td>1.00</td>
<td>0.50</td>
<td>0.00</td>
<td>0.00</td>
<td>1.00</td>
<td>0.00</td>
<td>1.00</td>
<td>1.00</td>
</tr>
</tbody>
</table>
Table 4.9: Weight x standardised values of the enviro-economic indicators for the year 2013

<table>
<thead>
<tr>
<th>Indicator</th>
<th>Weight</th>
<th>Company 1</th>
<th>Company 2</th>
<th>Company 3</th>
<th>Company 4</th>
<th>Company 5</th>
<th>Company 6</th>
<th>Company 7</th>
<th>Company 8</th>
<th>Company 9</th>
<th>Company 10</th>
<th>Company 11</th>
<th>Company 12</th>
</tr>
</thead>
<tbody>
<tr>
<td>Is there an environmental risk assessment for the company? (+)</td>
<td>0.106</td>
<td>0.000</td>
<td>0.000</td>
<td>0.053</td>
<td>0.000</td>
<td>0.106</td>
<td>0.000</td>
<td>0.106</td>
<td>0.106</td>
<td>0.106</td>
<td>0.106</td>
<td>0.106</td>
<td>0.106</td>
</tr>
<tr>
<td>Is there any employee sustainability engagement outside the company? (+)</td>
<td>0.036</td>
<td>0.000</td>
<td>0.000</td>
<td>0.036</td>
<td>0.000</td>
<td>0.000</td>
<td>0.036</td>
<td>0.036</td>
<td>0.000</td>
<td>0.000</td>
<td>0.000</td>
<td>0.036</td>
<td>0.036</td>
</tr>
<tr>
<td>Are there water scarcity risk management plans in place? (+)</td>
<td>0.247</td>
<td>0.000</td>
<td>0.1235</td>
<td>0.124</td>
<td>0.000</td>
<td>0.247</td>
<td>0.124</td>
<td>0.247</td>
<td>0.000</td>
<td>0.247</td>
<td>0.000</td>
<td>0.000</td>
<td>0.247</td>
</tr>
<tr>
<td>Are there any resource scarcity management plans in place? (+)</td>
<td>0.247</td>
<td>0.000</td>
<td>0.000</td>
<td>0.247</td>
<td>0.000</td>
<td>0.247</td>
<td>0.000</td>
<td>0.247</td>
<td>0.247</td>
<td>0.247</td>
<td>0.000</td>
<td>0.247</td>
<td>0.247</td>
</tr>
<tr>
<td>Are emissions of company suppliers known or measured? (+)</td>
<td>0.305</td>
<td>0.000</td>
<td>0.000</td>
<td>0.000</td>
<td>0.000</td>
<td>0.000</td>
<td>0.000</td>
<td>0.000</td>
<td>0.000</td>
<td>0.000</td>
<td>0.000</td>
<td>0.000</td>
<td>0.000</td>
</tr>
<tr>
<td>Are there any energy scarcity management plans in place? (+)</td>
<td>0.059</td>
<td>0.030</td>
<td>0.030</td>
<td>0.059</td>
<td>0.000</td>
<td>0.059</td>
<td>0.030</td>
<td>0.059</td>
<td>0.059</td>
<td>0.059</td>
<td>0.000</td>
<td>0.059</td>
<td>0.059</td>
</tr>
</tbody>
</table>
Table 4.10: Weight x standardised values of the current trends for the year 2013

<table>
<thead>
<tr>
<th>Indicator</th>
<th>Weight</th>
<th>Company 1</th>
<th>Company 2</th>
<th>Company 3</th>
<th>Company 4</th>
<th>Company 5</th>
<th>Company 6</th>
<th>Company 7</th>
<th>Company 8</th>
<th>Company 9</th>
<th>Company 10</th>
<th>Company 11</th>
<th>Company 12</th>
</tr>
</thead>
<tbody>
<tr>
<td>Is there an environmental risk assessment for the company? +</td>
<td>0.106</td>
<td>0.000</td>
<td>0.000</td>
<td>0.053</td>
<td>0.000</td>
<td>0.106</td>
<td>0.000</td>
<td>0.106</td>
<td>0.106</td>
<td>0.106</td>
<td>0.106</td>
<td>0.106</td>
<td>0.106</td>
</tr>
<tr>
<td>Is there any employee sustainability engagement outside the company? +</td>
<td>0.036</td>
<td>0.000</td>
<td>0.000</td>
<td>0.036</td>
<td>0.000</td>
<td>0.067</td>
<td>0.000</td>
<td>0.000</td>
<td>0.000</td>
<td>0.000</td>
<td>0.000</td>
<td>0.000</td>
<td>0.036</td>
</tr>
<tr>
<td>Are there water scarcity risk management plans in place? +</td>
<td>0.247</td>
<td>0.000</td>
<td>0.1235</td>
<td>0.1235</td>
<td>0.000</td>
<td>0.247</td>
<td>0.000</td>
<td>0.1235</td>
<td>0.247</td>
<td>0.000</td>
<td>0.247</td>
<td>0.000</td>
<td>0.247</td>
</tr>
<tr>
<td>Are there any resource scarcity management plans in place? +</td>
<td>0.247</td>
<td>0.000</td>
<td>0.000</td>
<td>0.247</td>
<td>0.000</td>
<td>0.247</td>
<td>0.247</td>
<td>0.000</td>
<td>0.247</td>
<td>0.247</td>
<td>0.000</td>
<td>0.247</td>
<td>0.247</td>
</tr>
<tr>
<td>Are emissions of company suppliers known or measured? +</td>
<td>0.305</td>
<td>0.000</td>
<td>0.000</td>
<td>0.000</td>
<td>0.000</td>
<td>0.000</td>
<td>0.000</td>
<td>0.000</td>
<td>0.000</td>
<td>0.000</td>
<td>0.000</td>
<td>0.000</td>
<td>0.000</td>
</tr>
<tr>
<td>Are there any energy scarcity management plans in place? +</td>
<td>0.059</td>
<td>0.0295</td>
<td>0.0295</td>
<td>0.059</td>
<td>0.000</td>
<td>0.056</td>
<td>0.0295</td>
<td>0.059</td>
<td>0.059</td>
<td>0.059</td>
<td>0.000</td>
<td>0.059</td>
<td>0.059</td>
</tr>
</tbody>
</table>