# AN ANALYSIS OF THE RELATIONSHIP BETWEEN CORPORATE CARBON DISCLOSURE AND FINANCIAL PERFORMANCE: A STUDY OF COMPANIES LISTED IN THE FTSE/JSE RESPONSIBLE INVESTING INDEX

**by**

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**Declaration**

I declare that this research project is my own work. It is submitted in partial fulfilment of the requirements for the degree of Master of Business Administration at the University Of Limpopo Turfloop Graduate School Of Leadership. It has not been submitted before for any degree or examination in any other university. I further declare that I have obtained the necessary authorisation and consent to carry out this research .

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Andzani George Mathebula

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**Abstract**

The international nature of the climate change challenge complicates the cost analysis. Researchers have therefore concluded that atmospheric carbon concentrations influence climate change, and that greenhouse gas emissions may be a contributing factor, leading policy makers in several countries to examine options for reducing emissions of greenhouse gases, particularly carbon dioxide (CO2). There are at least four ways to estimate the "cost of carbon emission reductions: (1) the carbon tax necessary, which measures the marginal cost of the final tonne of emissions cut; (2) the total direct cost, which measures the marginal cost of all emissions reductions; (3) the loss in GDP." A wide range of businesses' economic performance and behaviour are directly impacted by carbon emissions. This study was aimed at examining, using quantitative methods, the relationship between Corporate Carbon Disclosure and Financial Performance of the top 30 companies listed in the FTSE (Financial Times Stock Exchange) and JSE (Johannesburg Stock Exchange) Responsible Investing Index. The study results showed that sales revenue is negatively correlated to carbon disclosure, although the relationship is statistically insignificant. The regression results showed that the relationship between Carbon Disclosure and Return on Equity is statistically insignificant implying independence between the variables, despite the negative correlation being established . The study results also showed that Earnings per Share is negatively correlated to Carbon Disclosure, although the relationship was not statistically significant. The study recommends the crafting of comprehensive Carbon Disclosure metrics, which enable objective measurement of the variable and establishment of the statistically significant relationship with performance measures and the improvement in stakeholder involvement and engagement in order to improve the level of carbon disclosure and financial performance. Legislations should be made in order to compel all organisation listed on the JSE to disclose the impact of their operations on the environment. The study also recommends that organisations diversify their activities to include environmentally friendly operations. Green activities improve the image of the firm in the market which leads to improvement in the financial activities. In addition, diversification to green activities motivates the organisation to engage more on carbon disclosure.

**Keywords;** Corporate Carbon Disclosure, Financial Performance, Companies

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## Abbreviations

| | |
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| JSE | Johannesburg Stock Exchange |
| CO2 | Carbon Dioxide |
| CSR | Corporate Social Responsibility |
| CDP | Carbon Disclosure Project |
| UK | United Kingdom |
| FTSE | Financial Times Stock Exchange |
| NGOs | Non-Government Organisations |
| CDSB | Climate Disclosure Standards Board |

# CHAPTER ONE

# INTRODUCTION AND BACKGROUND

## 1.1 Introduction

The association between carbon disclosure and financial results will be investigated in this study. Many businesses believe that disclosing their carbon footprint would hurt them, but analysis shows that the top 100 JSE-listed carbon disclosure project study in South Africa is a high-quality resource document for all stakeholders involved in keeping their businesses informed about climate change. Many customers are delighted to learn that the South African government pension fund has now been the new signatory participant and has agreed to cooperate with the carbon transparency project study, demonstrating a local role in evaluating climate risk and potential in investment decisions (Bimha & Nhamo, 2017). Financial success, according to Susilo, Chandrarin, and Triatmanto (2019), is an examination of a company's ability to execute the procedure properly and accurately use the principles of financial execution.

Carbon Disclosure refers to regulatory compliance, carbon trading, management, and civil regulation for accountability and transparency, as well as other risks and opportunities associated with climate change; greenhouse gas (GHG) emissions intensity and energy use; corporate governance and strategy concerning climate change; and performance against climate change targets (Knox-Hayes & Levy, 2011). As a result, in this study, carbon disclosure is described as a collection of quantitative and qualitative data about a company's past and projected carbon emissions, its exposure to and financial impacts of climate change-related risks and opportunities, and its past and potential efforts to manage these risks and opportunities (Knox-Hayes &

Levy, 2011). These details could be made public by the company's annual reports, stand-alone environmental reports, or other outlets such as the Carbon Disclosure Project (CDP), a platform used by institutional investors. This initiative required the world's biggest corporations to monitor and track their carbon emissions, as well as to factor in the long-term value and expense of climate change while evaluating their financial wellbeing and prospects. According to this concept, the material, consistency, and in formativeness of carbon disclosure are more important in this analysis. This strategy is reinforced by the fact that high-quality transparency is more reliable and insightful for a variety of customers, including stock market participants (Al-Tuwaijri, Christensen & Hughes, 2004).

Companies, according to Hoffmann and Busch (2008), are paving the way for a low-carbon environment, since industrial activity accounts for a significant portion of carbon inputs and greenhouse gas emissions. As a result, multiple creditors are gradually requiring nearly all businesses to report their climate change plans. Company approaches to environment and carbon problems, on the other hand, have been defined as vague, and external evaluations of corporate efforts have been inconsistent, even though the same companies are examined (Jones & Levy, 2007).

Previous studies, such as Saka and Oshika (2014), attempted to determine the effect of corporate carbon emissions and transparency on corporate value, especially in terms of whether disclosure tends to mitigate unpredictability during company assessment. Other scholars, such as Braam, De Weerd, Hauck, and Huijbregts (2016), tried to figure out what variables affect environmental reporting and the value of corporate environmental efficiency. Similarly, Galant and Cadez (2017) explored the connection between

corporate social responsibility and financial success, as well as the advantages of assessment methods for clients who do business with firms and want to incorporate expertise in their corporate investment decisions, in their study.

Although these previous researchers have done related work, a study that evaluated the effect of Carbon Disclosure jointly with sale revenue, returns on equity, and earnings per share is not common in the literature. Therefore, this research will cover what was left out by other researchers with regard to financial performance.

## 1.2 Problem Statement

The cost analysis is complicated by the multinational existence of the climate change crisis (Weyant, 1993). It is now widely accepted that carbon dioxide (CO2) emissions from the creation of greenhouse gases contribute to climate change, which has prompted some nations to adopt new policies to minimize greenhouse gas emissions, particularly CO2 emission from power plants (Stavins, 1997).

The cost of carbon emission reductions is reported using at least four alternative cost measures. According to Weyant (1993), (1) the carbon tax required, which measures the marginal cost of the last tonne of emissions reduced; (2) the total direct cost, which measures the marginal cost of all emissions reductions; (3) the loss in gross domestic product. Carbon Emissions have a direct impact on economic operation and behaviour for a variety of businesses . According to some reports, carbon emissions are linked to firm valuation, and Corporate Social Responsibility (CSR) transparency has a direct positive impact on financial results. Most investors want to have an effect by gaining social benefits and benefiting from their investment (Mukhibad, 2018).

The researchers, Luo and Tang (2014), attempted to address the fact that carbon knowledge is becoming more relevant in the decision-making of various stakeholders, but there is increasing uncertainty about the reliability of Corporate Carbon Disclosure, and the degree of Carbon Disclosure was assessed based on content analysis of Carbon Disclosure Project (CDP) reports and carbon results .

According to Mukhibad (2018), the Stakeholder Theory demonstrated that an organisation cannot act solely for its profit, but must also benefit stakeholders (shareholders, creditors, consumers, suppliers, governments, communities, analysts, and others) . The interests of communities are dependent on businesses that care for the environment. Improving environmental reporting is one of its stakeholders' strengths. As a result, it can be argued that the stakeholder's principle forces the organization to assume environmental responsibility. According to Guenther, Schiemann, and Weber (2016), stakeholders typically need to be told about a company's success and associated operations, which may increase the burden on businesses to report such information.

Other analysts, such as De Klerk, De Villiers, and Van Staden (2015), used CSR data gathered from an independent company to investigate the association between share prices and the extent of corporate social responsibility (CSR) transparency of major UK firms. The approach an updated Ohlson's (1995) model was used to investigate the association between CSR disclosure and a share price within the top 100 largest UK firms, and it was discovered that higher levels of CSR disclosure are linked to higher share prices .

Although these previous researches are related, they have not dealt with the relationship between the Carbon Disclosure and sale revenue, return on equity, and earnings per share within the scope of the FTSE/JSE Responsible Investing Index, therefore this research will bridge this identified gap and knowledge by empirically examining how Financial Performance is linked to sales revenue, Return on Equity and Earnings Per Share of various companies. This leads to examining the factors that influence the relationship between Corporate Carbon Disclosure and Financial Performance of the top 30 companies listed in the FTSE/JSE Responsible Investing Index.

### 1.3 Aim of the Study

The aim of this study is to examine the relationship between Corporate Carbon Disclosure and Financial Performance of the top 30 companies listed in the FTSE JSE Responsible Investing Index .

### 1.4 Research Objectives

The objectives of this study are:

I. To examine the relationship between Corporate Carbon Disclosure and Sales Revenue.
II. To evaluate whether Carbon Disclosure is related to Return on Equity.
III. To assess the link between Corporate Carbon Disclosure and Earnings per Share.

### 1.5 Research Questions

This research will answer the following questions

I. What is the relationship between Corporate Carbon Disclosure and Sale Revenue?

II. What is the link between Carbon Disclosure and Return on Equity?

III. What is the link between Corporate Carbon Disclosure and Earnings per Share?

## 1.6 Research Hypotheses

### Hypothesis 1

*Null hypothesis*: H0: There is no relationship between Corporate Carbon Disclosure and Sale Revenue

*Alternative hypothesis*: H1: There is a relationship between Corporate Disclosure and Sale Revenue

### Hypothesis 2

*Null hypothesis*: H0: There is no relationship between Carbon Disclosure and Return on Equity

*Alternative hypothesis*: H1: There is a relationship between Carbon Disclosure and Return on Equity

### Hypothesis 3

*Null hypothesis*: H0: There is no relationship between Corporate Carbon Disclosure and Earnings per Share

*Alternative hypothesis*: H1: There is a relationship between Corporate Carbon Disclosure and Earnings per Share

## 1.7 Motivation/Rationale of the Study

The growing importance of and concerns about Carbon Emissions levels and climate change impacts which provide motivations for this research study . First, there are still companies that do not disclose their Carbon Emissions, and reduction of carbon is the global necessity as expressed in agenda 2030, that focus on ensuring a clean environment (Das & Bandyopadhyay, 2016). Second, companies need the motivation to reduce carbon and one of these is through disclosure of Carbon Emissions (Luo, 2019).

If companies know that there are financial benefits from disclosure, they will disclose more and reduce more carbon (Gallego-Álvarez, Segura & Martínez-Ferrero, 2015). The findings of this research study will assist the Non-Government Organisations (NGOs) such as the Climate Disclosure Standards Board (CDSB) in developing disclosure guidelines. Lastly, this research study demonstrates how Carbon Disclosure and Financial Performance of the various companies play an important role in evaluating and implementing the sustainable business practice .

## 1.8 Significance of the Study

The research will analyse the relationship between Carbon Disclosure and Financial Performance of thirty listed companies' disclosures in the FTSE/JSE Responsible Investing Index. This research will demonstrate how Carbon Disclosure and the Financial Performance of the various companies play an important role in evaluating and implementing sustainable business practice. They also illustrate the significance of the various companies that have great potential for economic growth in the country,

through the potential of utilising the greenhouse gas emissions that contribute to global warming and climate change .

Several groups may be interested in the results and conclusions of this research study. The findings of the research study could be used by the University's institutional research for learning and by other professional researchers who are striving to achieve in their studies based on carbon disclosure. Further, this research study may be of interest to those companies who think that carbon disclosure might disadvantage them.

## 1.9 Outline of the Research

The main dissertation is arranged into five chapters

**Chapter 1**

This chapter comprises of an introduction, which contains the problem statement, the aim of the study, research objectives, and research questions, motivation/rationale of the study and the significance thereof .

**Chapter 2**

This chapter contains the literature review which includes sub-sections such as Carbon Disclosure and Sales revenue, Carbon Disclosure and return on equity, and Carbon Disclosure and Earnings per Share.

**Chapter 3**

This chapter includes the research methodology which includes the research paradigm, research methods, and research design.

**Chapter 4**

This chapter comprises of data collection which includes data analysis, ethical consideration, validity, reliability, limitation of the study, and discussion of the findings.

**Chapter 5**

This chapter includes the summary of each research objective, recommendations, and conclusions.

# CHAPTER TWO

# LITERATURE REVIEW

## 2.1 Introduction

The aim of the literature review is to analyse applicable data constructively and objectively in order to identify research possibilities that have been ignored indirectly in previous research and to contextualise the research findings within a larger body of information. Reviewing the literature critically lays the groundwork for answering the research question and achieving the research goals. The research question would look at whether there is a correlation between Corporate Carbon Disclosure and financial success as measured by Sales Income, Return on Equity, and Earnings per Share. The literature review will discuss and analyse previous studies done by various researchers on the subject of Corporate Carbon Disclosure and Financial Performance with the particular emphasis on the top 30 companies listed in the FTSE/JSE Responsible Investing Index . The literature review will also discuss how different companies respond to the Disclosure of Carbon and their impact on the Financial Performance. The literature review comprises of three sections: First, Carbon Disclosure and Sales Revenue. The second part focuses on the Carbon Disclosure and Return on Equity. The last part focuses on the Carbon Disclosure and Earnings per Share.

## 2.2 Theoretical framework

### 2.2.1 Legitimacy Theory

According to Cormier and Gordon (2001), the notion of legitimacy is derived from the social contract concept, which states that an organization's legitimacy is derived from the relationship it has with society. According to Lindblom (1994), legitimacy is a condition or status that arises when an entity's value system is compatible with the larger social system of which the entity is a part. This compatibility is what determines whether or not an entity is legitimate. The entity's legitimacy is put in question whenever there is a disparity, either real or prospective, between the two different value systems . Suchman (1995) viewed legitimacy as a commonly held opinion or assumption that an entity's activities are desirable, legitimate, or acceptable within a socially established system of norms, values, beliefs, and definitions.

Legitimacy Theory is linked to the idea of a social contract, as previously stated. Companies and other organizations exist at the behest of society and are subject to its desires to some extent. Legitimacy is achieved when society believes the business is functioning in line with the society's established standards and values. In order to maintain its social compact, the organization will continue to look to society for legitimacy. It is common for organizations to use a range of strategies when their legitimacy is under threat.

Because of this, companies may use social and environmental disclosure to meet the needs of the public. In order to retain their credibility, companies provide social and environmental disclosures to show that they are meeting their stakeholders' expectations and convince them of their own performance (Cotter et al., 2011).

According to Hannele (2010), if the organization is not considered legitimate by society, a legitimacy gap exists. In such a scenario, the measures chosen are determined by management's assessment of the risks to legitimacy.

When management detects a legitimacy gap, according to Lindblom (1994), they will use a variety of tactics, including:

- rectifying their organization's behaviour by realigning it with societal desires
- altering society's view of their behaviour, but not the behaviour itself
- changing society's view of their actions by manipulating, misleading, or just diverting attention away from them, and/or
- indoctrinating society in order to change its expectations and adapt them to the organization's goals

Company disclosure of social and environmental data in order to look more socially responsible is a key component of the Legitimacy Theory (Deegan, 2002; O'Donovan, 1999). Legitimacy Theory has been used by several researchers in the past to explain the reasons for social and environmental disclosure, such as Deegan et al. (2000) .

When a company's image is tarnished by bad performance, it publishes positive information to improve its image and close the legitimacy gap (Deegan & Rankin, 1996). In this instance, companies cope with society's expectations and requirements by using soft social and environmental disclosure (Reverte, 2009). Businesses demonstrate to a variety of stakeholders that they are fulfilling their expectations by making good social and environmental disclosure (Deegan & Gordon, 1996; Deegan & Rankin, 1996). To preserve credibility in the eyes of stakeholders, these companies provide positive social

and environmental information in annual reports (Cho & Patten, 2007; Deegan et al., 2000) and company websites (Cho & Roberts, 2010) .

To summarize, when companies perceive a loss of legitimacy as a result of a violation of the social contract, they will make good social and environmental disclosures in order to maintain their legitimacy.

### 2.2.2 Stakeholder Theory and sustainability disclosure

Freeman and Reed (1983) characterize stakeholders as any identifiable group or individual who may influence, or is impacted by, the attainment of an organization's objectives. Many persons or groups may be categorized as stakeholders under this idea, including shareholders, creditors, the government, the media, employees, local communities, local charities, future generations, and so on (Deegan & Unerman, 2006) . Stakeholders are broadly categorized into two groups, as major and minor stakeholders (Clarkson,1995). Major stakeholders are the individuals or group of people without their support, the firm cannot continue to operate and exist as a going concern. Minor stakeholders are the individuals or group of people who are affect or are affected by the decisions of the firm and are regarded as not important for the survival of the firm. In line with ethical perspective, O' Dwyer, Unerman, and Hession (2005) asserted that both major and minor stakeholders have specific minimum rights that should not be violated. The ethical perspective shows that all stakeholders have the right to be informed about how the organization affects them through, for example, pollution, community sponsorship, and employment provision (O' Dwyer, Unerman & Hession, 2005).

The stakeholder theory may be divided into two different branches: the ethical branch, which is also known as the normative branch, and the management branch, which is also known as the positive branch. The ethical department of an organization will argue that all of the organization's stakeholders have the right to be treated in the same manner . It also claims that concerns of stakeholder power are unconnected. As a consequence, rather than the quantity of a stakeholder's economic power over the organization, the influence of the organization on the stakeholder's life experience should define the business's obligation to that stakeholder (Deegan & Unerman, 2006). According to Hasnas (1998), the ethical branch of Stakeholder Theory proposes that managers should manage the organization for the benefit of all stakeholders, not just shareholders, regardless of whether or not stakeholder management enhances financial performance. This is the case, even if stakeholder management does not improve financial performance. According to the normative Stakeholder Theory, management is obligated to take into account the concerns of all stakeholders on an equal footing . In the event that these concerns compete with one another, management is tasked with guiding the organization in such a way that it achieves the greatest possible equilibrium between the competing concerns. As a consequence, the normative component of Stakeholder Theory contends that firms have meaningful social duties.

Stakeholder Theory's management branch indicates that diverse stakeholders' expectations would impact an organization's operating and disclosure practices. Although it will not respond to all stakeholders, the organization will focus on those it sees as influential rather than those it does not deem significant (Buhr, 2002). Nasi et al. (1997) acknowledged that the needs and interests of the stakeholders who have

significant influence on the activities of the organization be addressed first before focusing on other stakeholders. As the influence of the stakeholders on the firm increases, they will have more power and their demand become more complex (Wallace, 1995).

"Organization-cantered" is a better description, as noted by Bimha and Nhamo (2017). Organizations choose their stakeholders depending on the degree to which they believe engagement with each group is necessary to promote the aims of the organizations in question. More effort is spent into managing a stakeholder's relationship with the company if they are a big stakeholder. Organizations have the ability to manage and influence stakeholders via the use of information in order to win their support and acceptance, or to divert their attention away from their resistance and disapproval.

One way to measure whether a stakeholder has influence on corporate management is to look at how much power that stakeholder has in terms of resources. Demand from stakeholders is more likely to be satisfied if they have a greater impact on an organization's long-term viability and performance. In order for a company to be successful, it must be able to satisfy the requirements of a wide range of powerful stakeholders. A number of actions such as public reporting will be carried out by the organizations in order to meet the expectations of important stakeholders. Organizations provide information about their activities to ensure that they comply with the expectations of different stakeholders (Waddock & Graves, 1997). As noted by the stakeholder theory, disclosure and dissemination of information is an important tool for organizations to maintain legitimacy and meet the needs of different stakeholders.

Documents issued by organizations detailing the economic, social, and environmental impacts of their activities are known as sustainability reports. A company's governance principles, strategy, and commitments to a sustainable global economy are all revealed in this document (GRI, 2017). Documents issued by organizations detailing the economic, social, and environmental impacts of their activities are known as sustainability reports. It also highlights the style and principles of the organization's governance and the connections between its strategy and its commitments to a sustainable global economy (GRI, 2017).

It is up to enterprises to decide whether or not to participate in sustainability reporting, which has two basic objectives. The first objective of participating in sustainability reporting is to measure the organizational performance and the second objective is to communicate sustainability initiatives undertaken by the organization. The two objectives are supported by Ekins and Vanner (2007), who stated that and organization must generate growing economic value while also preserving natural resources and the environment. As a result, the organization creates economic value to the stakeholders whilst preserving the environment at the same time. Cowan et al. (2010) noted that stakeholders' expectations about a company's business sector put pressure on the organization to publish a sustainability report. However, Kolk (2004) highlighted the many factors that companies may consider when deciding whether or not to report on sustainability apart from stakeholder pressure.

Kolk (2004) stated in his article that for a large number of businesses, the reasons in favour of reporting outweighed the arguments against it. Furthermore, according to Lozano (2013), sustainability reporting is an essential driver and component of a

company's sustainability contribution. It legitimizes the necessity for companies to disclose when they execute their sustainable strategy, he said. If companies wish to master this process, they must be able to manage, evaluate, and measure their activities. As a result, Lozano (2013) came to the conclusion that companies utilize sustainability reporting to track their progress over time. It also enables them to compare themselves to other businesses and show how they are affected and influenced by sustainable development objectives.

### 2.2.3 Voluntary Disclosure Theory

According to Meek et al. (1995, p.555), voluntary disclosure is "free choices on the part of company management to provide accounting and other information deemed significant to the decision needs of users of their annual reports." The goal of voluntary disclosure is to provide stakeholders with an accurate picture of the company's long-term viability while also minimizing information asymmetry and agency conflicts between management and investors. Voluntary disclosure is done for a variety of reasons (Healy & Palepu, 2001; Boesso & Kumar, 2007).

According to Verrecchia (1983), the Voluntary Disclosure Theory assumes that businesses that have superior environmental performance will be motivated to disclose information about their good performance practices in order to differentiate themselves from businesses that have inferior environmental performance. In other words, the Voluntary Disclosure Theory predicts that companies with superior environmental performance will disclose information about their good performance practices . This idea is predicated on the assumption that businesses which have better environmental

performance would distinguish themselves from organizations that have poor environmental performance by sharing information about the actions that contribute to their superior performance. In order to achieve these objectives, good performers will provide information that can be independently verified or that are actual about their environmental performance. This knowledge is difficult to recreate, which makes it difficult for rivals and competitors. Companies that have bad environmental performance may opt to stay quiet about their performance if it is impossible for outsiders to identify whether the non-disclosure is due to poor performance or high proprietary expenses. On the other side, businesses that have a bad track record in terms of environmental performance could choose to keep quiet about how they are doing (Verrecchia, 1983).

Clarkson et al. (2008), on the other hand, are of the opinion that there would be a positive correlation between environmental performance and the degree of environmental disclosure that is deemed voluntary. They came to this conclusion after doing research on the topic. The reasoning behind this is that businesses that are better at protecting the environment are more likely to convey their type by referring to objective environmental performance measures, which are more difficult for businesses that are of a more substandard type to imitate . This is one of the main reasons why this is the case. Poor performers, on the other hand, will choose to provide less information about their environmental performance or will choose to be "quiet" about it altogether, which will result in their being placed in a pool of firms to which investors and other users attach the average type.

### 2.2.4 Signaling Theory

A firms' desire to freely share business information may be explained using Signaling Theory (Bin Abdullah, 2008). The problem of information asymmetry is addressed by signaling theory (Ross, 1977). This theory explains how problems caused by information asymmetry (where one party has more or better information than the others) may be resolved when the party that possesses more knowledge signals it to the parties who possess less knowledge. Signaling is done by businesses via the use of voluntarily disclosed information, financial statements, and other techniques to express the quality or worth of the firm. In the event that the corporation chooses to voluntarily disclose more information, managers provide investors with such information to help them in making investment decisions (Cotter et al., 2011). Companies that are successful have a greater propensity to share more information with investors, which is an indicator of the companies' high quality (Bin Abdullah, 2008).

The theory of signaling was developed with the intention of explaining the information gap that exists in the job market (Spence, 1978). It is now being used as an explanation for voluntary company disclosures (Ross, 1977). In every imaginable setting for social interaction, the Signaling Theory examines how to meet the challenges posed by information imbalance. It suggests that information asymmetry should be reduced if the party that has more knowledge is able to communicate signals to other parties who are interested in receiving them (An et al., 2011). As a result of the information asymmetry problem, businesses signal certain information to investors in order to demonstrate to those investors that they are superior to other businesses operating in the market. This is done with the intention of attracting investments and developing a positive reputation (Verrecchia, 1983).

A signal may be a visible action or structure that is used to represent the signaller's hidden qualities (or quality). The transmission of a signal is generally predicated on the idea that it will be beneficial to the signaller, such as signaling that its goods are of better quality than those of its rivals (An et al., 2011).

On the one hand, signaling businesses would cause investors and other stakeholders to evaluate the firm's worth, resulting in more favourable choices for the company (Whiting & Miller, 2008). On the other hand, a company's favour among different stakeholders would lead to greater investment and, as a result, lower capital-raising expenses. Companies may communicate information about themselves in a variety of ways. Among them, one of the most successful is voluntary disclosure of positive accounting information (Xiao et al., 2004) . Companies utilize voluntary disclosure to indicate that they are better than they are by disclosing more information than is needed by obligatory rules and regulations (Campbell, 2004). The signal must be difficult to duplicate by another company in order to be effective (Morris 1987). Making hard disclosures (Clarkson et al., 2008) about a company's better environmental performance via discretionary disclosure channels, using objective measures, is one method a company may accomplish this.

Since signaling and voluntary disclosure theories both predict that there is a positive relationship between environmental performance and environmental disclosure , it can be assumed that high-performing entities with regard to Carbon Emissions would try to differentiate themselves from low-performing entities with regard to Carbon Emissions by making disclosures that are both verifiable and difficult to signal their good Carbon Performance to various stakeholders.

Proprietary Expenses Theory contends, in contrast to past views, that corporations limit the voluntary disclosure of key information to the financial market owing to expenses associated with disclosure, such as preparation and competitive costs (Wagenhofer, 1990). This idea is briefly addressed below since it offers a totally new viewpoint on why certain companies do not want to reveal anything at all, regardless of their success.

## 2.3 Corporate Carbon Disclosure and Performance

A growing number of scholars have observed that firms communicate carbon information on both sides of a transaction so that stakeholders have sufficient knowledge to aid in transaction creation, while also promoting the growth of corporate value. Disclosure of environmental knowledge mostly occurred at the theoretical and descriptive levels (Li et al., 2018). Social responsibility information was used to undertake appropriate research, and environmental information sharing was limited to theoretical and descriptive analysis. Corporate Social Responsibility and performance have been studied by Friedman (Liesen et al., 2017). There is a lot of continuing study on the economic ramifications and market reactions, and on the drivers of social responsibility and environmental information disclosure (Liu et al., 2017). Research on environmental stewardship and social responsibility has also advanced in the last several years. Social responsibility and environmental information have been analysed from a variety of angles by academics, including both an internal and external one (Rohani, Jabbour & Abdel-Kader, 2021) .

Traditional economics and neoclassical schools' belief about how carbon disclosure affects Financial Performance were corroborated by most of the early studies. As Li et

al. (2018) shown via research and cost theory, publishing carbon information in the process of preserving an enterprise's legitimacy costs more than it saves in terms of maintaining an enterprise's credibility. Since releasing carbon information affects corporate performance, there is a negative correlation between disclosure quality and firm value (Liu et al., 2017). The high cost of firms acquiring legitimacy by carbon disclosure surpasses the benefits of the act, and corporate carbon management techniques may have an impact on the value of the company (Busch & Lewandowski, 2018) . Similarly, Liesen et al. (2017) noted that company profitability may be adversely affected by the disclosure of carbon information.

According to the concept of information asymmetry, non-financial information on carbon is vital for the decision-making process of investors, and the disclosure of high-quality carbon information may aid in minimizing the information disadvantage suffered by investors . Data on carbon emissions that are of a high quality may help to lessen investor ignorance and minimize risk while safeguarding investors' interests to some degree (Rohani, Jabbour & Abdel-Kader, 2021). All of the resources required for production and operation may be accessed concurrently. Proactively disclosing carbon data is the most crucial strategy for enterprises to acquire access to stakeholders and realize their sustainable development objectives. It is also the most significant strategy to obtain access to stakeholders. The distribution of information on carbon emissions is helpful to market-based Financial Performance (Busch & Lewandowski, 2018). In the research by Li et al. (2018), it was demonstrated that a company's carbon performance was strongly connected to its disclosure of carbon emissions. A company may save money in the short term by not meeting its carbon emission reduction obligations and

not disclosing relevant information, but long-term development will generate more explicit or implicit costs, affect the efficiency of the enterprise resource allocation, and lead to unrealistic costs . Liesen et al. (2017) acknowledged that enterprises may meet consumer expectations by lowering their carbon footprint and may fairly expect to receive attention from existing or future consumers after fulfilling consumer expectations (Busch & Lewandowski, 2018). Qian and Schaltegger (2017) discovered that high-quality disclosure may minimize knowledge asymmetry between stakeholders and increase Financial Performance by minimizing risk, whereas low-quality Disclosure had no effect on Financial Performance.

Enhancing stakeholder understanding and support by Carbon information Disclosure, according to signaling theory, may alleviate enterprises of burden while also enhancing Financial Performance. If a corporation is aware of the environmental risk, it will take prompt measures to reduce pollution and preserve its brand and image by sharing information as soon as feasible. This may aid to lessen the possibility of financial loss. It was observed that the publication of Carbon information by corporations enhanced shareholder incentive and cut transaction costs. This, in turn, resulted in an increase in stock market value as a consequence of the disclosure of carbon information by firms (Li et al., 2018). A study by Ziegler et al. (2017) found that U.S. energy corporations aggressively promote their efforts to adapt to climate change . This boosts the corporations' corporate image, which, in turn, significantly improves the corporations' stock performance as a direct result of this effort (Damert, Paul & Baumgartner, 2017). Rohani, Jabbour, and Abdel-Kader (2021) investigated at more than a thousand Japanese companies to establish whether or not there was a link between Carbon

Disclosure and stock market value. They made the finding that an increase in the amount of information on Carbon Disclosure leads to an increase in the share market value of the companies that are being discussed. Ganda (2018) used a cross-section of South African companies in their study to gather data for their examination of the influence that reporting Carbon Emissions has on the financial worth of a firm. The study by Ganda (2018) made the startling discovery that carbon disclosure had a positive correlation with the accounting-based metric Return on Assets (ROA), but a negative correlation with the market-based indication Market Value Added. Zhang, Xing and Wang (2020) came to the conclusion that the disclosure of a company's carbon emissions has a significant and negative effect on the value of the company, whereas the disclosure of a company's corporate social responsibility has a significant and positive effect on the value of the company. Siddique et al. (2021) explored how Financial Performance is impacted by Carbon Disclosure, as well as how Carbon Performance impacts Carbon Disclosure, in line with the predictions stated by the signaling theory. Siddique et al. (2021) also looked into how Carbon Performance influences carbon disclosure. Carbon Disclosure was also shown to have a detrimental effect on financial performance in the short term, but a positive effect on financial success in the long term.

From the point of view of corporate governance, the potential economic effect of Carbon information Disclosure has been the subject of investigation by a number of academics. Damert, Paul, and Baumgartner (2017) chose Nordic listed companies who were included in the CDP report as the focus of their research because they feel that releasing carbon information is a rational choice for a company to make . They

discovered that listed companies who report Carbon information may increase their value, which is significant from both an accounting and a marketing point of view. Annual reports from Australian corporations reveal that the return on corporate assets increased when Carbon information was revealed. This finding lends credence to the hypothesis that the publication of Carbon information had a positive influence on the Financial Performance of the companies that Busch and Lewandowski (2018) researched. According to Lewandowski (2017), an improvement in a company's Carbon Performance and Disclosure has a positive long-term impact on the financial success of the company.

Several studies have shown a favourable association between environmental information disclosure and economic performance, which is based on the standpoint of environmental information disclosure. Environmental disclosure in the oil business is said to have a significant correlation with financial success, according to (Zhang, Xing & Wang, 2020) . According to the findings of a second piece of research, Qian and Schaltegger (2017) revealed a positive association between the quality of environmental disclosure made by several UK companies and the current financial success of such companies. On the other hand, Anderson et al. found that businesses that had good financial success also offered more thorough environmental information disclosure. There is a correlation between a company's Financial Performance and the environmental policies and/or commitments that it has. Companies with high Financial Performance have a greater number of environmental policies and/or commitments than companies with low Financial Performance, while companies with low Financial Performance have a lesser number of environmental policies and/or commitments than

companies with high financial performance. Empirical research has shown a correlation between environmental disclosure and financial success, leading researchers to conclude that environmental disclosure is likely a key contribution to a company's profitability .

Based on a report from Fortune 500 corporations in 2009, the Carbon Disclosure Project (CDP) conducted an analysis of the Carbon Disclosure strategies implemented by Fortune 500 companies as a response to the challenges posed by climate change. The CDP came to the conclusion that economic constraints were strongly connected with the decision to Disclose Carbon Emissions (Damert, Paul & Baumgartner, 2017). According to the reports that were handed in to the Carbon Disclosure Project (CDP) in 2009, a sample of 2045 big companies from 15 different countries and a wide variety of sectors was chosen to be studied by Luo (2019). In order to determine the likelihood of companies disclosing their Carbon Emissions, the Luo (2019) looked at a number of characteristics, including business involvement in the CDP and the availability of resources . A lack of resources, according to the findings of some researchers, is one of the reasons why less developed countries do not report their Carbon Emissions or make commitments to reduce those Emissions (Lewandowski, 2017). Matsumura et al. (2014) examined the effect of Carbon Emissions and the voluntary disclosure of Carbon Emissions on company value using data from the Carbon Disclosure Project (CDP) from 2006 to 2008. The CDP collected the data over the course of four years. According to the findings of the research, there was a connection between Carbon Emissions and the value of firms (Kuo & Chen, 2013) . The quality of the Carbon Emission information disclosed by China's publicly traded companies was found to have a positive correlation

with the Return On Net Assets (RONA), according to research conducted on China's publicly traded companies to determine the quality of the carbon emission information content. Qian and Schaltegger (2017) used the 2008–2011 China CDP report as a sample and discovered that the degree of Carbon Disclosure was considerably associated with Financial Performance for listed firms in the heavy polluting sector. In order to evaluate and investigate the connection between the quality of Carbon information Disclosure and Financial Performance, Qian and Schaltegger (2017) divided the quality of Carbon information Disclosure evaluation index into ten categories. This was done for the purpose of evaluating and investigating the connection. When the quality of CO2 Emissions data is released, there is a benefit to the company's Financial Performance, and this advantage is intertemporal; nevertheless, the effect of this benefit on the company's Financial Performance decreases year by year (Kuo & Chen, 2013). In a panel analysis that included annual Carbon Emission reports of South African enterprises from 2010 to 2015, it was shown that Carbon Disclosure had a positive association with ROA (Return on Assets), but a negative correlation with MVA (Market Value Added) (Lewandowski, 2017). Luo et al. (2014) analyzed 57 published integrated reports of Polish listed enterprises and found that there were insignificant conflicts between their judgments of the completeness of performance disclosures.

When it comes to making decisions about a company's future direction in terms of its Carbon Emissions, the vast majority of academics based in the United States have focused their research on the relationship between the value of a company, the costs of its capital investments, and the utility of information. This has been the primary focus of the vast majority of their investigations. There is a great deal of controversy around the

practice of reporting information on the environment and social responsibility; nevertheless, there is very little dispute over the extent to which such practices affect a company's financial success. In addition, there is a great deal of variety in the findings of the research that is now available. The researchers reported a variety of outcomes, including those that were positive, negative, and uncorrelated.

Through the use of empirical research on a sample of sixty Australian companies, the majority of which were involved in the extractive services industry, Lewandowski (2017) found that higher performing corporations are more willing to disclose environmental information than lower performing corporations. The majority of the companies in the sample were involved in the extraction of natural resources . According to the findings of study carried out by Tang, Wang and He (2013), the dissemination of environmental information has a positive influence on both internal and external indicators of a company’s performance. Al-Tuwaijri et al. (2018) identified a positive link between environmental performance, environmental information disclosure, and company performance. This association was shown to exist even when environmental performance was taken into account. The investigation that was carried out by Lemma, Shabestari, Freedman and Mlilo (2020) found that there was a positive connection between Social Responsibility Disclosure and corporate value in a sample of 10 mining companies from all over the globe.

However, the findings of other scholars have shown that environmental disclosure does not have a favourable impact on the financial success of a corporation. Researchers discovered that there was no link when they looked at the relationship between the quantity of pollution disclosure and the economic performance of businesses operating

in highly polluting industries. This was true for the whole sample of pollution disclosure. In spite of the findings from the subsample, the findings for the smaller businesses revealed that there was no association between their economic success and their pollution declaration (Liesen et al. 2017). Companies that performed better financially showed a weaker association between social disclosure and equity capital expenses. This finding suggests that businesses may be punished financially for sharing information that is socially responsible. He, Tang and Wang (2013) showed a strong positive association between social disclosure and equity capital costs in a sample of Canadian firms from 1990 to 1992. The sample of companies was taken from the period of time spanning from 1990 to 1992. According to the findings of Lemma et al (2020), the actions of a company that are illegal or irresponsible will cause the company to lose money and will have a negative impact on the company's overall Financial Performance. On the other hand, merely adhering to legal requirements or engaging in occasional acts of social responsibility will not help the company financially. According to He, Tang and Wang (2013), there is no significant correlation between Carbon Disclosure and investment, nor does it contribute to an increase in the success of businesses. According to He, Tang and Wang (2013), the costs of environmental stewardship are prohibitive for many firms. They suggest that disclosure of greenhouse gas emissions may not offer immediate economic rewards and may, rather, impair the competitiveness of the company. According to He, Tang and Wang (2013) study, a negative relationship exists between environmental information disclosure and the business financial performance of polluting industries, whereas a positive relationship

exists between environmental information disclosure and the Financial Performance of general industries.

Researchers have found that they are unable to establish a study conclusion that is consistent across all of their findings after sorting and summarizing the results of previous studies as well as looking at the vast number of publications on research into research on Financial Performance from the perspective of environmental information disclosure. This has led them to the realization that they are unable to draw a definitive conclusion based on their findings. The researchers chose different research objects, which also contributed to the diversity of the findings from the study. For example, Carbon intensive and Carbon non-intensive industries cannot be lumped together due to the distinctive differences in industry characteristics and the regulatory pressures faced by each industry. Another one of the reasons is that various academics pick different metrics for the publication of environmental information.

It is not common practice to investigate how disclosing Carbon information affects a company's Financial Performance. Despite the efforts of a number of academics, the majority of research is focused on the impact factors of Carbon information disclosure rather than the effect of Carbon information disclosure on current Financial Performance or whether it is postponed to the next period. Disclosure of Carbon information has also been graded by academics according to whether or not it should be disclosed, which is a question that may be answered in a variety of ways. The Carbon Disclosure Project (CDP), whose methodology is more thorough and authoritative, as well as its data having more depth and breadth, utilizes PricewaterhouseCoopers as a consultant.

## 2.4 Carbon Disclosure and Sales Revenue

Several researches have been conducted on the relationship between Carbon Disclosure on performance and revenue, such as Martin, Yadiati and Pratama (2018); Qian and Schaltegger (2017) and Gallego-Álvarez, Segura & Martínez-Ferrero (2015), but these have come up with different findings.

Martin, Yadiati and Pratama (2018) investigated how much Corporate Social Responsibility transparency impacted financial results, as determined by revenue growth and return on assets. The verification analysis technique was used in the study, with 21 firms being sampled. According to the findings, Corporate Social Responsibility transparency has little progressive or meaningful impact on revenue growth.

Qian and Schaltegger (2017) investigated whether environmental transparency and efficiency are mostly concerned with whether disclosure is a replacement for bad performance. They found that a rise in Carbon Disclosure level is positively correlated with the subsequent change in Carbon output, based on a change study of 500 global businesses and their Carbon Emission and Disclosure data reported .

Gallego-lvarez, Segura, and Martnez-Ferrero (2015) investigated the influence of variation in Carbon Emissions on performance using multiple regression analysis with panel data, and found that many companies promote greater environmental behaviour in order to achieve better Financial Performance. However, the results also showed that many companies promote greater environmental behaviour in order to achieve better Financial Performance;

## 2.5 Carbon Disclosure and Return on Equity

Recent research in other countries has highlighted the effect of the industry sector on voluntary environmental transparency and the connection between carbon-related risk exposure and the cost of equity for businesses (Kumar & Firoz, 2017). The environmental disclosure model was created to test the impact of business sector on voluntary environmental disclosure, and a regression model was used to look at the relationship between voluntary environmental disclosure and the cost of equity. The study discovered a connection between carbon-related risk exposure and equity capital cost; companies with carbon-related risk exposure in the capital market have a higher cost of equity. According to Kumar and Firoz (2017), organizations working in the more well-known highly environmentally sensitive business sectors are more likely to openly release carbon information than those operating in less environmentally sensitive industry sectors .

Li, Yang and Tang (2015) used market liquidity and cost of equity capital, to determine whether enterprises' Carbon knowledge disclosure would typically support their value development. The results demonstrate that carbon information disclosure contributes more favorably to the organization's value creation by using web crawler technologies to connect carbon information disclosure and enterprise value creation. This means that by sharing more Carbon data and engaging in Carbon Emissions control, business leaders will reap greater financial rewards.

He (2017) investigated the relationship between Carbon exposure and the cost of capital, as well as a possible advantage associated with Carbon Disclosure, such as a

lower cost of capital for the business. A survey of US S&P 500 companies who present their CDP reporting on the websites of CDP organizations was used to assess the relationship between Carbon Disclosure and firm cost of capital, and it was discovered that the cost of capital is substantially negative correlated with Carbon Disclosure . The negative relationship can, however, be mitigated among firms with better Carbon output. The thesis also discovered that mediocre Carbon performers had a higher degree of Carbon Disclosure than effective Carbon performers, which may offer some tentative support for the authenticity hypothesis.

## 2.6 Carbon Disclosure and Earning Per Share

Bimha and Nhamo (2017) examined the role of environmental and general Disclosure to see whether Carbon Disclosure could be related to share price fluctuations of JSE top 100 firms. To collect more detail, the sampling approach was combined with regression analysis. However, the findings suggest that businesses that actively register and engage in the CDP on a daily or irregular basis faced the same effect on share price fluctuations as a result of official announcement of their carbon emissions.

According to Moyo and Wingard (2015), climate change has a huge impact on the financial viability of South African businesses. The aim of the research was to see how adapting to climate change affects financial results. The climate change output of 70 JSE listed firms was compared to Financial Performance metrics using secondary review of historical evidence. The finding demonstrates the existence of a positive and

statistically significant connection between climate change success and earnings per share growth.

## 2.7 Relationship between carbon disclosure and financial performance

While numerous studies look into the connection between Carbon Performance and Financial success, no study has looked into the interrelationship between Carbon Disclosure and Financial Performance .

The preceding part of this research stated and justified that there is a positive connection between Carbon Performance and Financial Performance, i.e. that a company's Carbon performance improves its financial performance. According to Liu et al. (2017), as a company's financial performance improves, it may create more internal financial resources to enhance its environmental performance . In other words, improving a company's environmental performance will improve its financial performance, and better financial performance will help the company improve its environmental performance. It is argued that since there is no known study that investigates the interrelationship between Carbon Performance and Financial Performance, and because Carbon Performance is a subset of environmental performance, that improving a firm's Carbon Performance will lead to improved Financial Performance, which will allow the firm to invest in Emission reduction (Lemma et al., 2020).

There is no significant current research that examines the connection between Carbon Disclosure and Financial Performance, according to this study. Even the link between

environmental Disclosure/Corporate Social Performance Disclosure and Financial Performance has not been well investigated . The little study that has been conducted in this area has shown mixed findings. Rohani, Jabbour and Abdel-Kader (2021) investigates the response of the stock market to pollution disclosure in annual reports. According to the research, companies that publish environmental information have better stock market returns than those that do not.

Some studies, such as Liu et al. (2017) argue that there should be a positive connection between CSR Performance Disclosure and Financial Performance Disclosure. The rationale behind this is that by disclosing and enhancing their CSR efforts, businesses may earn a reputation as good corporate citizens, attracting investors and other stakeholders. According to the findings of a research by Lemma et al., (2020), better Corporate Social Performance, as well as more open disclosures of Corporate Social Performance, has a significant connection with increasing businesses' internal financial resource use. However, such Corporate Social Performance and disclosures do not always translate into improved external financial success .

Rohani, Jabbour and Abdel-Kader (2021), on the other hand, investigate the relationship between the degree of pollution disclosure and the economic success of companies in four highly polluted industries: paper and pulp, oil refinery, chemical, and steel. Economic performance is measured using ratios. According to the findings of the research, there is no link between the extent of pollution disclosure and economic performance .

The connection between environmental Disclosure/Carbon Disclosure and Environmental Performance/Carbon Performance has been the subject of much research. The majority of these researches discover a positive connection between them, but a significant number of them also discover a negative relationship. Similarly, several studies have looked at the connection between Environmental Performance/Carbon Performance and Financial Performance. There are contradictory findings in this instance as well (Liu et al, 2017). Many studies suggest a negative connection between Environmental Performance/Carbon Performance and Financial Performance, despite the fact that the majority of studies show a favourable relationship. However, no study has been done to see whether and how environmental Disclosure/Carbon Disclosure impacts a company's financial performance. If a link could be established between Environmental Disclosure/Carbon Disclosure and Carbon Performance, it would be beneficial to business stakeholders (Lemma et al., 2020). As a result, the goal of this research is to fill a knowledge vacuum by determining how a company's carbon disclosure impacts its financial performance.

According to the premise of Instrumental Stakeholder Theory, if a company engages in stakeholder management, such as voluntary Carbon Disclosure, the firm's Carbon Performance is likely to increase (Liu et al., 2017). This research, on the other hand, demonstrated and validated why a company's Carbon Performance is likely to enhance its Financial Performance. We may conclude from these two reasons that Carbon Disclosures will have a beneficial impact on companies' future Carbon Performance. This better Carbon Performance will, in turn, have a beneficial impact on the company's Financial Performance (Lemma et al., 2020). If a company's carbon disclosure has a

positive impact on its Carbon Performance, and Carbon Performance has a positive impact on its Financial Performance, we may conclude that a company's Carbon Disclosure will have a good impact on its Financial Performance (Rohani, Jabbour & Abdel-Kader, 2021) .

## 2.8 Conclusion

This chapter reviewed the literature on the relationship and interrelationships between Carbon Disclosure and Financial Performance. The findings of these studies will aid in the interpretation of the findings of this research. The Legitimacy Theory proposes that when companies perceive a loss of legitimacy as a result of a violation of the social contract, they will make good social and environmental Disclosures in order to maintain their legitimacy . According to Stakeholder Theory, companies would utilize Disclosure procedures as an essential instrument to preserve their legitimacy and fulfill the expectations of their stakeholders. Firms with superior environmental performance will be motivated to disclose information about their good performance practices, to differentiate themselves from firms with inferior environmental performance, and to signal their superior performance to investors, according to Voluntary Disclosure Theory and Signaling Theory .

# CHAPTER THREE

# RESEARCH METHODS & DESIGN

## 3.1 Introduction

This chapter explains how the research methods for the thesis were carried out. It begins by explaining the researcher's research paradigm, research techniques, and research architecture for this research analysis. The sampling strategy, research instrument, data collection methods, and data processing techniques used in this study are also discussed in this section. The chapter concludes with a description of how ethics is taken into account in this research project.

## 3.2 Research Paradigm

The positivist theory, according to Kaboub (2008), notes that actual events can be observed empirically and clarified by consistent interpretation. As a way of learning intelligence, the positivist paradigm uses scientific approaches. Genuine, true, and objective events may be analysed and observed objectively and empirically, as well as explained by articulate and logical inquiry and interpretation, according to the positivist model. The anti-positivist theory, on the other hand, emphasizes that social meaning is perceived and understood by individuals based on their ideological positions (Dash, 2005).

The positivist model was used in this study, and positivist paradigms are often associated with quantitative data collection and interpretation approaches. The positivist paradigm examines the connection between Corporate Carbon Disclosure and Financial Performance of JSE/FTSE Responsible Investing Index companies. A

positivist theory stresses the objectivist approach to social analysis and emphasizes quantitative research methods.

### 3.3 Research Method

The fact that there have been a lot of studies on classification methods, quantitative and qualitative methods are the most common. Quantitative approaches, according to Rahman, Ationg and Zulhaimi (2017), are analysis tools that are commonly used to collect information on quantitative statistics, information dealing with numbers, and all that can be measured quantitatively. This approach uses graphical elements like percentages, charts, and graphs. The qualitative approach, on the other hand, is a tool of inquiry used in a variety of academic fields, and qualitative researchers seek to gain a comprehensive interpretation of relevant factors such as human behaviour and the potential causes that govern them.

In this research, the chosen method of the research study was quantitative. Quantitative research enables the researcher to describe record, analyse and interpret the object statistically. The quantitative approach is applicable since the research paradigm is positivist which involves the measurement of relationships between dependent and independent variables through employing statistical analysis.

**Characteristics of quantitative research**

Quantitative research includes the following characteristics:

- There is a single reality that can be established via meticulous measurement.
- It is typically short and sweet.

- Wherever feasible, it describes, analyses connections, and establishes causation among variables.
- Statistical analysis is used to minimize and organize data, as well as to discover important connections and differences and/or similarities within and across various categories of data .
- The sample should be representative of a broad population, and the instruments' reliability and validity are critical .
- Comprehensive data gathered using various techniques and/or instruments should provide a comprehensive description of the variable or population under study, as well as an accurate assessment of the characteristics of specific people, situations, or groups .

### 3.4 Research Design

The research design, according to Polit and Hungler (1995), is a plan, or strategy, for completing the study in such a way that elements that may interfere with the validity of the research findings are eliminated. The research design is the researcher's overall approach for answering the study's research questions. According to Burns and Grove (2001), designing a study aids researchers in organizing and implementing the study in a method that would assist them in obtaining the planned outcomes, consequently boosting the possibilities of acquiring data that can be connected to the actual world .

The research design, according to Saunders, Lewis, and Thornhill (2012), is the foundation for data collection and interpretation and is divided into five types:

experimental design, cross-sectional or social sample design, longitudinal design, case study design, and comparative design".

The multiple case study design was included in this study for the following reasons: Multiple firms in the FTSE/JSE Responsible Investing Index can include financial data such as historical share prices and business and market results.

A Multiple case study design is described as an intensive study aimed at generalising over several units, where the focus is based on a speciality unit (De Vries, 2020). Multiple case studies have been used in previous quantitative studies, which were based on secondary data, to study the effect of Carbon Disclosure on Financial Performance; such studies include those of Alsaifi, Elnahass and Salama (2020) and Matsumura, Prakash & Vera-Munoz (2014).

### 3.5 Study Area

The study field for this analysis was the Johannesburg Stock Exchange (JSE), which is situated in Sandton, Johannesburg, South Africa, at the intersection of Maude Street and Gwen Lane. The JSE provides stable and effective primary and secondary capital markets, as well as post-trade and regulatory services, for a wide variety of securities. The JSE is the preferred South African stock exchange for domestic and foreign investors seeking links to the countries and continent's leading capital markets. The JSE is the largest stock exchange on the African continent and the 19th largest stock exchange in the world by market capitalization.

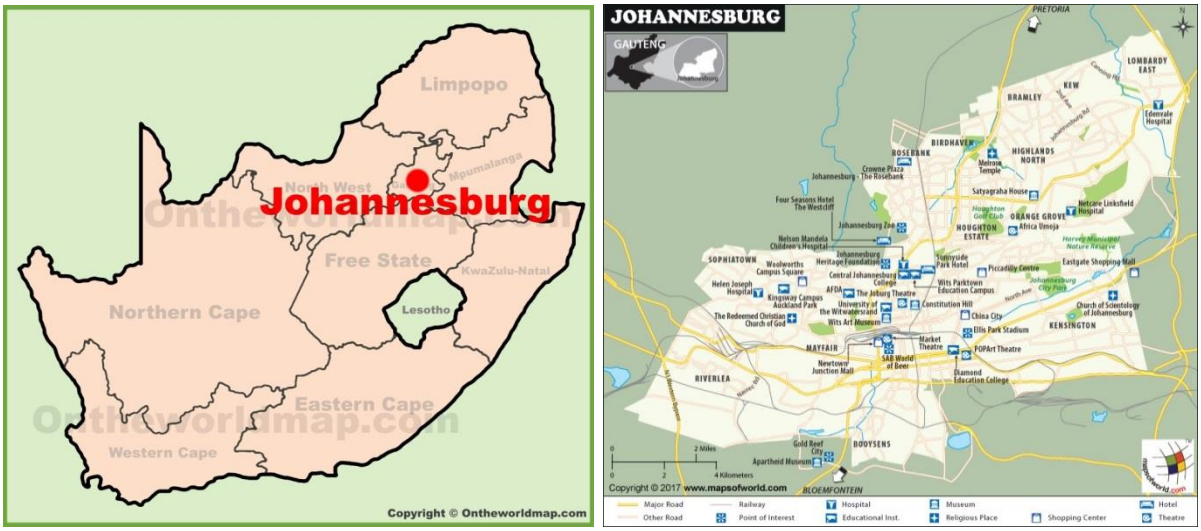


**Figure 3.1. Map of Johannesburg (Gauteng Province)**

**Source: Google Maps (2019)**

## 3.6 Population

According to Sagala, Ningsih and Turgarini (2019), the population is the total number of objects or subjects to be included in the study, which consists of objects or subjects with specific characteristics and attributes decided by the researcher on whom or what the research was conducted and conclusions drawn. The top 30 companies listed in the FTSE/JSE Responsible Investing Index from 2015 to 2019 make up the research study's target population. Companies that delisted or were placed on the Alternative Exchange (Alt-X) during the research time would be disqualified. Companies with dual listings whose main listing is not on the JSE would be exempt as well.

### 3.7 Sampling Method & Sample Size

According to Alvi (2016), a sample is a group taken from a larger population that has a smaller number of units that are selected for the purpose of investigation. The two most common forms of sampling procedures are known respectively as the probability sampling method and the non-probability sampling method. In the probability sampling method, there is an equal chance that either of the participants from the target group will be selected for the survey. A non-probability sampling process is one in which the sample population is chosen in a non-systematic way that does not assure that each participant in the target population has an equal chance of being selected. This kind of sampling procedure is also known as a convenience sample .

Non-probability sampling, with a purposive sampling approach, would be used in the analysis sample. The use of a purposive sampling approach is essential because not all samples have criteria that correspond to the phenomena being studied. As a result, the purposive sampling protocol outlines the considerations or basic requirements that the samples used in this analysis review must meet .

(1) The top 30 companies listed on the FTSE/JSE Responsible Investing Index from 2015 to 2019 were used as study samples. (2) Organizations that issued annual reports and environmental reports from 2015 to 2019. (3) Businesses that have details on the study's variables. (4) Businesses that disclose carbon emissions (at least one regulation related to carbon/greenhouse gas emissions or at least one transparency item related to carbon emissions) must be included.

As a result, the sample for this analysis is the top 30 companies listed on the FTSE/JSE Responsible Investing Index from 2015 to 2019.

### 3.8 Data Collection

Data collection, according to Paradis, O'Brien, Nimmon, Bandiera, and Martimianakis (2016), is the method of collecting and measuring information on variables of interest in a structured manner that allows one to address specified study questions, test theories, and determine outcomes. There are two types of data collection methods: secondary data collection methods and primary data collection methods .

This research made use of the secondary data collection method. The three dependant variables: sales revenue, return on equity and earnings per share were collected from the financial statements of the companies from online financial statement archives of these companies, and Carbon Disclosure Performance for these companies were collected from the data base of the Carbon Disclosure Project of South Africa for a period of five years.

### 3.9 Data Analysis

Data was analysed quantitatively by using the SPSS software since the researcher intends to measure the relationship between variables. The simple panel data regression analysis was used to analyse the data. Data was arranged in a panel data approach, this means that the number of companies (30) gave a total of 90 observations which is (30 companies x 3 year period for each company). Hence the panel data regression analysis was used. Regression analysis is a straightforward

approach for examining the functional relationships between variables that is logically simple. The connection between the answer or dependent variable and one or more explanatory or predictor variables is represented in the form of an equation or a model (Hadi & Chatterjee, 2015).

Since there are three dependent variables, the researcher used the following regression model:

For the first objective

$y1 = a + b1x1 + e$ …….. (1)

For the second objective

$y2 = a + b1x1 + e$ …….. (2)

For the third objective

$y3 = a + b1x1 + e$ …….. (3)

Where:

$y1$ = Sales revenue

$y2$ = Return on equity

$y3$ = Earnings per share

$a$ = Constant

$b$ = Regression coefficient

$x$ = Carbon disclosure

$e$ = error (representing on accounted independent variable)

**Measurement of variables;**

1. Carbon disclosure

The researcher used the percentage score of each company as rated by carbon disclosure index (this means the researcher only picked the percentage scored by each companies as rated by carbon disclosure and did not do the quantifications)

2. Sales revenue

The researcher picked the sales revenue in rand (R) reported by each company, in each annual financial report

3. Return on equity

The researcher picked the return on equity in rand (R) reported by each company, in each annual financial report

4. Earnings per share

The researcher picked earnings per share in rand (R) reported by each company, in each annual financial report

## 3.10 Ethical Considerations

According to Clarke and Cossette (2016), ethical considerations in a secondary data research involves the use of existing data sets to answer the new research questions. This research used secondary data to conduct data analysis. This data is freely available to the general public for use in market analysis and for research purposes, therefore, there was no contact with humans or animals, hence there were few ethical issues in this research. However, the researcher complied with ethical issues regarding data gathering and reporting. Data was collected as originally reported by the companies in their annual reports without misrepresenting the data. In addition, secondary data collected from companies was duly referenced to the company. The result from the secondary data analysis was made available to the general public on the university website.

## 3.11 Validity and Reliability

### 3.11.1 Validity

According to Heale and Twycross (2015), validity is well-defined as the extent to which a concept or variable is precisely measured in a quantitative study. The variables of this research is validated because the variables used in the analysis, namely Sales Revenue, Return on Equity, Earnings per Share were collected from audited financial reports of the companies under the FTSE/JSE Responsible Investing Index . These financial reports were validated by independent auditors and the JSE before making these publicly available and free for public use.

### 3.11.2 Reliability

Reliability is the additional measure of excellence in a quantitative study or the accuracy of an instrument used (Heale & Twycross, 2015). This research study is associated with the high levels of reliability and thus other researchers may generate the same results, through the use of the same research methods under similar circumstances. This is because the regression results were tested for reliability using further statistics namely, the normality tests and heteroscedasticity tests.

## 3.12 Limitations

The first limitation of the study was the examination of the year 2015 to 2019 annual reports of carbon disclosure and only considering three financial performances of thirty listed companies' disclosures in the FTSE/JSE Responsible Investing Index and, as such, may not be generalised across other periods and companies. Since a result of this, more research into carbon disclosure in following years and among different firms would be a valuable expansion to this study, as it would allow for the determination of whether or not the results are constant over time.

## 3.13 Conclusion

The creation and administration of the pilot research, questionnaires, and semi-structured interviews, as well as theoretical and practical problems, were emphasized in this chapter. It also described why each technique was chosen and what this meant for the research's subsequent phases, such as the final surveys and interviews. The next

chapter will go through the research sites' and respondents' characteristics, as well as the findings from the site observations.

# CHAPTER FOUR

# DATA PRESENTATION AND INTEPRETATION

## 4.1 Introduction

This chapter presents the findings of the study from the data that was collected and analysed using statistical analysis. The chapter contains the descriptive statistics of the data which highlights the characteristics of the variables used in the study. Furthermore, the diagnostic test and regression analysis results are presented in this chapter in line with the study objectives. Theoretical and empirical literature was used in discussing and interpreting the study results.

## 4.2 Descriptive statistics

**Table 4.1: Descriptive statistics**

| Variable | CDP | EPS | REV (R Billion) | ROE |
|---|---|---|---|---|
| Mean | 3.0917 | 2.3182 | 17.8398 | 17.9807 |
| Median | 3.0000 | 2.3495 | 17.2650 | 17.5000 |
| Maximum | 5.0000 | 7.5100 | 36.7000 | 32.1000 |
| Minimum | 1.0000 | -1.7800 | 6.0600 | 13.6000 |
| Std. Dev. | 0.8401 | 1.7265 | 5.6031 | 2.7699 |
| Skewness | -0.1735 | 0.0229 | 0.9487 | 1.8367 |

| | | | | |
|---|---|---|---|---|
| Kurtosis | 2.6745 | 3.9997 | 4.1866 | 8.4633 |
| Jarque-Bera | 1.1318 | 5.0078 | 25.0388 | 216.7110 |
| Probability | 0.5679 | 0.0818 | 0.0000 | 0.0000 |

Gujarati (2004) noted that the normal value for skewness is 0. The descriptive statistics from Table 4.1 show that all the variables in the study are positively skewed as the skewness values are greater than 0. Positive skewness indicates that the majority of the observations for a given variable are greater than the mean. In addition Table 4.1 shows the kurtosis of the variables. According to Gujarati (2008), a variable is considered to be leptorkurtic if the kurtosis value is greater than 3 and platykurtic when less than 3 . Table 4.1 shows that the Carbon Disclosure Performance (CDP) is platykurtic whilst the remaining variables are leptokurtic. Leptorkic shows that the variables significantly fluctuate around the mean hence it is a necessary condition for the presence of non-stationarity of data (Gujarati, 2004). The leptokurtic properties of the variables necessitate the stationarity test to ascertain the unit root properties.

### 4.3 Panel unit root test

The unit root test was conducted so as to determine whether the variables are stationary as well as highlighting the order of integration.

**Table 4.2: Unit root test results**

| Variable | Levin, Lin & Chu Statistic | Probability Value | Order of Integration |
|---|---|---|---|
| CDP | -2.33933 | 0.0097 | I(0) |

| | | | |
|---|---|---|---|
| EPS | -11.9738 | 0.0000 | I(0) |
| REV | -12.7357 | 0.0000 | I(0) |
| ROE | -12.1217 | 0.0000 | I(0) |

The results from table 4.1 show that all the variables are stationary at levels and do not contain unit roots. The presence of unit root results in spurious regression where a relationship between unrelated variables is established (Magazzino, 2012). Since the variables do not contain unit roots, the Pooled Ordinary Least Squares method can be applied in the study.

### 4.4 Correlations

The correlation coefficient matrix was used to determine the linear relationships between the variables in the study. Most studies have shown that there is a positive association between Carbon Disclosure and financial performance of a business (Qian & Schaltegger, 2017; Al-Tuwaijri et al., 2018; Lemma, Shabestari, Freedman & Milo, 2020) . Based on previous empirical studies, positive correlations are expected between Carbon Disclosure each dependent variable (Return on Equity, Sales Revenue and Earnings per Share). Table 4.3 below shows the correlation between variables.

**Table 4.3: Correlation matrix**

| **Variable** | **ROE** | **REV** | **EPS** | **CDP** |
|---|---|---|---|---|
| **ROE** | 1.0000 | 0.2234 | 0.2312 | 0.0233 |
| **REV** | 0.2234 | 1.0000 | 0.1980 | -0.0137 |
| **EPS** | 0.2312 | 0.1980 | 1.0000 | 0.0374 |

| | | | | |
|---|---|---|---|---|
| **CDP** | 0.0233 | -0.0137 | 0.0374 | 1.0000 |

The results from Table 4.3 show that Carbon Disclosure Performance is negatively correlated to sales revenue (REV). The study results therefore imply that as Carbon Disclosure improves, Sales Revenue earned by the firm declines. The findings contradict the findings by Lin et al. (2017) and Gallego-lvarez, Segura and Martnez-Ferrero (2015) which found a positive correlation between Financial Performance of an organisation and Carbon Disclosure. In addition, the negative correlation between Carbon Disclosure Performance and Sales Revenue contradicts the Instrumental Stakeholder Theory, which asserts that Carbon Disclosure improves Financial Performance (Lemma et al., 2020) . The cost of disclosing environmental/carbon information outweigh the benefits and a negative relationship with business performance is expected (Li et al., 2018). Carbon disclosure does not have an economic benefit and may decrease the performance (Liesen et al., 2017). The study results support the studies by Li et al. (2018) and Liesen et al. (2017), as they indicate a negative relationship between Carbon Disclosure and Sales Revenue.

Furthermore, the correlation results from Table 4.3 show that carbon disclosure is positively correlated to Earnings per Share (EPS) and Return on Equity as measures of financial performance. According to Rohani, Jabbour and Abdel-Kader (2021) providing environmental impact information enhances the image of the firm and is associated with positive returns on the stock market.

The study findings from Table 4.3 support the study by Liu et al. (2017), which showed that there is no consensus on the impact of Environmental Disclosure on the

performance of a business. The findings in Table 4.3 imply that the link between Carbon Disclosure varies with each measure of financial performance. However, Gujarati (2004) noted that correlation does not imply causation and there is need to further establish the relationship between variables through other econometrics and statistical techniques.

In addition, according to Battaglia (2011), variables are considered to be strongly correlated when the coefficients range between 0.3 and 0.9 and weakly correlated when the coefficients are below 0.3. The study findings from Table 4.3 show that all the correlations coefficients are below 0.3 hence there are weak correlations between Carbon Disclosure and the independent variables. Weak correlation indicates that the relationship between variables may not be statistically significant when the regression model is run.

### 4.5 Co-integration

Co-integration shows whether the variables move together in the long run (Magazzino, 2012). The panel co-integration was conducted so as to determine whether there is a long run relationship between Carbon Disclosure and other independent variables (Sales Revenue, Return on Equity and Earnings per Share). Table 4.4, Table 4.5 and Table 4.6 below show the panel co-integration test results .

**Table 4.4: Objective 1 Panel co-integration test results**

| Dependent Variable | Independent Variable | Panel rho | Probability Value | Cointegration |
|---|---|---|---|---|
| CDP | REV | -1.452848 | 0.0731 | Yes |

The test results from Table 4.5 show that there is cointegration between Carbon Disclosure Performance and Sales Revenue. 6 out of 11 statistics show that there is cointegration between the variables (Appendix 3). The findings imply that there is a long run relationship between Carbon Disclosure and Sales Revenue.

**Table 4.5: Objective 2 Panel co-integration test results**

| Dependent Variable | Independent Variable | Panel rho | Probability Value | Co-integration |
|---|---|---|---|---|
| CDP | ROE | -2.047901 | 0.0203 | Yes |

The test results from Table 4.4 show that there is co-integration between Carbon Disclosure Performance and Return on Equity. 9 out of 11 statistics show that there is co-integration between the variables (Appendix 3). The findings imply that there is a long run relationship between Carbon Disclosure and Return on Equity.

**Table 4.6: Objective 3 Panel cointegration test results**

| Dependent Variable | Independent Variable | Panel rho | Probability Value | Co-integration |
|---|---|---|---|---|
| CDP | EPS | -1.927961 | 0.0269 | Yes |

The test results from Table 4.4 show that there is cointegration between Carbon Disclosure Performance and Earning per Share. 9 out of 11 statistics show that there is co-integration between the variables (Appendix 3). The findings imply that there is a long run relationship between Carbon Disclosure and Earnings per Share.

The study results from Tables 4.4, 4.5 and 4.6 shows that there is a long run relationship between Carbon Disclosure Performance and measures of performance. Carbon disclosure has a long term impact on business performance as it improves reputation and brand image (Lewandowski, 2017). The study results support the findings by Lewandowski (2017) as carbon disclosure is co-integrated with measures of financial performance.

## 4.6 Regression

Panel regression was conducted to establish the extent to which one variable influences the other. More specifically, regression quantifies the impact of one variable on the other.

**Table 4.7: Objective 1 Regression results**

| Dependent Variable | Independent Variable | Coefficient | t-Statistic | Probability value |
|---|---|---|---|---|
| REV | CDP | -0.091479 | -0.149013 | 0.8818 |
| REV | Constant | 18.1226 | 9.216864 | 0.0000 |

$R^2$= 0.0002 (*see Appendix 4*)

The study results from Table 4.6 show that Carbon Disclosure has a negative impact on the Sales Revenue of the firms. Table 4.6 shows that 1% improvement in Carbon Disclosure is associated with a 9.15% decline in Sales Revenue. According to Lewandowski (2017), Carbon Disclosure has positive effects on the market image and reputation which leads to increase in revenues and financial performance. The study

results contradict the findings by Lewandowski (2017), and show that carbon disclosure is inversely related to sales revenue.

Furthermore, the results from Table 4.6 show that the relationship between Sales Revenue and Carbon Disclosure is not statistically significant. Therefore the null hypothesis which states that there is no relationship between Carbon Disclosure and Sales is not rejected as the probability value is greater than 0.05 . This is corroborated by the low $R^2$ of 0.0002 which shows that 0.02% of the variations in Sales Revenue are explained by Carbon Disclosure. The results support the findings of the study by Martin, Yadiati, and Pratama (2018) which did not establish a relationship between Carbon Disclosure and Revenue.

According to Nobes (2012), the main determinants of Sales Revenue are the market share, marketing expenditures, price, product quality and brand image. The study findings therefore support the assertion by (Nobes, 2012) as carbon disclosure is not considered as having an effect on the sales revenue of the firms. Furthermore, Das and Bandyopadhyay (2016) noted that measuring the effect of environmental disclosure is difficult hence challenges are faced in quantifying its impact on the financial performance of an organisation. The results may indicate challenges in quantifying the impact of Carbon Disclosure on sales revenue as noted by Das and Bandyopadhyay (2016).

**Table 4.8: Objective 2 Panel regression results**

| Dependent | Independent | Coefficient | t-Statistic | Probability |
|---|---|---|---|---|

| Variable | Variable | | | value |
|---|---|---|---|---|
| ROE | CDP | 0.076706 | 0.252793 | 0.8009 |
| ROE | Constant | 17.74352 | 18.25735 | 0.0000 |

$R^2$= 0.0005 (*see Appendix 4*)

The study results from Table 4.7 show that there is a positive and direct relationship between Carbon Disclosure and Return on Equity. Specifically, a 1% improvement in Carbon Disclosure results in 7.67% increase in Return in Equity. The study findings are aligned to the studies by Liet et al. (2018) and Rohani, Jabbour and Abdel-Kader (2021) where a positive relationship was established. The legitimacy theory posits that disclosure of environmental information legitimatises the operations of a business and improves the social credibility thus improving the performance (Deegan & Gordon, 1996). Conversely, the study results contradict the legitimacy theory and show independence between Carbon Disclosure and Return on Equity.

However, the results from Table 4.7 indicate that the relationship between Carbon Disclosure and Return on Equity is not statistically significant. Thus the null hypothesis that there is no relationship between Carbon Disclosure and Return on Equity is not rejected . The low $R^2$ of 0.0005 further highlights that only 0.05% variations in Return on Equity are explained by Carbon Disclosure hence 99.95% of the changes are explained by other factors contained in the error term. Return on Equity is a complex measure of financial success which is dependent on other factors such as the profitability of the firm and the level of taxation (Saunders, Cornett & McGraw, 2012). Thus other factors have a significant bearing on the Return on Equity compared to Carbon Disclosure.

**Table 4.9: Objective 3 Panel regression results**

| Dependent Variable | Independent Variable | Coefficient | t-Statistic | Probability value |
|---|---|---|---|---|
| EPS | CDP | 0.076948 | 0.407017 | 0.6847 |
| EPS | Constant | 2.080286 | 3.43558 | 0.0008 |

$R^2$= 0.0001 (*see Appendix 4*)

The study results from Table 4.8 show that Carbon Disclosure has a positive relationship with Earnings per Share. Specifically, a 1% improvement in Carbon Disclosure results in 7.77% increase in Earnings per Share. The findings contradict the study by Kuo and Chen (2013), which found a negative association between Carbon Disclosure and measures of stock market performance measures. In addition, the study results support stakeholder theory which highlights that Carbon Disclosure positive influences financial performance.

However, the results from Table 4.8 indicate that the relationship between Carbon Disclosure and Earnings per Share is not statistically significant. Thus the null hypothesis that there is no relationship between Carbon Disclosure and Earning per Share is not rejected . The low $R^2$ of 0.0001 further highlights that only 0.01% variations

in Earnings per Share are explained by Carbon Disclosure hence 99.99% of the changes are explained by other factors contained in the error term. According to Pushpa, Bhatt and Sumangala (2012), Earning per Share is determined by the performance of the firm, competitors' performance, inflation levels and financial leverage. The study results imply that there is independence between Carbon Disclosure and Earnings per Share supporting the notion by Pushpa, Bhatt and Sumangala (2012) that some studies found no relationship between Carbon Disclosure and financial performance.

## 4.7 Conclusion

The chapter presented the study results on the relationship between Carbon Disclosure and measures of Financial Performance which are Sales Revenue, Return on Equity and Earnings per Share. The discussion and interpretation of the study results was based on both empirical and theoretical literature. The study results showed that Carbon Disclosure is negatively correlated to Sales Revenue and positively correlated to Return on Equity and Earnings per Share . Furthermore, the study results showed that Carbon Disclosure is cointegrated with Earnings per Share, Return on Equity and Sales Revenue. This implies that there Carbon Disclosure follows the same time path with Earnings per Share, Sales Revenue and Return on Equity.

However, the study results showed that the relationships between Carbon Disclosure and Return on Equity, Earnings per Share and Sales Revenue are not statistically significant. The results showed that Carbon Disclosure does not have an effect on Return on Equity, Sales Revenue and Earnings per Share. The study findings show that

there is independence between Carbon Disclosure and Return on Equity, Earnings per Share and Sales Revenue as dependent variables.

# CHAPTER FIVE

# CONCLUSION AND RECOMMENDATIONS

## 5.1 Introduction

Chapter Five contains the conclusion, summary of the study and the recommendations. The summary of the study and the study recommendations are primarily guided by the results of the study presented in Chapter Four. The summary of the study provides a recap of the entire study whilst the recommendations proffered highlight the ways to improve the financial performance of the organisations. The conclusion of the study serves as the end note and it highlights the contributions made by the study.

## 5.2 Summary of the study

The summary of the study is based on the findings of the primary study and literature.

### 5.2.1 Summary from literature

According to the Legitimacy Theory, when businesses perceive a loss of legitimacy as a consequence of a breach of the social contract, they will make appropriate social and Environmental Disclosures to reclaim their legitimacy. In response to global pressure,

firms engage in Environmental Disclosure to legimitise their operations. According to Stakeholder Theory, firms would use disclosure processes as a critical tool for preserving their legitimacy and meeting their stakeholders' expectations. According to Voluntary Disclosure Theory and Signaling Theory, firms with superior Environmental Performance will be motivated to disclose information about their good environmental practices in order to differentiate themselves from firms with inferior Environmental Performance and to signal their superior performance to investors.

Empirically, there is no consensus on the relationship between Carbon Disclosure and Financial Performance. The conclusions from empirical literature are significantly contrasting with positive, negative and uncorrelated results being found. The majority of early studies on Carbon Disclosure found a negative correlation supporting the views of conventional economists and classical theorists. Other studies found a positive correlation between Carbon Disclosure and performance although the correlation is inter-temporal, with the impact of Carbon Disclosure decreasing each year. The propensity to disclose carbon is correlated with an indicator of resource availability and that this relationship is stronger in developing countries, implying that a lack of resources is one of the reasons for these countries' lack of committed carbon reductions and disclosure.

### 5.2.2 Summary from primary study

Based on the research questions, the summary from the primary study is presented as follows:

**What is the relationship between the Corporate Carbon Disclosure and Sales Revenue?**

The correlation study results showed that there is a negative and inverse correlation between Carbon Disclosure and Sales Revenue. It implies that as Carbon Disclosure improves the Sales Revenue declines. The cointegration test results showed that there is a long running relationship between Carbon Disclosure and Sales Revenue. The regression test results further showed that there is a negative relationship between Carbon Disclosure and Sales Revenue where a 1% improvement in Carbon Disclosure is associated with a 9.15% decline in Sales Revenue. However, the results showed that the relationship between Sales Revenue and Carbon Disclosure is not statistically significant implying that the Carbon Disclosure does not have an effect on Sales Revenue. The null hypothesis that there is no relationship between Carbon Disclosure and Sales Revenue was not rejected.

**What is the link between Carbon Disclosure and Return on Equity?**

The correlation study results showed that there is a positive correlation between Carbon Disclosure and Return on Equity. It implies that Return on Equity increases as Carbon Disclosure improves. The co-integration test results showed that Carbon Disclosure and Return on Equity are co-integrated, establishing the presence of a long running relationship between the variables. Furthermore, the regression test results further showed that there is a positive relationship between Carbon Disclosure and Return on Equity. The regression results show that a 1% improvement in Carbon Disclosure is associated with a 7.67% increase in Return on Equity. However, the results showed that

the relationship between Return on Equity and Carbon Disclosure is not statistically significant implying that the Carbon Disclosure does not have an effect on Return on Equity. The null hypothesis that there is no relationship between Carbon Disclosure and Return on Equity was not rejected.

**What is the link between the Corporate Carbon Disclosure and Earnings per Share?**

The correlation study results showed that there is a positive correlation between Carbon Disclosure and Earnings per Share. The correlation results imply that as Carbon Disclosure improves, an increase in Earnings per Share is expected  The co-integration test results showed that Carbon Disclosure and Earnings per Share are co-integrated, establishing the presence of a long running relationship between the variables. Furthermore, the regression test results further showed that there is a positive relationship between Carbon Disclosure and Earnings per Share. The regression results show that a 1% improvement in Carbon Disclosure is associated with a 7.77% increase in Earnings per Share. However, the results showed that the relationship between Earnings per Share and Carbon Disclosure is not statistically significant implying that the Carbon Disclosure does not have an effect on Earnings per Share. The null hypothesis that there is no relationship between Carbon Disclosure and Earnings per Share was not rejected.

## 5.3 Recommendations

The study proffers the following recommendation based on the study results in order to improve the Financial Performance and Carbon Disclosure of the firms:

- **Transparent information sharing:** The study found that there is no statistically significant relationship between Carbon Disclosure and Financial Performance. According to Das and Bandyopadhyay (2016), it is difficult to establish the relationship between Carbon Disclosure and Financial Performance due to poor and subjective metrics to measure Carbon Disclosure which are widely used. The study therefore recommends the crafting of comprehensive Carbon Disclosure metrics which enable objective measurement of the variable and establishment of the statistically significant relationship with performance measures.
- **Stakeholder involvement:** Stakeholders are critical players who influence the Financial Performance of an organisation as well as the level of Carbon / Environmental disclosure (Schiemann & Weber, 2016). The study recommends the improvement in stakeholder involvement and engagement in order to improve the level of Carbon disclosure and Financial Performance.
- **Legal framework:** Legislations should be made in order to compel all organisation listed on JSE to disclose the impact of their operations on the environment. Therefore judiciary capacity to deal with poor disclosure is needed hence it legimitises the operations of the firms which improves market image and Financial Performance.

- **Diversification to green activities:** The study recommends that organisations diversify their activities to include environmentally friendly operations. Green activities improve the image of the firm in the market which leads to improvement in the financial activities. In addition, diversification to green activities motivates the organisation to engage more on Carbon Disclosure.

## 5.4 Conclusion

This study aimed to examine the relationship between Corporate Carbon Disclosure and Financial Performance of the top 30 companies listed in the FTSE”JSE Responsible Investing Index. One of the study objectives was to examine the relationship between Corporate Carbon Disclosure and Sales Revenue. The objective was achieved as the study results showed that Sales Revenue is negatively correlated to Carbon Disclosure although the relationship is statistically insignificant. Furthermore, another study objective was to evaluate whether Carbon Disclosure is related to Return on Equity. The objective was met as the regression results showed that the relationship between Carbon Disclosure and Return on Equity is statistically insignificant implying independence between the variables despite the negative correlation being established. The third objective of the study was to assess the link between the Corporate Carbon Disclosure and Earnings per Share. The objective was attained as the study results showed that Earnings per Share are negatively correlated to Carbon Disclosure although the relationship was not statistically significant.

The study has several managerial implications. The study showed that Carbon Disclosure does not have an impact on Return on Equity, Earnings per Share and Sales

Revenue. Therefore, measures other than Carbon Disclosure need to be targeted in order to improve the financial performance of the firms listed on the JSE. The study contributed to the existing literature on Carbon Disclosure and Financial Performance hence showed that there is independence between the variables. The main conclusion drawn by the study is that Carbon Disclosure does not influence Financial Performance thus Financial Performance is determined by other factors.

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