

**DURBAN UNIVERSITY OF TECHNOLOGY**



**THE IMPACT OF ENVIRONMENTAL REPORTING ON THE VALUE  
OF LISTED MANUFACTURING FIRMS IN SOUTH AFRICA**

**A Thesis submitted in fulfilment of the requirements of the degree of**

**Master of Accounting: Financial Accounting**

**in the Faculty of Accounting and Informatics at  
Durban University of Technology**

**Nolwando L Mgilane**

**(21639482)**

**2023**

## DECLARATION

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 All information cited from published or unpublished works has been acknowledged.

-----  
Nolwando L Mgilane

07 March 2023  
-----  
Date

## APPROVAL FOR FINAL SUBMISSION

-----  
Dr Haruna Maama  
(Supervisor)

07 March 2023  
-----  
Date

-----  
Dr Ferina Marimuthu  
(Co-supervisor)

07 March 2023  
-----  
Date

## **DEDICATION**

This thesis is devoted to my beautiful and warm-hearted mother, MaMthembu. To my most adorable sisters, Onesimo Mgilane, Sisispho Mgilane, Esona Phundulu and to my two wonderful brothers Malwande Mgilane and Lwandiso Mgilane. I just want to say it's all possible. My two best friends, Yonela Nyangule and Sinovuyo Cinani, and Lindokuhle Mkhwanazi, a good special friend of mine. Without their constant love and support throughout the duration of this thesis, I would not have reached this milestone.

## ACKNOWLEDGEMENTS

My heart is overflowing with unmeasurable gratitude to the Lord Almighty, to whom I owe my every existence for His infinite guidance and protection. The grace, love and wisdom he showed me throughout this thesis is beyond amazing.

I am extremely humbled by the amount of knowledge, support and love I have received from my Supervisor and Co-supervisor, Dr Haruna Maama and Dr Ferina Marimuthu, throughout my study. Dr Maama, I am still in awe of your undivided attention whenever I needed your insights and assistance and I do have to recognise that without your support, this thesis would not have been made possible. Your time is precious to me, and it did not go unnoticed. You really challenged me to think differently, resulting in a significant improvement in my confidence. You have pushed and inspired me to grow as an academic and as an individual. Together with Dr Ferina, you really groomed me to be the better person I am today.

My heartfelt gratitude also goes to the officials responsible for the NRF funding, without their amazing financial support, I cannot imagine how this project was going to be successful. A special appreciation goes to the Durban University of Technology's Department of Financial Accounting for granting me this amazing opportunity to further my studies in the Master of Financial Accounting.

Finally, to everyone that has helped me with any kind of support I say “Ndibamba ngazbini, nangomso”.

## **ABSTRACT**

Environmental reporting is a recent novelty in both corporate and academic fields around the globe. As a result, an increase in environmental pollution and degradation has raised many concerns from the stakeholders. Equally, the firms addressed these concerns through a proper disclosure in a form of annual integrated reporting which addressed how firm's day-to-day operations and production activities affect the environment, especially the environment of the location where firms operate, this reporting included the measurements implemented to mitigate the impact. On the 1<sup>st</sup> of March 2010, the JSE has passed a listing requirement which compelled all the listed firms and companies to also report on non-compliance and compliance of environmental and social aspects. This JSE listing requirement was prompted by the assumption that the annual financial statements, also referred to as traditional reporting, only served the interest of investors with financial interest. However, the question of whether the disclosure of environmental reporting impacts firm value remains unanswered. Therefore, this study aims to investigate the impact of environmental reporting on the value of South African manufacturing firms listed on the Johannesburg Stock Exchange (JSE). A content analysis was utilized to attain the environmental reporting information from the integrated annual reports of listed manufacturing firms from 2016 to 2020. These reports were retrieved from the companies' websites. Both descriptive and Wilcoxon-signed ranked test was used to test the extent and the movement of environmental reporting practices of South African listed manufacturing. Furthermore, this study adopts regression techniques to test the association between environmental reporting and firms' profitability. The findings of this study further indicated that the environmental reporting practices implemented by manufacturing firms increased gradually over time. The evidence further showed a significant negative relationship between environmental reporting and return on equity (ROE) and a positive but insignificant relationship with ROA. Lastly, this study documents that environmental reporting negatively affects firm value. The study further demonstrated that environmental reporting is mainly adopted to conform with JSE listing requirements and not for accountability purposes. As a result, it is recommended that South African listed manufacturing firms must develop a technique that will assist in knowing and understanding the desires of primary and prominent stakeholders to disclose relevant environmental reporting information to the relevant stakeholders, as this can increase the trust between stakeholders and manufacturing firms.

## TABLE OF CONTENTS

DECLARATION.....	ii
DEDICATION.....	iii
ACKNOWLEDGEMENTS .....	iv
ABSTRACT .....	v
LIST OF FIGURES .....	ix
<b>CHAPTER ONE INTRODUCTION.....</b>	<b>1</b>
1.1 Background to the Study .....	1
1.2 Conceptual Context of the study .....	3
1.3 Research Problem.....	4
1.4 Aim of the Study .....	6
1.4.1 Objectives of the study.....	6
1.4.2 Research questions.....	6
1.5 Contribution or significance of study.....	6
<b>CHAPTER TWO LITERATURE REVIEW .....</b>	<b>8</b>
2.1 Introduction .....	8
2.2 Conceptual literature Review .....	8
2.2.1 The Concept of Environmental Reporting.....	8
2.2.2 Conceptual Linkage between Environmental Reporting and Firm Performance.....	11
2.3 Empirical Literature Review .....	24
2.4 The Theories underpinning the Study .....	28
2.4.1 Legitimacy theory .....	28
2.4.2 Stakeholder theory .....	31
2.4.3 Agency Theory.....	32
2.5 Conceptual Framework .....	33

2.6	Summary of the Chapter .....	35
<b>CHAPTER THREE METHODOLOGY .....</b>		<b>36</b>
3.1	Introduction .....	36
3.2	Research Design .....	36
3.3	Research Approach .....	37
3.4	Target Population of the study .....	39
3.5	Sampling and Census .....	40
3.6	Data Collection Procedure .....	40
3.7	Content Analysis .....	41
3.8	Data Analysis Method .....	42
3.9	Econometric Model .....	43
3.10	Validity and Reliability .....	45
3.11	Choosing Between Random and Fixed Effects .....	46
3.12	Ethical Consideration .....	46
3.13	Conclusion of the Chapter .....	47
<b>CHAPTER 4 DATA ANALYSIS, INTERPRETATION AND DISCUSSION ....</b>		<b>48</b>
4.1	Introduction.....	48
4.2	Descriptive Results.....	48
4.3	Multicollinearity Test.....	50
4.4	The Level and Trend of Environmental Reporting.....	52
4.4.1	Impact of Environmental Reporting on Return on Assets.....	57
4.4.2	The Impact of Environmental Reporting on Return on Equity.....	61
4.4.3	Impact of Environmental Reporting on Firm Value .....	66
45	Summary of the Chapter .....	73

<b>CHAPTER 5: SUMMARY, CONCLUSION AND RECOMMENDATIONS .....</b>	<b>74</b>
5.1 Introduction.....	74
5.2. Summary of the study .....	74
5.3. Summary of the Major Findings and Conclusion .....	76
5.4 Recommendations and Implications of the Study .....	78
5.5. Limitations and Suggestion for Further Studies .....	80
<b>REFERENCES.....</b>	<b>81</b>



## **LIST OF FIGURES**

Figure 2.1: Conceptual framework .....	34
--	----

## **LIST OF TABLES**

Table 4.1: Descriptive statistics .....	49
Table 4.2: Correlation results.....	51
Table 4.3: The Level and trend of environmental reporting practices.....	52
Table 4.4: Wilcoxon signed ranked test Results .....	53
Table 4.5: Impact of Environmental Reporting on Return on Assets.....	57
Table 4.6: Impact of Environmental Reporting Components on Return on Assets.....	58
Table 4. 7: The Impact of Environmental Reporting on Return on Equity .....	61
Table 4. 8: The Impact of the Combined Environmental Reporting on Return on Equity .....	62
Table 4. 9: Impact of Environmental Reporting on Firm Value.....	67
Table 10: The Impact of Combined Environmental Reporting on Firm Value.....	68

# CHAPTER ONE

## INTRODUCTION

### 1.1 Background to the Study

Manufacturing firms contribute more to stimulating South Africa's economic growth and development by contributing to a high advancement that boosts the value of the economy (Mandler *et al.* 2021). The manufacturing process includes value chains that incorporate the extraction and transformation of raw materials into finished goods (CFI, 2020). During the 18<sup>th</sup> century, industrial revolution took place in western countries due to the origination of innovative technologies and manufacturing mechanisms to intensify productivity and all that has prompted a high volume of manufacturing industries in both developed and underdeveloped countries such as South Africa. A growing manufacturing industry has resulted to environmental issues such as environmental pollution, water pollution, air pollution, resource depletion and climate change, amongst others. In some cases, the unconsumed materials or inputs that could not be properly processed during production would destroy the environment when it is negligently discarded. This could result in an increase in carbon emissions as a consequence of the leaking of solid fuels and other chemical substances (Domínguez, Mares and Hernández 2021; Tahajuddin *et al.* 2021). These issues affect firms in facilitating their business activities. The mentioned environmental problems have attracted the undivided attention from the stakeholders of the high society, this is supported by Deswanto and Siregar (2018) and Nishitani and Kokubu (2020). As a result, environmental pollution became a central matter in society, resulting in civil society stakeholders demanding that firms take responsibility for the environment where firms conduct their daily production operations (Acar and Temiz 2020; Lear *et al.* 2021). Thus, firms had to disclose the mitigating measures and practices taken in cleaning and preserving the environment by adopting environmental reporting that is attainable to every interested stakeholder (Tahajuddin *et al.* 2021).

Environmental reporting is a type of mechanism that emerges in an attempt to factor in the environmental impacts of firms' operations. Maama and Appiah (2019b) channelled the idea that financial reporting alone is no longer an ultimate method to communicate firms' performance across different spectrums of the business, as investors and stakeholders also put pressure on firms to disclose how their business activities impact on the environment and

society. Hence, environmental reporting has been gaining popularity and importance across the world, all because of firms' undeniable impact to the environment.

This field of environmental reporting is attaining overwhelming recognition in both academia and emerging economies. Additionally, various researchers have conducted studies in this domain, testing the relationship between environmental reporting and firm performance and firm value. However, their findings are contradicting one another, meaning that the argumentation is still on-going. Academic findings are either positive (Lee and Yeo 2016; Lee and Klassen 2016; Bose *et al.* 2017; Zhou, Simnett and Green 2017; Saini and Singhanian 2019; Sharma, Bhattacharya and Thukral 2019; Agudelo, Johannsdottir and Davidsdottir 2020) or negative (Baboukardos and Rimmel 2016; Jeroe 2016), yet some authors found no link at all (Chetty, Naidoo and Seetharam 2015; Cortesi and Vena 2019). In a study by Maama (2021), the author found that environmental accounting is an outflow of money and can be costly to the business. Whilst some authors such as Agudelo, Johannsdottir and Davidsdottir (2020) hold that firms benefit from environmental accounting in terms of a good public image which attracts investors and improves their financial performance, these findings remain inconclusive, which might be because of the different kinds of methodological approaches adopted by researchers in conducting their studies. Hence the enthusiasm to investigate the impact of environmental reporting on the value of listed manufacturing firms in South Africa.

This study was conducted amongst South African manufacturing firms that are listed on the Johannesburg Stock Exchange. The firms listed on the JSE were selected because King Code IV requires all listed firms to publish annual integrated reporting, which is made available in the public domain and was attainable for this study. This makes South Africa the only country in Africa and amongst only a few in the world that mandates firms to provide such information. Quantitative research was adopted for this study. Environmental reports collected from a selected 50 manufacturing firms were analysed using statistical and econometric regression models. Additionally, an evaluation matrix was adopted where environmental responsibility reporting, environmental degradation reporting and social responsibility reporting were regarded as the components that were used to ensure validity of data collection, these components of environmental reporting were used as they are, there were no subtitles that fall under each component meaning that they were attended at a broader context. This gave the researcher the flexibility of including any relevant and useful information under each

component respectively. Database such as McGregor BFA was also relied upon for financial performance and firm value data.

## **1.2 Conceptual Context of the study**

The rapid increase of environmental awareness in society has led to an increase in the role of the importance of environmental reporting. Various authors have explained the term ‘environmental reporting’, and it seems very broad with countless definitions (Finau 2020). Firstly, Maama and Appiah (2019) define environmental reporting as an accounting practice that provides information that demonstrates firms’ contribution to economic prosperity and considers all the estimated expenditure incurred as a remedial tool to diminish the negative impacts caused on the environment and society as a result of day-to-day business activities. Similarly, Agudelo *et al.* (2020) define environmental reporting as a system that demonstrates firms’ non-financial information about the social, environmental and economic aspects of firms.

In essence, environmental reporting is also known as ‘environmental accounting or green accounting’, which serves as an avenue through which firms report and disclose their environmental and societal involvement projects to the public domain. It is a firm’s mechanism to communicate its diverse activities pertaining the environment, society and the connection with the community of its location. As a result, environmental reporting targets attaining sustainable development by maintaining a complementary relationship with the community and pursuing the most advantageous and legitimate environmental activities that contribute to the successful environmental conversation and economic growth of societies (Marrone *et al.* 2020). The researcher’s main interest in this study is to scrutinize the motives that drive JSE-listed manufacturing firms’ devotion to environmental reporting.

Historically, many large organisations seemed to have neglected the importance of taking responsibility for preserving the environment (Dkhili 2018; White, Habib and Hardisty 2019). As a result, when environmental issues around the world became more complex, preventative measures and solutions were formed and implemented by developed countries (Deswanto and Siregar 2018). As time passed, these preventive measures were also adopted by developing countries. These preventative measures emphasized the importance of environmental reporting for both firms’ operations and stakeholders (Schaltegger and Burritt 2017). From this

perspective, environmental reporting is the disclosure of information relating to firms and their relationship with the environment (Agudelo *et al.* 2020). It provides information about how a firm's activities affect the environment and the measurements taken to forestall such impacts. Understanding the surroundings in which the firm operates is an essential tool to determine relevant supporting community activities and projects to engage in as a practice of environmental accounting (Zhou *et al.* 2017).

Industries that operate close to their customers usually feel pressured to portray a good image (Babu *et al.* 2020). Indeed, firms have a very strong connection with their local communities, especially when customers and managers reside in firms' location of trading. Therefore, in recent times, environmental information disclosures that are found in firms' annual integrated reports are regarded as the most significant to the public as environmental concerns have captured the attention of the business community and the general public (Emmanuel and Ifeanyichukwu 2021; Igbekoyi *et al.* 2022). Thus, environmental reporting identifies the use of resources and plays a vital role in measuring the expenditure of a company as a result of the economic impact it causes on the environment. Some scholars referred to it as 'green accounting or environmental accounting', which makes it possible to measure the extent to which the company may have affected the environment, followed by the publication of such information to meet the needs of the interested stakeholders (Nicholls 2020). The stream of recent considerations advocates the idea that the demand for firms to publicise environmental data is a result of the wide range of interested institutions in environmental or non-financial disclosures, which include government, financial subordinates' officials, investors and financial analysts after the realisation of the severe impact of environment pollution on communities (Olayeni *et al.* 2021).

### **1.3 Research Problem**

Stakeholders are increasingly demanding that firms provide information on how their business activities affect society and the environment because companies' operations negatively impact the environment and society (Adudelo *et al.* 2020). It is, therefore, essential that firms provide information on how they are taking care of the environment. This has resulted in several companies providing information on their environmental activities in their annual reports in many countries. In South Africa, the King IV Code of Corporate Governance enjoins firms to provide information on their environmental, social and governance information in their annual

reports, called integrated reports (Ackers & Eccles, 2015). However, there is no standard on which set of information to provide in the reports (Beretta *et al.* 2019), thus allowing firms the flexibility on what information to provide on reports in response to stakeholders' demands. Despite the novelty of environmental reporting practices, there have been concerns about whether it is beneficial to the firms to adopt it, given that it is costly.

In prior studies, researchers expressed different views and findings concerning environmental reporting. Firstly, Maama (2021) holds that adopting environmental reporting depletes resources and is costly to firms. Confirmatory to the study conducted by Ruan and Liu (2021), where the findings revealed a significant negative relationship between environment, social, governance activities and firm performances, the researcher further clarified that implementing environmental and socially friendly activities can result in financial burdens for firms. Conversely, Chen (2021) and Mohammad (2021) stated that environmental reporting minimises environmental violations and promotes a competitive advantage, and greater environmental performance can strengthen firms' long-term performance or value. The related study conducted by Lee and Yeo (2016) and Zhou *et al.* (2017) revealed that the inclusion of environmental and social information to the integrated annual reports provide a concise, holistic account of firm's value and performance for short-, medium-, and long-term capacity for value creation.

These conflicting views have raised issues on whether firms benefit from environmental accounting. However, the perused previous South African papers in this study have focused on all the listed firms in South Africa, the findings of these studies might have been influenced by the nature of all listed companies. Meanwhile, certain firms such as financial services, and technology firms, may have minimal or no direct carbon footprint or negative environmental impact. This might have affected the results of the prior studies, as such firms may still have a section on environmental impact in their integrated annual reports. The present study recognises the effect of manufacturing firms on the environment. In essence, a gap in extant knowledge is identified in this study. Hence the main aim of this study is to investigate the impact of environmental reporting on the value of listed manufacturing firms in South Africa. Furthermore, the current study is expected to contribute to the existing literature and to the ongoing debate in the field of environmental reporting.

## **1.4 Aim of the Study**

The main aim of this study is to investigate the impact of environmental reporting on the value of manufacturing firms listed on the Johannesburg Stock Exchange (JSE).

### **1.4.1 Objectives of the study**

This study aims to achieve the following specific objectives:

- To assess the environmental reporting practices of manufacturing firms listed on the JSE.
- To examine the relationship between environmental reporting and the profitability of manufacturing firms listed on the JSE; and
- To investigate the impact of environmental reporting and the value of manufacturing firms listed on the JSE.

### **1.4.2 Research questions**

The following research questions guide the study:

- What are the environmental reporting practices of manufacturing firms listed on the JSE?
- What is the relationship between environmental reporting and the profitability of manufacturing firms listed on the JSE?
- What is the impact of environmental reporting on the value of manufacturing firms listed on the JSE?

## **1.5 Contribution or significance of the study**

The environmental reporting field has made a remarkable history in the research domain, which captivated an emerging universal bunch of scholars (Dumay *et al.* 2018). In particular, rapid growth in the number of scholars shifted concentration onto different environmental accounting problems in developing countries. Hence, the findings of this study will significantly benefit various stakeholders, such as the management of manufacturing firms, the government and its institutions, and researchers interested in the field. Firstly, the management of manufacturing firms will know the financial implications of environmental reporting. If it is proven that it improves their financial performance, firms will commit more resources to environmental reporting practices. In addition, the findings of the study will help the government in its policy

formulation and guidance on the financial reporting of firms. Furthermore, the findings will serve as a reference for researchers conducting studies in environmental reporting or a similar field. More significantly, the study will contribute to the foregoing debate in environmental reporting.

## **1.6 Organisation of the study**

This study comprises five chapters, as follows:

Chapter 1 provided the introduction and overview of the study, problem statement, the research objectives, and a detailed presentation of present literature.

Chapter 2: Provides the literature review of the study and explores various secondary sources that allow for the exploration and construction of a more detailed theoretical framework.

Chapter 3: This chapter illustrate in detail the research methodology and design adopted in this study.

Chapter 4: The chapter focuses on the discussion of data analysis that was used to analyse the current study into detail.

Chapter 5: The conclusion of the study based on the findings and empirical methods of the dissertation is provided in the final chapter.



## **CHAPTER TWO**

### **LITERATURE REVIEW**

#### **2.1 Introduction**

This study aims to investigate the impact of environmental reporting on the value of JSE-listed manufacturing firms in South Africa. Thus, this present study addresses the critical research question, which is as follows: What is the impact of environmental reporting on the value of South African JSE-listed manufacturing firms? Chapter one provided an introduction and overview of the present study; it further stated the problem statement, which highlighted the existing gap that supported the need for this study. The research aims, objectives, research questions were stated, and the expected contributions of this project on its completion. Therefore, the present chapter reviews the previous related studies of environmental reporting and firm value. Accordingly, the components or topics that support the theory of environmental reporting will be explored and discussed thoroughly. These concepts include mandatory and voluntary environmental reporting; the theory and the requirements of the King Code of Corporate Governance; Triple Bottom Line, Sustainability Reporting and Global Reporting Initiative Guide Standards. The empirical literature review from different studies with different findings will be discussed. Finally, the theoretical literature will be discussed by utilizing the three (3) theories underpinning the study, namely, agency theory, stakeholder theory and legitimate theory, to depict a holistic understanding of environmental reporting.

#### **2.2 Conceptual literature Review**

##### **2.2.1 The Concept of Environmental Reporting**

Throughout the past three (3) decades, the conception of corporate environmental reporting was initiated, and it has swiftly captured great attention from different stakeholders such as government, international bodies and other related associations, and has demanded firms' accountability towards the environment. The rules and restrictions were introduced to ensure a proper and steady implementation amongst the firms. (Deswanto and Siregar 2018) Lu *et al.* 2018; Zhang *et al.* 2019). In view of this, it is evident that it takes a while to redeem or renew natural resources after depletion (Mihalciuc and Apetri, 2019). In this instance, it is therefore essential to prevent and protect against the environmental deterioration that occurs as a result of massive population growth and industrialization (Gao *et al.* 2017; Ye, Wang and Lu 2021;

Zhou, Wang and Yuen 2021) Lee and Klassen, 2016). Ultimately, current corporate accounting disclosures could not present environmentally related information to satisfy the users' non-financial information needs; hence, environmental reporting emerged in an attempt to lessen the demands of the republic by reporting on environmental reporting information. (Eccles *et al.* 2015; Baboukardos and Rimmel). Subsequently, companies and other corporate organisations began to indicate their commitment to maintaining their environmental performance to keep up with stakeholder demands (ACCA, 2004; ACCA, 2010).

In the opinion of Maama (2020), the meaning of the term 'reporting' should be reviewed in its primary context. Several authors have played around with the definition of environmental reporting. Alternatively, in terms of Baron (2014), reporting is the process of disclosing or presenting all the information pertaining to the activities, projects and programmes that a firm initially undertakes in compliance with social and environmentally aspects of firms that promotes a friendly environment for the civil society, resulting to a significant impact on the economic decisions of investors (Maama and Marimuthu, 2021). Hence, it is presumed that listed firms are in the spotlight of investors, considering all the factors and circumstances mentioned above. That being so, Stolowy and Paugam (2018) and (Jackson *et al.* 2020) also defined environmental reporting as an endorsed presentation of information that discloses a firm's environmental performance. Hence, environmental reporting refers to public disclosure of environmental performance-related information in a single document as the presentation or disclosure of annual financial statements (Akparhuere, 2019), and environmental reporting information is found under the section of sustainability reporting.

In this perspective, environmental reporting is the disclosure of information relating to firms and their relationship with the environment (Adudelo *et al.* 2020). Moreover, Trumpp *et al.* (2015) define environmental information as a presentation of all the information that shows the relationship between a firm's social, environmental and corporate activities to different interested stakeholders, such as users of the financial statements. Scarpellini *et al.* (2020) also emphasise that adopting environmental reporting information is significant because firms' non-financial information is an achievement of investors' guidelines, yielding a high competency of firms (Borowy 2019).

Concerning the discussed environmental reporting definitions, it is evident that the adoption of environmental reporting may be either advantageous or disadvantageous to the financial

performance of firms. It provides information that discloses how firms' production operations affect the environment and the measurements taken to forestall such impacts. Understanding the surroundings in which the firm operates is an essential tool to determine relevant supporting community activities, as well as projects to engage in as a practice of environmental accounting (Zhou *et al.* 2017). Industries that operate close to their customers usually feel pressured to portray a good image (Babu *et al.* 2020). Indeed, firms have a strong connection with their local communities, especially when customers and managers reside in firms' location of trading. Hence, in recent times, environmental information disclosures found in firms' annual integrated reports are regarded as the most significant mechanism for responding to stakeholders' demands (Igbekoyi *et al.* 2022). Environmental reporting plays a vital role in measuring the expenditure of a firm's environmental and social impact that it causes to the environment. Some scholars refer to it as green accounting or environmental accounting, which makes it possible to measure the extent to which the company may have affected the environment, followed by the publication of such information to meet the needs of the interested stakeholders (Stjepanovic *et al.* 2017). The stream of recent considerations supports the idea that the demand for firms to publicise environmental data is a result of the wide range of institutions interested in environmental or non-financial disclosures, which include government, financial subordinates' officials, investors and financial analysts after the realisation of the severe impact of environment pollution on the community (Olayeni *et al.* 2021).

According to Das (2017), environmental reporting is the umbrella concept that covers legal, financial, technological and scientific aspects. From this point of view, environmental reporting can be qualitative or quantitative. Moreover, environmental reporting is said to be an accountancy sub-division, and its main priority is not only based on firms' shareholders but also on all other interested parties (Demirel and Eskin 2021). The main highlight regarding environmental disclosure is that some companies are seen as environmentally sensitive. Those firms are perceived to impose high pollution levels because of their nature and production levels (Baalouch, Ayadi and Hussainey 2019). This point suggests that firms or industries with highly intensive environmental deterioration have to enhance high disclosures of environmental reporting to keep up with stakeholder pressures (Gao *et al.* 2017; Lin *et al.* 2017). In the last decade, a growing concern among stakeholders over environmental

sustainability has been discovered, which has led to an increase in the adoption of environmental reporting by the majority of firms (Li *et al.* 2018).

In terms of King code reporting principles, the publication of firms' environmental affairs is to be practiced transparently, allowing a detailed demonstration of performance in the form of triple bottom-line aspects (Chvileva and Golovina 2017). Additionally, the Global Reporting Initiative remains the most recognised and applicable practice worldwide, and this is supported by GRI G4, which sheds a light and advanced understanding of the key principles of reporting and environmental disclosure requirements. In the last few decades, the disclosure of environmental reporting has been voluntary. Still, due to an increase in levels of industrial evolution, and firm rules in some areas across the world, it has transitioned into compelling mandatory firms to abide by all the environmental legislation passed to lessen the degradation of the environment by firms (Fang, Wei and Logan 2017; Meech and Bayliss 2021). Furthermore, when the disclosure transforms from a voluntary to a mandatory framework, its function and materiality attributable to the environmental features will shift, and firms and other institutions are expected to follow this rhythm as results (Balluchi, Lazzini and Torelli 2021).

### **2.2.2 Conceptual Linkage of Environmental Reporting and Firm Performance**

Although authors have conducted different studies testing the possible relationship between environmental reporting and profitability, the literature remains inconclusive. This has resulted in a continuous debate among scholars (Buschand Friede., 2018). Maama (2020) argue that the provision of environmental information costs firms additional resources; hence it does not benefit firms. This point of view has been confirmed in a study by Sekhon and Kathuria (2019).

Additionally, the primary objective of any profit organisation is to generate profit and maximise shareholders' value while keeping up with environmental demands from society and therefore remain socially responsible (Kiliç *et al.* 2015). Furthermore, the firms' main aim is to maximise profits and shareholders' wealth. Conversely, Nguyen *et al.* (2020) argue that firms benefit in terms of gaining a market share and increased profitability as a result of investing in activities that improve the environment. In a related study conducted by Cantele and Zardini (2018), the authors found a positive association between environmental performance and financial performance. The authors further put forward that environmental and social

sustainability practices lead to a competitive advantage in the industry and improve corporate reputation and customer satisfaction. Socoliuc *et al.* (2018) also pointed out that firms that engage in environmental reporting also benefit in terms of conditions for business building. Jiang *et al.* (2018) argued that based on the Organizational Theory point of view, the green firm-level strategic orientation positively affects firms' performance in China.

In recent considerations, Pucheta-Martínez *et al.* (2020) investigated the "mediating role of firms' performance" on whether the stakeholder engagement policies of firms influence the disclosure of environmental reporting. The findings of this paper suggested that firms that are trading closely with their stakeholders are hypothetically expected to report on environmental their affairs of the environment in a document called sustainability reporting. Alternatively, it has been confirmed that environmental reporting is part of the accounting system that adopted a non-numerical method of reporting, also known as non-financial information, that measures the environmental costs and achieves the desirable interest of stakeholders (Nguyen *et al.* 2020). Thus, Fatemi *et al.* (2018) reported that environmentally friendly activities could improve the management team's capabilities and the firm's potential to attract qualified employees. Therefore, environmental reporting information is seen as complementary to financial information, and it is also an essential factor in both strategic planning and decision-making; it reduces the impact of risk and uncertainties attached to specific investment processes (Nordengren and Cedlöf, 2021; O'Dwyer and Unerman, 2020).

Moreover, such activities can improve firms' image and better relationships with stakeholders (Brooks and Oikonomou, 2018). This implies that an environmentally responsible firm stands a chance to present favourable environmental reporting information to the public (Kim and Lyon, 2015). However, it has been noted numerous times that some economic entities publish environmental reporting information only to conform with official laws and regulations (Aldaz *et al.*, 2015; Balluchi *et al.*, 2021). Environmental reporting differs from firm to firm and varies in accordance with the nature, sector and capacity or size of the firm (Garg and Kumar, 2018; Christ and Burritt, 2013). According to the users of environmental information, environmental reporting is divided into three divisions: environmental, financial accounting and environmental management accounting. Various researchers from different sides of the continent have provided that environmental reporting results in many benefits, such as advanced economic and environmental efficiency. Thus, environmental reporting is an

essential accounting tool for the state of environmental affairs in global sustainable development, particularly for environmentally responsive firms, especially those in mining and manufacturing (Nguyen *et al.* 2020). In confirmatory to Wang *et al.* (2019), managers play a major role in implementing environmental reporting, and it is said that senior executives' support is vital. This emphasises that corporate socially and environmentally responsible firms may enjoy the benefit of lower costs of capital (García-Sánchez *et al.* 2021). Thus far, firms that volunteer to disclose their environmental reporting information in countries where the environmental reporting is not mandated obtain positive responses from potential and existing investors (Martin and Moser, 2016). This can assist in decision-making for the overall performance of firms to improve performance and add value to the firm.

In accordance with Braam *et al.* (2016), environmental reporting disclosure is important in challenging stakeholder condemnation and gaining corporate legitimacy. Dong *et al.* (2014) and Śmiechowski and Lament (2017) also championed that an increase in environmental engagement activities and disclosure of such programmes eventually results in great support in terms of a good image towards the societies, as well as acquiring stakeholders' affirmation. On that account, Cormier and Magnan (2015) advocated that shareholders are likely to regard environmental expenditure as firms' additional costs that may negatively affect the firms' earnings and, eventually, the firm value. However, diverse authors have emphasised that the cost of environmental reporting should be assessed against the potential benefits derived from the deployed initiatives (Huang and Kung 2010; Guidry and Patten 2012; Groening and Kanuri 2013). Environmental reporting provides more condensed, accurate and relevant information and assured transparency to respective groups of stakeholders (Baboukardos and Rimmel 2016; Manes-Rossi *et al.* 2018; La Torre *et al.* 2020; Raimo *et al.* 2020).

### **2.2.2.1 The Development and Purpose of Environmental Reporting**

The focus from traditional financial reporting, which is generally recognised as annual financial statements, has swiftly moved to environmental reporting as a way to meet the demands of investors (Batista and Francisco 2018; Hoang 2018; Shad *et al.* 2019; Mans-Kemp and van der Lugt 2020; Nicholls 2020; Balogh, Srivastava and Tyll 2022). While traditional annual financial reports address the financial aspects of firms, environmental reporting is a disclosure of environmental and social information (Rupley, Brown and Marshall 2017; Maama and Appiah 2019a). Environmental reports differ from firm to firm and is primarily influenced by

factors such as the nature of the firm, size, and age, amongst others (Drempetic, Klein and Zwergel 2020; Zahid *et al.* 2020). As a result, previous studies of this discipline revealed findings that support the idea of elevated disclosures, authors further suggested that it is advantageous in terms of higher credit ratings (Heflin *et al.* 2011).

Mass production is one of the highlighted results which has led to the surfacing of the alliance across economic benefits with social ethics and environmental transparency. Respectively, firms' ultimate goal is not only to maximise profit but also address environmental and social concerns. In consonance with these new developments, as of 1980s environmental reporting has been gaining a remarkable recognition (Alipour and Ghanbari 2019; Alipour *et al.* 2019). Khan (2016) also revealed that studies in 2014 highlighted that more than 7000 companies across the world adopted environmental reporting. It is further stated that the roots of conceptual environmental reporting were uncovered through two main different frameworks: in South Africa the King Report on Governance for South African companies (King III) and the Global Reporting Initiative IV (Narula *et al.* 2021). Thus, in South Africa, the journey of integrated annual reporting commenced in 1994 and the first King Code of corporate governance was released, officially known as King Code I, named after Professor Mervyn King.

The year 1997 is considered as a boom period whereby several environmental reporting related studies were conducted. In practice, environmental reporting is a detailed report of firms' environmental performance which illustrates firms' policies, practices and anticipated future direction (Deegan 2019; Maama and Mkhize 2020b). From this perspective, the central objective of environmental reporting is to communicate firms' environmental performance to the relevant stakeholders (Hoang 2018; Balogh, Srivastava and Tyll 2022; Vallone 2022). Environmental pollution sounded the alarm to the stakeholders of civil society, and as a result firms had to introduce measurements such environmental practices which included corporate social responsibility in accordance with environmental reporting to control the damage (Acerete, *et al.* 2019). It then came into the picture that there is necessity for firms to implement conservation and preservation measures to lessen their impact on the environment for the future consumption of natural resources (Fernando *et al.* 2019; Chaklader and Gulati 2015).

Massive pollution and the degradation or omissions of the environment as well as other external factors that affect the social wellbeing of the residents and environmental surroundings had to

be addressed. Hence the urge for firms to provide documented evidence on how they contribute to maintaining an adequate environment, which allows for a continuity and succession of natural resources without compromising the quality of life especially where firms are operating closely to the community stakeholders (Porchelvi., 2019). This makes environmental reporting a medial and leading approach to communicate the impact caused as a result of firms' operations, and all possible remedial measurements and practices that are put in place to mitigate the effect. As a results, this fundamentally benefits societies in terms of economic growth, sustainability and development (Akparhuere. 2019; Mihalciuc and Apetri. 2019; Sarea 2020; Rahman and Alsayegh 2021). For this reason, it results in an increase in market share together with a faithful and reliable firm image to the communities and a strong relationship between firms and stakeholders. Environmental reporting plays a vital role in minimizing risks and improving shareholders' decision-making (Cosofret, 2020; Das, 2017; Burritt and Schaltegger, 2010; Dyllick and Muff, 2016; Wangombe, 2013). Thus, it is advantageous for firms to operate closely with their community stakeholders as this makes it easy to observe the needs and responses of community members with respect to the firms' operations. On that account, firms voluntarily prepared public reports and issued them to the interested stakeholders as a manifestation on how firms are legalizing their activities.

The next aspect of environmental reporting was integrating the reporting for environmental issues with some fields of sustainability, such as economic and social sustainability. Amongst the integrated fields, environmental reporting attracted more attention in recent years. As a result, many companies commenced the preparation of many reports with different environmental information that is useful for the knowledge of stakeholders. The main objective was to find a better approach to publishing various information across all the relevant stakeholders. In respect of this viewpoint, all the relevant financial and non-financial information across all spheres was later merged into a single report called integrated reporting (IR). The International Integrated Reporting Council then stimulated IR and within the integrated report, environmental reporting associated information is found.

In the majority of countries, environmental reporting is entirely voluntary and there are no legal requirements to follow. However, it has become difficult to resist its adoption because large companies are more concerned about their reputations, most especially in highly developed countries where these companies experience high political visibility. As it is technically



voluntary, companies can theoretically adopt any approach to environmental reporting that they like, but in practice, a number of voluntary reporting frameworks have been adopted. The best known and most common of these is called the Global Reporting Initiative (or GRI) and the Integrated Reporting Framework.

#### **2.2.2.2 Effect of Mandatory vs Voluntary Environmental Disclosure on firms**

In consideration of the widespread impact on the environment imposed by firms while conducting their business activities, firms are increasingly required to disclose environmental information because stakeholders are more alert to the environmental responsibilities of firms (Lu *et al.* 2018; Pu *et al.* 2019). Therefore, it is essential that firms present the measurements they put in place in order to forestall the impact and also disclose all the information concerning the environment to keep up with the increasingly demanding stakeholders for the provision of that information. This ought to yield a complete performance across all spheres of the firms. However, in many countries, environmental reporting is still voluntary (Maama, 2020). Nonetheless, in South Africa after 2010, it became mandatory for all firms listed on the Johannesburg Stock Exchange to disclose integrated information (Moloi, 2014). This is in accordance with ‘apply and explain approach’ (Caglio, Melloni, and Perego, 2020). Additionally, this requirement does not give directions concerning the type of environmental or social practices to report, for instance, performance formats to be disclosed. This requirement is not regulated or standardised by the government (ACCA, 2014) and does not require independence or validation from external bodies or parties such as auditors.

As maintained by the literature, there are two things which could lead to poor or inadequate execution and disclosure of environmental information. The first reason could be that the environmental laws and regulations are weak and abortable. Another reason is that firms are concerned more about the cost and benefit that could be derived from the implementation of environmental information and this opinion is favoured by Matsumura *et al.* (2013). Moreover, environmental reporting information is made easily attainable to the public domains. This suggests that this may threaten firms’ competitive advantage, and financial performance will be at risk because everyone can see the firm's financial and non-financial particulars. Also, an increase in costs, such as litigation costs due to errors and ambiguous information in presenting environmental information, could be very costly to the firms. Hence it is every firm’s main objective to maximise profit and shareholders value. However, this becomes very challenging

if the disclosure implementation might result in additional expenditure rather than the expected benefits. Furthermore, it is perceived that firms that maximise excessive profit can afford the cost related to the objective and the implementation of environmental disclosure (Qiu *et al.* 2014). Besides, such firms are more purposeful in engaging more voluntary disclosure to keep all the interested parties well posted; however, it is the opposite for the firms with low levels of profitability (Harun *et al.* 2020; Kays 2022). Firms would only commit more to publishing environmental reporting information provided that the benefit of the disclosure exceeds or offsets the associated costs.

The low adoption of environmental reporting has occasioned a debate about what is voluntary or mandatory adoption. Various researchers have debated against the implementation of mandatory disclosure of environmental reporting. Khlif *et al.* (2015) and Aragon-Correa *et al.* (2016) pointed out that the disclosure of environmental reporting is a comeback from the pressures of civil society or public stakeholders and that the salient stakeholders do not need it. However, Talbot and Barbat (2019) and Husillos *et al.* (2011) expressed a contrary view about environmental reports, that they are not transparent and lack adequate quality and most of the time, they are incomparable (Coombs and Holladay, 2013). It is argued that the environmental activities that firms undertake are perceived as self-management acts and that customers and other stakeholders will portray their votes by means of their strong spending or buying power to a firm that is involved in any social and environmental programmes that promote the economic growth of the community (Khlif *et al.* 2015). In this regard, environmental reporting will benefit both firms and stakeholders because firms will eventually realise high levels of profitability by decreasing the cost of capital, and this can also work as a strategy to attract new investors (Orens *et al.* 2010; Ghoul *et al.* 2011; Dhaliwal *et al.*, 2011). These arguments make a strong case for the mandatory adoption of environmental reporting.

It has been mentioned that South Africa is among the few countries in the world that mandates all listed firms to produce environmental information. This has resulted in a remarkable increase in the amount of non-financial information being by firms (Stolowy and Paugam, 2018). Another slight increase from 2011-2016 has been recognised; the requirement passed in 2010 for JSE-listed companies to publish integrated reports appears to have triggered this increase. Furthermore, there are bodies such as the Global Reporting Initiative assigned to grant companies guidance on how to prepare reports, including environmental/integrated reports.

Concerning the literature of this context, mandatory disclosure is more of a central weapon deployed by government bodies and officials to regulate and promote transparency in reporting between firms and civil society (Park, 2019). King III report outlines a list of requirements that should be part of firms' integrated report based on the pre-determined principles and officiated practices (IoDSA, 2009). Solomon and Maroun (2012) indicated that although the King Code is based on materiality principles, South African firms tend to publish duplicated immoderate data, resulting in errors and information anomalies. In the past decade, mandatory disclosure has been gaining popularity and importance across various countries (e.g. Europe, UK, India, Indonesia, New Zealand). Firms take this reporting approach for a good time to successfully collaborate and abide by legislations.

### **2.2.2.3 Frameworks for Environmental Reporting**

The practice and adoption of environmental reporting has been gaining a lot of popularity due to the development and introduction of certain frameworks. A growing commitment of firms towards the environment and their devotion to meeting stakeholders' needs and requirements has a variety of international reporting frameworks with the similar objective of achieving global sustainable development (Sulkowski, Edwards & Freeman 2018). It is indeed true, that as a result of growing concern from the stakeholders over the depletion of resources, global warming has revitalized firms to be more socially and environmentally focused in conducting their business practice (Al Farooque and Ahulu 2017). These frameworks have been published by different organisations, with a common aim of guiding firms and organisations to adopt environmental, social and governance reporting. The following subsections discuss the roles played by some of the prominent frameworks that have assisted firms in adopting and implementing environmental accounting.

### **2.2.2.4 International Integrated Reporting Council (IIRC)**

A major assumption is that firms cannot adequately report their environmental and social activities in a more material, accurate and unambiguous manner. That alone seems to have created a void that required closure, which resulted in the development of the integrated reports, which was developed by IIRC, it incorporates traditional financial reports as well as non-financial data where environmental, social, and government information are all considered non-financial information (Adams, 2015; Eccles *et al.*, 2015; Maama, 2020). Integrated reporting

is a baseline of corporate reporting, and it supplies both business related and community-related information on one document called integrated annual reporting (IIRC, 2013).

The evolution and development of integrated reporting was due to the discontent that annual reports fail to meet the needs of other users of annual reports who are perhaps interested in environmental, social and governance information (Maama and Marimuthu, 2021). Hence according to Eccles and Krzus (2010), it acts as a tool to meet the needs of stakeholders by providing how firms establish, increase and sustain value. According to IIRC (2013), one of the main objectives of integrated reporting is to accelerate the decisions of stakeholders financing the firm (Capital provider or investors) and, secondly, to communicate information across all varieties of stakeholders. Considering that South Africa is the first country around the globe to introduce or adopt the mandatory disclosure of integrated reports, South Africa is a champion of this disclosure (Ernst & Young 2012; Vitolla *et al.* 2018).

The institutionalisation and advancement of environmental, social, governance and integrated reporting encapsulate the idea that the publishing of integrated reports is not only prepared to communicate to stakeholders but also a way of legitimising firms' or organisations' activities (Tregidga *et al.* 2014). In due course, the Johannesburg Securities Exchange (JSE) then made the disclosure of integrated report a mandatory requirement for all listed firms, revolutionising South Africa into a dominant country in disclosing all the related policies and disclosures of this framework (SAICA, 2013), and the origination of this framework commenced from 2010 up to date. Over and above, this reporting has been attaining recognition all over the world. Again, the evolution of annual reporting standards and the practice of social, environment and governance reporting have been largely influenced by fundamental global fluctuations that are currently challenging stakeholders' expectations as well as global expectations (IIRC,2019). Hence it is very significant that firms remain alert and be able to track and be responsive to all the possible trends, not forgetting the forecast of these changes over time can play a vital role in determining all the attainable factors of the external environment and determine policies and strategies that are necessary to respond to those changes. In this regard, the integrated reporting framework maintains that companies are not only profit-driven, but they also take into account the public interest by cleaning up after their production activities in order to create and sustain the creation of value over time, and this can be published as a set of environmental reporting practice as to gain trust from the stakeholders.

### **2.2.2.5 King's Code of Governance for South Africa**

The introduction of the King's Code of Governance in South Africa represents a significant milestone towards adopting environmental reporting. The Code provides essential guidelines on how firms must be governed. At the heart of the Code is the reporting practice of firms, where the reporting of a firm's environmental, social and governance activities was highly emphasised. The principles of the King Code of Governance which are applicable to all kinds of companies irrespective of the sector and the category they fall under have made an unforgettable benchmark, that the companies must implement integrated reporting to provide an explanation for non-compliance and compliance in environmental and social aspects. The JSE was the first exchange to adopt or introduce King into the listing requirements for financial years beginning on or after 01 March 2010 (JSE 2013a). In connection to this point, the endorsement and implementation of this code of conduct are highly dependent on companies' size, nature, reputation and complexity of parties responsible for preparing and communicating corporate and environmental reports. In light of this, stakeholders responsible for the preparation should ensure to acquire the necessary knowledge about all the important aspects of governance such as skills development, transparency and higher level of disclosure will be significant.

The King Code I was the maiden document that was published by King Committee in 1994. It highlighted on some key financial issues while prioritising stakeholder involvement in the organisations. After apartheid, South African citizens recognised these rules or principles as essential components King I; it remained optional or voluntary until JSE, which is the central principle of this code, took over and transformed them into a listing requirement in accordance with 'comply or explain' (Marrone and Oliva., 2020). Later in 2005, JSE inaugurated the Socially Responsible Investing (SRI) index that was designated to represent the performance of companies with high ratings of Environmental, Social and Governance (ESG) activities. As a result, it became possible to identify firms that comply with the triple bottom line principles (social, environmental and financial).

The King's Code has seen regular updates since it was first published in 1994. The second publication, called King Code II was published in 2002, King's Code III in 2009 and then King Code IV in 2016. These reports of corporate governance disclosure applicable in South Africa.

Even though the King IV Code is newly developed with a different approach of ‘apply and explain’. This means that the application of the principles is assumed and that an explanation is disclosed on the practices that have been implemented and the progress made towards governance outcomes.

Subsequently, South Africa has gained credibility globally, which is perceived as something that significantly added to the South African standing in the capital market (Maroun *et al.* 2014). South Africa’s superintendence persona in the domain of environmental, social and corporate governance reporting is perceived to have been anchored with the history of the country’s government and the shift from apartheid to diverse liberation (Marron and Oliva, 2020). According to Clayton *et al.* (2015), during the racial segregation stage as a result of the oppression of the trade embargo, companies operating in South Africa resorted to participating in voluntary programmes through the support of the Sullivan Principles. The African American pastor Rev. Leon Sullivan created two corporate rules of conduct called the Sullivan principles to encourage corporate social responsibility. The original Sullivan principles were created in 1977 to exert economic pressure on South Africa in opposition to its apartheid system. (Larson, 2020).

#### **2.2.2.6 The Triple Bottom-Line Concept**

Recent considerations show that the present rate of industrialization has led to many economic challenges across the world. Some of these challenges comprise over-consumption of non-renewable natural resources and environmental degradation resulting in massive climate changes. This has created an increasing demand for implementing the triple bottom line (TBL) concept in corporate governance and reporting (Jayashree, *et al.* 2021; Nikolaou., *et al.* 2019). The triple bottom line concept represents one of the significant initiatives towards adopting and implementing environmental reporting. This conception was devised by John Elkington during the mid-90s. It began as an accounting framework that attempted to expand the traditional finance-centric measurement of business performance by including environmental and social dimensions (Elkington, 1994). Since that moment, this terminology has attracted a lot of attention from all the interested stakeholders. This framework can also be referred to as 3Ps: people, planet, and profits, and it has famously transposed perspectives on how the three dimensions can be measured (Goh, *et al.* 2020).

Nevertheless, TBL has no prescribed standard for holistically reporting and measuring environmental, social and economic aspects. Thus, the frameworks have shortcomings, including the absence of generally accepted principles, reliability issues and structural failures in determining indicators describing the current exhibition of various indicators for social, environmental and economic dimensions (Nikolaou *et al.* 2019). The main aim of TLB was to measure business performance by investing and assessing the impact it caused on stakeholders' value, taking into account social practices, profitability, and environmental capital (Pan and Chen, 2021). In respect of this insight, firms are expected to take profit motives and current demands into account in a way that doesn't jeopardize the ability of future generations to meet their needs. (Fero, 2019). Furthermore, this tool has been criticized, and also limitations have been pointed out. According to Babatunde (2020), no legal requirements have been outlined to report on this model, and also it is not a very useful component to measure overall business performance as it can be very complicated to measure people and planets bottom. The contradiction findings and ideas in the theory of this model makes it impossible for researchers to reach common grounds, to conclude on whether its implementation increases the level of productivity and thereby contributing to an increase in overall performance. Regardless of the criticism of the TBL approach, it has provided a foundation for the popularity and adoption of environmental reporting.

#### **2.2.2.7 Global Reporting Initiative**

The adverse challenges of power, energy and manufacturing dependence firms have created clusters of brown economies that contribute to environmental humiliation. In compliance, the notation of green citizenship is encouraged to ensure conducive environments employing implementing environmental reporting practices. The Global Reporting Initiative framework is one of the frameworks which have been gaining wide recognition. GRI is a global network organisation that is officially recognised within the three spheres of economic, social and environmental reporting. This international initiative was initiated in 1997, making it one of the oldest initiatives that encouraged and influenced environmental reporting. The GRI provide concise sustainability reporting guidelines which spread out the principles and indicators that firms and organisations can put in place to report their economic, social and environmental performance (GRI, 2013). According to GRI criteria, sustainability reporting means

strategically disclosing the following four key factors: economic, environmental, social, and governance.

The Global Reporting Initiative also developed a framework called the Sustainability Reporting Framework to provide a model for reporting a firm's sustainability activities. These sustainability activities involve financial, environmental, social and governance activities. In this regard, it has been noted that certain industries such as mining, manufacturing, tourism, energy industries and transportation have drastic sensitivity in both environmental and social wellbeing, which can be regarded as essential aspect of sustainability (De Grosbois., 2016; Hens *et al.* 2018; Khalili *et al.* 2015). Customarily, firms are presumed to pursue profit maximization because disclosing sustainability reporting information is assumed to be costly. Researchers such as Berthelot *et al.* (2012) established a linkage between firm value and sustainability reporting disclosure. Loh *et al.* (2017) suggest a positive relation between firm market value and sustainability disclosure. However, firm status, including family business operating in sensitive and state-owned industries, revealed no linkage impact. According to Global Reporting Initiative guidelines, sustainability reporting is the disclosure of the four main angles of sustainability: economic, environmental, social and governance. Similar to the other frameworks, sustainability reporting was a response to the call made by vulnerable societies negatively affected by the industrial revolution in the last few decades.

The foregoing discussion demonstrates a plethora of efforts by various organisations to improve the adoption and practice of environmental reporting. The capacity of different approaches in the reports provided by firms to enhance the advancement and transparency of environmental and social disclosures plays a vital role in fulfilling the primary firms' objectives to fulfil the stakeholders' requirements (Cortesi and Vena 2019). For this reason, the quality of the information provided in sustainability reports can be used to examine the legitimacy of firms and other corporate bodies. Despite the endless list of reporting methods, integrated reporting which is a single document that presents financial and non-financial information (Maama, 2020) has to be the most recent popular report that firms mostly adopt, including all South African JSE firms (Lee and Yeo 2016). These reporting practices increase transparency and provide investors with sufficient information for effective economic decision-making.



## **2.3 Empirical Literature Review**

This part of the study presents the empirical findings of the prior literature. It is then divided into two sections, where the first section addresses the first objective by reviews the literature on the environmental practices of firms. The second section follows to reviewing the literature related to both the second and the third objectives which addresses the impact of environmental reporting on financial performance.

### **2.3.1 The environmental reporting practices of firms**

The analysis of the environment has significantly dominated firms' performance appraisal. In the recent deterioration of the environment, the repercussion and importance of environmental reporting and sustainability have magnified firms' interest in identifying their environmental impact (Gerged, Beddewela and Cowton 2021). Thus, the study considers that environmental reporting has attracted a lot of attention from different stakeholders across the continent. Hence the present part of the study deals with the review of prior literature from diverse studies on this subject. The prevailing literature on environmental accounting or reporting has spotted a tremendous debate based on the practices deployed by firms that qualify them to attain the notation of responsible business citizens or green enterprises (Khan *et al.* 2021). Nevertheless, business practices that certify the improvement of the environment remain ambiguous (Yu *et al.* 2021). Indrasari *et al.* (2021) investigated the driving forces for putting corporate social and environmental reporting (CSER) into practice and further investigated the effects of these methods on business performance. The results demonstrated that businesses disclose their social and environmental actions using proactive and reactive techniques. The outcomes additionally showed how CSER implementation affected organizations' performance both financially and non-financially. These findings further highlighted that a company's desire to give back to the community through corporate social and environmental responsibility activities is motivated by its social involvement (Vuong *et al.* 2021). Another related study documented that engaging on environmental practices , enhances firms' trust to the community resulting to a customer loyalty (Hussain, Rigoni and Orij 2018). It is further stated that environmental reporting practices can assist firms in achieving the desirable competitive advantage by improving their reputation towards environment while simultaneously minimising operating expenditure (Rodríguez-Gutiérrez *et al.* 2021). Aslam *et al.* (2021) and Bhatia (2021) further supported this viewpoint and added that environmental practices results to improved levels of market share and profitability. In a nutshell, these environmental

practices minimise environmental impacts while improving firms' financial aspects. Although it has been noted in some paper that the implementation of environmental practices requires various capital such as intellectual capital , physical capital and monetary capital (Asiaei *et al.* 2022). Such capitals can be costly to the firms, that is why it is very crucial to analyse and understand the needs of the community, this allows firms to engage to environmental practices that conform to the expected standards, norms, and values of the societies (Malik *et al.*2020). Literature recognises that environmental reporting practices helps in separating firms that are purely interested in portraying themselves as responsible citizens from the ‘greenwash revolution’ for the aim of gaining legitimacy (Abdualimovna and Nabiyeovich 2021). Hence firms commit to environmental reporting practices as their corrective measures because of their impact to the environment (Kim and Schifeling 2016).

Conversely, Liute and De Giacomo (2022) discovered some interesting insights stating that societies expect firms to offer “more good” socially and do “less bad” to the environment . Acar and Temiz (2020) stated that firms with favourable environmental practices turn to disclose more information than low performer (firms with low environmental practices). The literature further suggested that these environmental reporting practices are genuine practices, there are valid reasons for their implementation. Earlier in this study, it has been further clarified that in most countries such as South Africa, these practices are mandatory and are monitored by government authorities.

### **2.3.2. The impact of environmental reporting on financial performance of firms.**

There are various studies that have examined the impact of environmental reporting practices on the financial performance of firms. These studies have provided varied results across various jurisdictions. In Nigeria, the connection between environmental accounting and company performance was investigated by Adediran and Alade (2013). The study's conclusions showed a significant inverse association between environmental accounting, return on capital equity (ROCE), and earnings per share (EPS). However, there is a positive association between environmental accounting, net profit margin, and dividend per share. Regarding this, it was suggested that businesses should pay less income tax if they abide with environmental rules and regulations. Furthermore, it was also proposed that the environmental accounting in Nigeria should be mandatory for all the firms to better their performance because implementing environmental reporting would inspire firms to be more accountable and more cautious towards

the environment. In a similar perspective, Nguyen and Tran (2019) discovered a favourable connection between environmental accounting and financial performance. The findings were indicative that good-quality environmental disclosures enhance financial performance. Again, a study in Nigeria conducted by Olowookere, Taiwo and Onifade (2021), examined the impact of environmental accounting disclosure on the financial performance of listed cement companies. A descriptive statistic model and panel regression method were utilised to analyse this study's data. Thus, the results set up a positive relation between the variables. Furthermore, while examining the environmental reporting effect using the regression analysis model, Radhouane *et al.* (2018) also conducted a study in France on environmental reporting implications concentrating on the customer and market-related performance using a “generalized method of moments (GMM)”. The study results showed a strong negative association between environmental reporting and customer response. In a related paper Ahmad *et al.* (2018) tested for the link between environmental accounting and ESG performance of listed in the Pakistan Stock Exchange. A strong link was discovered between environmental accounting and firm size, even though the EPS and ROCE in other firms’ performance were irrelevant to environmental related costs.

Another cascade of modern reflection in this field investigated the impact of environmental reporting on business performance or firm value and a positive relation between the two variables was produced by researchers (Gupta 2021; Hardiyansah, Agustini and Purnamawati 2021; Şimsek and Ozturk 2021). Likewise, Nguyen (2020) studied how Chinese enterprises' governance arrangements affected their environmental performance and found a relationship between financial performance and environmental performance as controlled by governance systems. This suggests that environmental reporting, the study's central idea, favours corporate value and financial performance. Hence, Susanto and Meiryani (2019) investigated the effect of environmental accounting information system alignment (EAIS ALI) on firm performance and environmental performance, where the findings of this study set up a positive connection. A different study conducted by Aboud, and Diab (2018) looked into the effects of environmental, social, and governance (ESG) practices disclosure and the results showed that firms listed in the ESG index have a higher firm value, and a positive link between firms’ higher rankings in the index and firm value was set.

Deswanto and Siregar (2018) realised a strong connection between environmental reporting and corporate value in Indonesia. The implication of these results expressed that the users of annual reports base their economic decisions on financial accounting and non-financial information covering companies' environmental and social aspects. In consideration of these findings, environmental reporting practices strengthens business image in society which perhaps in some other firms significantly contributes into high returns to reflect a desired firm performance (Murguia and Lence 2015). Susanto and Meiryani (2019) investigated the effect of environmental accounting information system alignment (EAIS ALI) on firm performance and environmental performance, where the findings of this study set up a positive connection. A different study conducted by Aboud, and Diab (2018) looked into the effects of environmental, social, and governance (ESG) practices disclosure and the results showed that firms listed in the ESG index have a higher firm value, and a positive link between firms' higher rankings in the index and firm value was set.

Again, a related paper published by Fatemi *et al.* (2018) showed that ESG strength increases the company value, while its weakness decreases firms' value. Li *et al.* (2018) also investigated the impact of environmental, social, and corporate governance (ESG) reporting on firm value. The results of this investigation demonstrated a favourable relation between the variables, suggesting that accountability and transparency increase stakeholders' trust and contribute towards uplifting and strengthening the value of firms. Again, in a related study conducted by Effendi (2020), which examined environmental accounting's impact on a company's value, the research established a positive relation between the two variables. Environmental performance was found to significantly impact company productivity, supporting corporate growth (Okoye and Asika 2013). The value relevance of integrated annual reporting quality of listed firms was explored by Moloj and Iredele (2020) somewhere in South Africa, and Tobin's Q demonstrated a strong link to firm value, indicating that disclosure of environmental reporting is valuable to the firms. Similarly, authors Gerged, Beddewela and Cowton (2021) explored the connection between the value of the enterprises and corporate environmental disclosure and documented the evidence revealing a positive association.

A gap is identified from the discussed different findings, the results of the reviewed studies are either influenced by the sample size of the population, and the nature of the businesses or firms in which the study was conducted differs from one study to another. Where other firms have

lesser environmental footprint than others. Lastly the results are also influenced by the study's country of location, whereby some countries enforce strong environmental rules and regulations. The current study was motivated by the effect that manufacturing firm's activities has on the environment and to the best of the researcher's knowledge none of these related prior studies investigated the impact of environmental reporting on the value of JSE listed manufacturing firms in South Africa. Hence, the researcher's eagerness to conduct the current study.

## **2.4 The Theories underpinning the Study.**

The conceptual literature review has been discussed in relation to the literature on the concept of environmental reporting. The chapter was expanded by discussing the origin and development of ER, the effect of mandatory and voluntary disclosure and other related concepts that support environmental reporting. The review shed light on how the environmental reporting has been gaining popularity across the world. This part incorporated the theoretical underpinnings of the investigation. These theories discuss the framework that establishes the relationships between environmental accounting and the value of firms. Theoretical studies are seen as the most liked research in the field, uncovering ways of applying practical accounting practices to businesses across various fields. Hence, stakeholder, agency and legitimacy theory are subjected to this study's substructures. The three theories will be utilized to explore how firms report on the environment, how environmental reporting affects their profitability, and how it affects company's worth. This chapter's theoretical section is supposed to shed light on the motivations behind the corporate adoption of environmental reporting standards.

### **2.4.1 Legitimacy theory**

This assumption emerges from the realisation that the support that firms receive from communities plays a huge role in firms' survival. Legitimacy theory suggests that corporate bodies, particularly pollution-problematic firms should consider managing their corporate affairs in a favourable way that aligns with all environmental laws and regulations (Amegah and Agyei-Mensah 2017). This theory hypothesises that corporate organisations must operate in line with all the boundaries and be accepted as norms and values of society. In essence, the quest for legitimacy trigger firms into voluntary reporting of their activities as required by

stakeholders (Aramburu and Pescador 2019). In other words, Legitimacy theory is engineered on the relationship between firms and their social contract with society. Therefore, a mutual understanding between firms and the society should exist for reciprocated well-being and compatibility reasons (Olubunmi, 2021). Furthermore, legitimacy inspires firms to achieve their strategic objectives and stakeholder demands. Although unexpected environmental uncertainties can impose a great challenge in accomplishing a desired level of understanding.

Legitimacy theory is more fundamental when it comes to ensuring compliance with all acceptable societal norms, cultural elements and social demands (Rezaee and Tuo 2019). This suggests an urgency to be transparent in terms of the information concerning firms' involvement in projects and activities that supports social and environmental aspects in response to the demands of society. Legitimacy theory has been used several times in the following studies (Deegan, 2002; Deegan *et al.* 2002), and it continues to be used (Deegan, 2019; Dumay *et al.*, 2018) as a tool to explain why it is essential for firms and corporate organisations to report on their social and environmental performance. Consistently, the pioneers of environmental reporting highly recommend transparency, accountability, and communication as the motives for firms and corporate organisations to engage in social and environmentally friendly activities (Ghosh 2015; Vourvachis and Woodward 2015; Qian *et al.* 2020). Legitimacy theory entails that firms make a great effort in order to be characterised as responsible citizens. As a result, firms initiate projects that educate society about their aims and objectives, especially firms with highly sensitive business activities to the environment (Martínez-Ferrero, Banerjee and García-Sánchez 2016). Where firms attempt to shift the perception of societies about their business activities with the purpose of portraying a good reputation to the entire society. As expected, such projects aim to change society's expectations towards the firm (Deegan, Rankin and Tobin 2002; Silva 2021).

Environmental reporting has been recognised by a vast number of firms and corporate bodies around the globe as it is regarded as one of the environmental practices that firms use as legitimacy activity for the firms in the eyes of the society (Deegan, 2002; Maksimov, 2015; (Vollero *et al.* 2019). Thus, the significance of environmental reporting is generally recognised as a positive aspect to increase the environmental and social credibility of firms to society, more especially firms with suspicious and unambiguous conduct towards society (Mio *et al.* 2020). The aim is to portray a good impression of themselves and be seen as socially

responsible (Maama, 2020). The implementation of this perception highly depends on uncompromised compliance with rules and regulations (Ofoegbu, Odoemelum and Okafor 2018). In accordance with this idea, in Australia, legitimacy helps companies predict relevant strategies to ensure social acceptance (Casonato, Farneti and Dumay 2018). However, in contravention to this, some authors questioned that the requirements and demands of the society could be unreasonable and unbearable, making it very hard and complicated for companies to attend to all the demands of the diverse group of the society (Munoz, Zhao and Yang 2017; Izzo, Ciaburri and Tiscini 2020). The review in the different of views of the authors shows that environmental reporting can benefit stakeholders or firms depending on both the social and environmental circumstances faced by firms in the location of operation.

Furthermore, the origin of this theory comes from the recognition that community support largely contributes towards firms' growth, resulting in remarkable economic growth. According to Maama and Appiah (2019), for firms to receive and maintain such support should ensure that environmental reporting disclosure meets the desired requirements of all the stakeholders. This suggests that environmental reporting is a tool that is used to convince the society to see the existence of firms and their activities as legitimate, favourable and purposeful to the society (Maama and Mkhize 2020b). Accordingly, Legitimacy theory highly depends on firms' social contract with the society which prioritises the importance of the environment for the survival of firms. One of the fundamental reasons for the adoption of the theory is that they want to educate and persuade society about their purpose, their long-term goals and objectives concerning the economic growth and development of that society, not forgetting to present measurements they intend to take as to ensure environmental sustainability (Ghosh 2015; Mensah, Frimpong and Maama 2017).

Therefore, it can be concluded that the present theory is more engineered to the power of the society, whereby firms reach a consensus with the society by conforming to their rules and regulations that are set in social contracts to set sound environmental laws and regulations (Nguyen and Tran 2019). This suggests that managers agree that they will manage and operate firms in line with specific terms and conditions of legal provisions stipulated in the social contract to meet the needs and expectations of the society. This theory basically explores the accountability of implementing environmental reporting of firms (Rezaee 2016, 2017; Rezaee, Dou and Zhang 2020). Additionally, firms are accountable to introduce and implement

environmental reporting practices by scrutinizing the current trends in society's demands, not forgetting to consider government and political discomfort. Hence, environmental disclosure motivates firms and corporate bodies to legitimise their business operation. In that way, firms gain a good reputation from the society which count as an advantage to the firm. Thus, disclosing environmental and social firm performance serves as a strategic business presentation. The strategy is linked with the credibility that firms performance is line within the desirable standards of the community citizens.

Most prior findings suggest that legitimacy is regarded as one of the main factors in adopting social and environmentally friendly activities. From this point of view, legitimacy theory is considered relevant in exploring the concept of environmental reporting. The different findings and viewpoints presented above suggest that the legitimacy theory may be sufficient in investigating environmental reporting and its impact on firm value.

#### **2.4.2 Stakeholder theory**

Stakeholder theory was pioneered by Freeman (1984). As stated by this researcher, this theory is engineered based on the following fundamental ideas. Firstly, a firm is made up of different connected stakeholders and the major purpose of this relationship is to create efficiency that results in high levels of profitability. For this reason, a stakeholder is defined as any individual, institution or society with interest or people affected by the firm in a legitimate capacity (Freeman., 1984; Deegan and Rankin 1996). This theory highlights relevant stakeholders to be considered, and it further determines how the inclusion of such stakeholders will contribute towards stakeholder value creation (Hörisch, Schaltegger and Freeman 2020). This theory is perceived to be the best in recognising that various stakeholders have different perspective and expectation about the firms' operations. It is, thus, recommended that firms analyse the views of all the stakeholder groups, which enables them to obtain an understanding of stakeholder needs. This would also assist in deciding how to respond to those needs (Maama and Appiah, 2019).

Stakeholders base their decision-making regarding investing, campaigning and precuring on annual integrated reports, including environmental information (Maama, 2020; Loana and Adriana 2014 ).Therefore, it is important that firms provide relevant and accurate information on to interested parties in order to make knowledgeable decisions. (Emmanuel and



Ifeanyichukwu 2021). Furthermore, there is no restriction as to what information must be given to stakeholders, considering firms have plenty of stakeholders. The question of which stakeholders to prioritise has been gaining much popularity in this research domain. Moreover, various prior authors suggested using criteria, which includes power, urgency and legitimacy, to identify which stakeholder to account for (Crilly and Sloan, 2012; Kaur and Lodhia, 2018).

Another pool of opinions suggest that stakeholder theory can be classified into two different categories namely: managerial and ethical (Lange and Bundy 2018). According to this idea, which has evolved into an ethically grounded philosophy of corporate governance, businesses have a moral imperative to respect the interests of all stakeholders fairly and equally. (Osemene *et al.* 2021) (Amorelli and García-Sánchez 2021; Okafor, Adeleye and Adusei 2021). However, the managerial category advocates the idea that the firms' board of directors are obligated to all major stakeholders in the firm, including shareholders whose resources are being managed for the firm or any organisation to thrive (Maama, 2020; Osemene *et al.* 2021). In this aspect, the managerial perspective is more engineered to respond to all the stakeholders' needs in accordance with their level of power dominance within the firm or organisation; thus, the inclusion of environmental reporting on annual integrated reports by boards of directors and management is considered as an activity that responds to stakeholders' demand to enhance the adequacy of financial reporting. It is so evident that stakeholder theory postulates that value creation is the main priority of firms and it is found at the heart of doing business. This study therefore postulates that Stakeholder theory can be employed to anchor a study on environmental reporting given that firms have various parties with an interest in how companies report on their environmental impact.

### **2.4.3 Agency Theory**

The term "Agency theory" explains the grounds behind the separation of power and roles between owners and managers of firms or corporate organisations. It argues that owners and management are kept apart and this has created problems such as conflicts of interest, where managers aim to maximise their interest rather than shareholders' value, resulting in agency costs having to be incurred by firm (Alipour *et al.* 2019). However, Vitolla, Raimo and Rubino (2020) suggested that firms should appoint a majority of non-executive members on the board to reduce agency problems. Non-executive members have no position within the firm or organisation, so obviously, this means less collusion with shareholders (Liao, Luo and Tang

2015). In accordance, managers often attempt to prevent the perceived agency problem by disclosing more social and environmental related information so as to depict themselves as accountable (Maama, 2020). Likewise, the agency problem is the responsibility of shareholders to solve, which is why shareholders demand managers to publish environmental reporting to prohibit managers from pursuing their agendas. In respect of this viewpoint, more perspective shareholders and investors are attracted as a result.

## **2.5 Conceptual Framework**

The practice and adoption of environmental reporting have been possible and gained popularity due to the development and introduction of certain frameworks. A growing commitment of firms towards the environment and their devotion to meeting stakeholders' needs and requirements has to a variety of international reporting frameworks with the similar objective of achieving global sustainable development (Sulkowski, Edwards & Freeman, 2018). It is indeed true that due to growing concern from the stakeholders over the depletion of resources, global warming has vitalized firms to be more socially and environmentally focused in conducting their business practice (AI Farooque and Ahulu, 2017). These frameworks have been published by different organisations, with a common aim of guiding firms and organisations to adopt environmental, social and governance reporting. Based on the knowledge and understanding generated from the literature of the discipline of this study, the performance of firms or organisations can be measured using return on equity (ROE), return on assets (ROA) and earnings per share (EPS). In contrast, a firm value will be measured using Tobins' Q. Therefore, environmental reporting is perceived to pose a positive or negative impact on the profitability and value of firms. Hence the main objective of this study is to investigate the impact of environmental reporting on the value of manufacturing firms listed on the JSE.

The following framework outlines the dependent and independent variables that are anticipated to be examined using econometric models to analyze how environmental reporting affects the value of listed manufacturing enterprises on the JSE in South Africa. According to the knowledge and perceptions gained from the literature in the field of this study, a firm's performance can be gauged using its return on equity (ROE), return on assets (ROA), and earnings per share (EPS), while its value may be gauged using Torbin's Q. Consequently, it is believed that environmental reporting may have a good or negative effect on a firm's

profitability and market value. Determining how environmental reporting affects the value of manufacturing firms listed on the JSE is the primary goal of this study. The conceptual framework presented below shows that the disclosure of environmental reporting complements traditional reporting, which is widely known as annual financial statements, in solution, these two reports work hand in hand to fulfil the desires of stakeholders (Saraite-Sariene, 2019). While financial information provides stakeholders with financial liquidity information, environmental reporting legitimises firms' activities and promotes accountability in the face of society (Montesinos and Brusca 2019). In essence, the purpose of the conceptual framework is to reveal that there is either a positive or negative relationship between environmental reporting and firm performance or firm value. Whereas firm performance is determined by Return on Asset, Return on Equity, and Earnings per Share, firm value is determined by Tobin's Q. As depicted in the diagram below, environmental reporting can improve financial performance and firm value. Hence, Figure 2.1 shows that environmental reporting might influence the value and financial performance of firms.

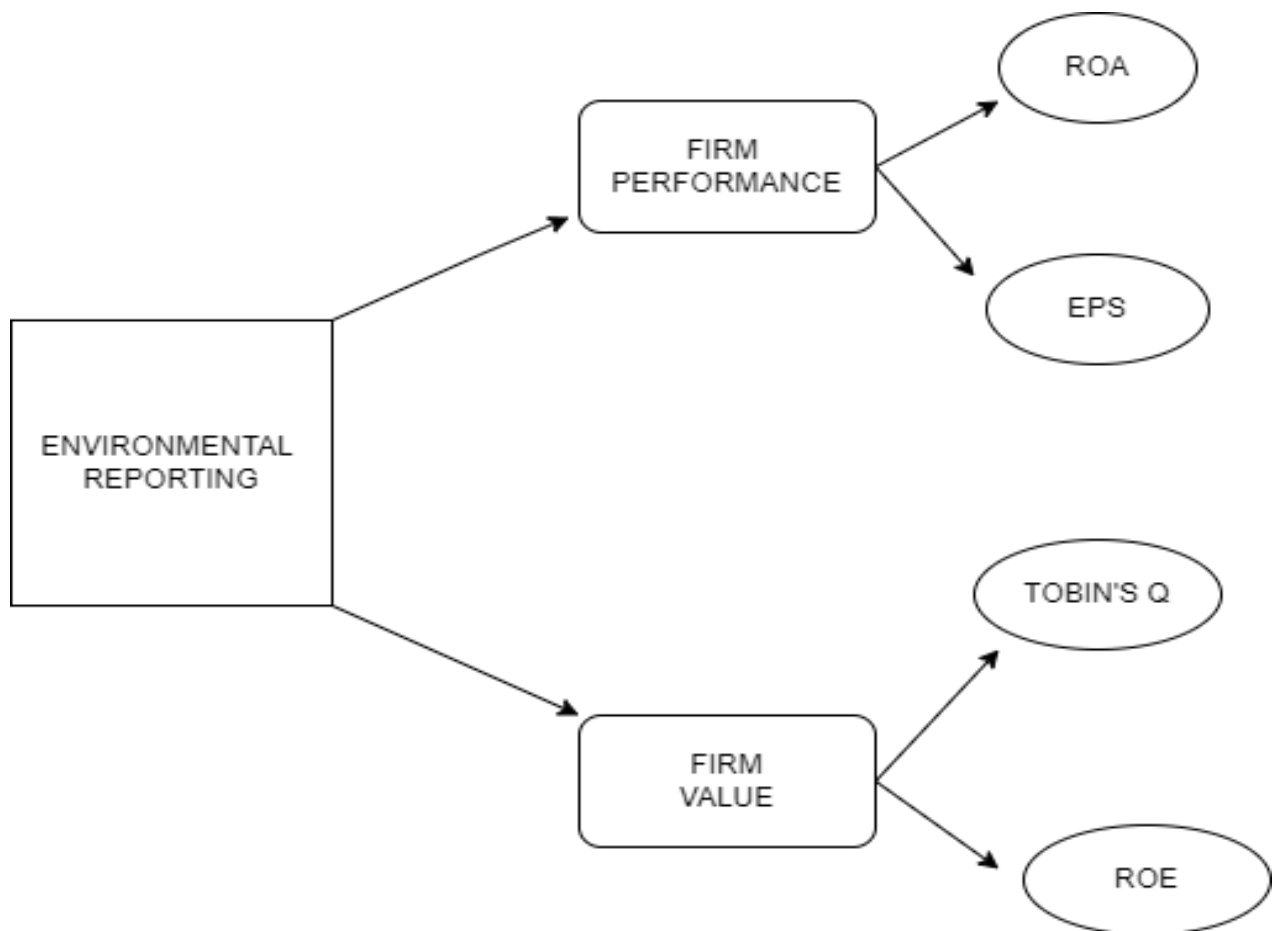


Figure 2.1: Conceptual framework

## **2.6 Summary of the Chapter**

The recent perused conceptual literature review suggested that previous researchers and interested people have different perceptions and ideologies about environmental reporting. However, in prior studies, the researchers seem to have supported the idea that the traditional reporting widely recognised as financial statements only communicates the financial information which benefits investors in terms of making economic decisions. Others hold that reporting should not be personalised, so when preparing the report, firms should also consider those stakeholders with an interest in environmental and social reporting.

The literature review showed that accounting is perceived differently through varied ideological lenses. However, most authors appear to support the long-held view that accounting communicates economic information to its stakeholders, especially shareholders. Others, however, contend that accounting should promote an equitable and fair redistribution of resources by providing information to satisfy the needs of various stakeholders. This view gives a broader scope on how to conduct daily business activities that are eco-friendly to the environment and society. The inclusion of environmental reporting in corporate reports is fast becoming the norm in many organisations across the world. Nevertheless, the study found that there are no specific standards on how to disclose environmental reporting information; hence firms are permitted to include any form of environmental information. Thus, manufacturing firms with more environmentally friendly economic, environmental and social activities are anticipated to disclose environmental information as this is also a tool to attract more investors and consumers.

## **CHAPTER THREE**

### **METHODOLOGY**

#### **3.1 Introduction**

In the former chapter of this study, the empirical and theoretical literature on environmental reporting was explored to derive a holistic understanding of the environmental reporting concept. Consequently, the three theories underpinning the study, namely Stakeholder theory, Legitimacy theory and Agency theory, were scrutinized to depict a clear understanding of how environmental reporting affects firms' performance and value. This chapter presents and explains the methods adopted to achieve the study's objectives. Specifically, the chapter explains methodological issues adopted in this study such as research design, research approach, population, sample size and sampling techniques, data collection and data analysis.

#### **3.2 Research Design**

Research design is a method, procedure and plan that provides the inherent structure to collect all the possible data to create credible, relevant and sound results free from bias and error (Dannels 2018; Bloomfield and Fisher 2019). Thus, the research design is intended to administer the correct and commendable framework used as a driver when collecting and analysing data. (Creswell and Creswell 2017). According to this viewpoint, research design serves as a hierarchy that controls the direction of all research undertakings. The research design technically explains how the study variables were used, how the study population was selected, how the data was gathered and analysed, and how variables were controlled to guarantee that the research problem was adequately and consistently addressed and that the study's goals and objectives were successfully attained.

The research design explores, investigates and assesses the identified research problem through data collection, data analysis, presentation of results, discussions, drawing conclusions based on the findings, and making recommendations. Additionally, descriptive and inferential approaches were adopted for this study's purposes. A descriptive research design is a research style that correctly characterises a population, circumstance, or phenomenon already occurring and being examined. (Sahin and Mete 2021). Atmowardoyo (2018) holds that the term 'existing phenomena' draws a line between descriptive and experimental research. It is said that

experimental research observes both existing phenomena and phenomena after specific periods of treatment have taken place. Thus, the phenomena being observed is openly attainable.

The descriptive method adopts the use of some components of a research method such as a survey, correlation study, qualitative study, or content analysis. The above-mentioned components of research methods differ from data availability and data collection perspectives. In accordance, the analysis depends on the type of data. Thus, the data is reviewed, and the results are refined and interpreted to depict a clear solution to the identified problem. According to Bloomfield and Fisher (2019) and (Bell, Bryman and Harley 2022), a descriptive research design is applicable for studies such as a study that outlines a commonality of the occurrence of the characteristics of a phenomenon, a study that is committed to outlining the degree of relationship between variables; and lastly , a study that makes predictions about the occurrence of a phenomenon. The objectives of the current research satisfy the use and the implementation of the descriptive method, taking into bargain all the prior studies of the current subject.

### **3.3 Research Approach**

The correct choice of suitable research method is the most pivotal decision in conducting a constructive scientific study. It is primarily centred on uniting the goals of the study with the qualities of practical research procedures. Based on the series of studies conducted by researchers in many different fields, it has been observed that researchers have to choose amongst techniques and methodologies that are suitable for their studies. Moreover, it has been noted that selecting the best suitable research methods and techniques is the most difficult and crucial decision to make. For this reason, this chapter's goal is to explore the two research approaches: qualitative and quantitative.

Within the academia space, researchers conclude that the role played by qualitative and quantitative research is fundamentally different. The qualitative approach follows the paradigm of interpretivism research and varies according to the data collection method. Qualitative research is exploratory, and its primary goal is to explore the interpretation that an individual or group of people perceive about a particular social phenomenon (Dawadi, Shrestha and Giri 2021; Braun and Clarke 2022). The qualitative approach has well-designed and structured questionnaires that are straightforward in the form of a hypothesis (Hennink, Hutter and Bailey 2020). The qualitative approach should follow some well-reasoning logic to disclose a

hypothesis, which will eventually develop into a substantive and even a formal theory (Armstrong *et al.* 2018). Coding, comparison, integration, triangulation, and interpretation are part of this approach's data analysis. All these listed methods are fundamentally essential in arriving at reasonable research findings when using a qualitative approach.

Conversely, the term "quantitative approach" refers to a research methodology based on objectivism and positivism and calls for well-articulated reasoning to support or reject ideas. (Maarouf 2019; Maama and Mkhize 2020a). The quantitative method is associated with a research paradigm dependent on collecting and analysing quantitative data (Park, Konge and Artino 2020; Paoletti *et al.* 2021; Uher 2021). The quantitative research approach is to be used to test theories and hypotheses by examining the link or connection between variables that are being investigated; that is why in some instances, it is called a confirmatory or a deductive approach (Pérez Rave, Jaramillo Álvarez and González Echavarría 2021).

Quantitative research methods are those methods typically from the positivism paradigm that highlight the measurements of the objectives that are commonly in numeric form or in quantities and its data is analysed through a statistical analysis such as descriptive and inferential statistics. The research method currently being used in this study is regarded as the traditional form of research preferred by post-positivists (Abutabenjeh and Jaradat 2018). According to positivist social reality, universal truths can be observable externally (Goduka 2012; Panthee 2020). Additionally, the qualitative approach is based on positivism, which maintains that the social world comprises a definite and invariant reality which can be quantified objectively. Quantitative research is recognised as a method that involves an elevated level of difficulty that includes collection tools such as survey questionnaires or schedules, class tests, national standardised assessments and polls, as well as econometric models. Quantitative methods involve the process of gathering data in the form of a quantitative approach where the data is subjected to analysis (Apuke 2017; Boeren 2018; Clark and Vealé 2018; Aspers and Corte 2019).

In quantitative research, the implementation of statistical analysis consists of descriptive statistics, which are commonly expressed using percentages, standard deviations, means, medians, minimum values, maximum values and inferential statistics, also generally articulated by means of analysing the variance, correlation analysis, t-test and regression analysis (Kaur, Stoltzfus and Yellapu 2018; Amrhein, Trafimow and Greenland 2019; Mishra

*et al.* 2019). The main purpose of statistical analysis in quantitative research is to allow the researcher to track all the material reality gathered from the data collected, including the trends and the significant changes (Nielsen *et al.* 2020; Assaad *et al.* 2022; Sarstedt and Danks 2022). One of the benefits of using a quantitative research method is that it capacitates the reduction of high-volume data into units that are considered important in achieving specific research aims and objectives and are considered a backup in processing complex data (Rahman 2020; Usoro 2022).

However, other researchers like Panthee (2020) find limitations with using a quantitative research method, mainly because it becomes abstract when producing information thoroughly that can depict a clear universal picture of the investigated variables. Additionally, the quantitative method faces severe challenges when defining the spatial and temporal scope of their analysis (Van Baalen and Mobjörk 2018). The quantitative data collected for this study included earnings per share, return on assets, return on equity, book value per share, business age, and leverage. Furthermore, the environmental practices of manufacturing firms were measured using the Wilcoxon Rank sum test and mean ratings. The quantitative data of this study were attained through MacGregor BFA and the integrated annual reports of the manufacturing firms.

In this particular study, a quantitative research methodology is used because it is suitable for the nature of this study. The integrated annual reports of South African listed manufacturing firms from 2016 to 2020 were obtained from company websites. The environmental reports of manufacturing firms were coded, analysed, and rated according to the information presented concerning the firms' environmental, social responsibility and environmental degradation activities.

### **3.4 Target Population of the study**

A specific group of people, items or organisations that possess corresponding attributes and are considered to be of interest to a researcher is regarded as the population of the study (Pandey and Pandey 2021). A total of fifty (50) listed manufacturing firms listed on the Johannesburg stock of exchange in South Africa. Furthermore, data was gathered from the integrated annual reports as of 2016-2020. The target population comprises only manufacturing firms solely involved in manufacturing activities. Moreover, these manufacturing firms were selected based



on the availability of integrated annual reports from the JSE website. The population group is strictly firms involved in manufacturing, and the total number of manufacturing firms used in this study is fifty (50), and all the selected firms were preferred based on the total assets of R 14 million. Manufacturing firms with a total value of less than R14 million were rejected.

### **3.5 Sampling and Census**

Sampling is characterised as selecting a subset of individuals from within the designated desired identified group of the population (Schreier 2018). It is described as the technique used to choose a sample of a selected study population. In a study by Garavan *et al.* (2019) it has been pointed out that large samples can act as a technique to prevent sampling errors and help to better the generalization of research findings. In respect of this study, a census of all the JSE-listed manufacturing companies was used. A census is whereby a total population is equivalent to the sample size. One of the benefits of using a census is that it captures the adequacy of the true population (Grundler *et al.* 2019). Moreover, working with the true total number of population is superior to working with samples as they are subjected to probability estimates (Crede, Jong and Harms 2019). However, the manufacturing firms with missing data were not included as part of the population, mainly because of the designed model specifically for this research.

### **3.6 Data Collection Procedure**

Data from secondary sources were used in this investigation. The annual integrated reports obtained from the websites of the 50 listed manufacturing firms from 2016 to 2020 were scrutinized and examined from page to page for environmental, social responsibility and environmental degradation information. The researcher coded the environmental reporting, social responsibility and environmental degradation information from each manufacturing firm. This resulted in a data record of 250 manufacturing firm-year observations.

The published integrated annual reports were digitized from all the JSE-listed manufacturing firms. The integrated annual reports retrieved across all the listed manufacturing firms totalled two-hundred and fifty (250). A content analysis method was adopted to collect the environmental reporting data from the firms.

### **3.7 Content Analysis**

The environmental, social responsibility and environmental degradation practices from annual integrated reports were thoroughly examined by means following the procedures and guidelines of content analysis. All the retrieved integrated annual reports were reviewed based on the criteria of the evaluation matrix. This kind of analysis has been recognised as the most relevant method of analysing companies' social, environmental and corporate practices (Hossain, Hecimovic and Choudhury Lema 2015). A content analysis identifies the patterns found in data in accordance with their respective context (Renz, Carrington and Badger 2018).

In this study, the interpretative checklist was used to measure the environmental responsibility reporting, environmental degradation and social responsibility information from the integrated annual reports of the manufacturing firms listed on the JSE in South Africa. Unlike related studies conducted by Posadas and Tarquinio (2021) and Carandang and Ferrer (2020), the two studies used a dichotomous procedure to measure environmental accounting and non-financial disclosure during data collection. Where '1' was used for full or partial disclosure of information, accordingly '0' was used for absent (where there was nothing disclosed). The use of dichotomous only works with 'yes or no', meaning that it only demonstrates whether the disclosure is present or not, thus not permitting a comparison of different disclosures presented by firms. Take, for instance, if one manufacturing firm provides a full disclosure of the required information for data collection and the other one provides a partial or weak disclosure, both firms will be assigned '1' as they would be considered as manufacturing firms that publish environmental reporting information and that is enough for the data collector in terms of dichotomous procedure theory. Hence this procedure is disadvantageous for the manufacturing firms as it de-recognises manufacturing firms that provide full and strong disclosure and high excellence of environmental and social information. Additionally, this method is considered biased. On the other hand, the dichotomous method is easy to use and saves time, especially for complex studies (Maama and Mhize 2020).

Conversely, the use of content analysis for this specific study supported the development of an interpretative checklist where the following criteria was thoroughly followed when capturing environmental, social and degradation reporting information from the annual integrated reports of the firms:

Score 1: Very inadequate information or the information was not provided at all in the report.

Score 2: Inadequate or limited information was provided.

Score 3: Average information was provided to some extent.

Score 4: Strong information was provided to a large extent.

Score 5: Extremely adequate and detailed information was provided.

The above demonstrated Likert scale based on a checklist was used to collect and measure data on the environmental reporting of the study, comprising environmental responsibility reporting information, environmental degradation reporting information and social responsibility reporting information. In this study, the disclosures were perused from the annual integrated reports. Moreover, the differences between the rating scores were based on the quality of the information disclosed by each manufacturing firm, as there is no prescribed standard as to which information to disclose with regard to environmental reporting. The 250 integrated annual reports were retrieved from 50 manufacturing firms, and the reports were from 2016 to 2020, representing five years of integrated annual reports. As a result, after thoroughly reading and re-reading the reports, the differences and trends were spotted amongst listed manufacturing firms and the causes of such trends were critically investigated to draw sense from each pattern and difference. Respectively, the desired score was assigned to each report based on the quality and the quantity of information provided.

### **3.8 Data Analysis Method**

This study adopted the descriptive analysis approach in the form of moving averages on ERR, EDR, SRR, ERI and the Wilcoxon signed rank test (WSRT) to analyse the annual integrated reports of listed manufacturing firms. As such, the reports were analysed to draw conclusions to address the first objective, which is to assess the environmental practices of manufacturing firms listed on the JSE. The collected data were analysed using an average or mean rating scale to identify the trends of environmental reporting practices of listed manufacturing firms. In compliance, the Wilcoxon's signed-rank (WSR) test was used to investigate any significant and insignificant differences in environmental practices over the past five years (from 2016 to 2020). Consequently, the trend in environmental practices was analysed through the change of mean score for every year to demonstrate whether there was any change in the practices of environmental reporting. The significance and insignificance of the change over the years were

determined through the use of p-values. Additionally, Objectives Two (2) and Three (3) were analysed using multiple regression analysis, where an econometrics model based on Ohlson's (1995) value relevance model was used to test the relationship between dependent and independent variables.

### 3.9 Econometric Model

A multiple regression analysis was developed for this specific study. Fixed effect and random effect estimation techniques was used to estimate the regression models. The relationship between environmental accounting and firms' value was estimated using the value relevance model developed by Ohlson (1995). According to the Ohlson's (1995) model, the provision of information influences the decisions of investors and other stakeholders, which would result in improved performance. Guided by Ohlson's Model and following studies such as Soyemi, Okewale and Olaniyan (2021). The following econometric models are developed for the estimation. Models 1, 3 and 5 examine the impact of the individual components of environmental reporting on ROA, ROE and firms' value (Tobin's Q), respectively. On the other hand, Models 2, 4 and 6 assess the impact of the combined environmental reporting score on firms' ROA, ROE and value (Tobin's Q), respectively. Models 1 to 4 address Objective 2, while Models 5 and 6 address Objective 3.

$$ROA_{it} = \beta_0 + \beta_1ERR_{it} + \beta_2EDR_{it-1} + \beta_3SRR_{it} + \beta_4BVPS_{it} + \beta_5EPS_{it-1} + \beta_6Size_{it} + \beta_7Age_{it} + \beta_8Leverage_{it} + \epsilon_{it} \quad 1$$

$$ROA_{it} = \beta_0 + \beta_1ERI_{it} + \beta_2BVPS_{it} + \beta_3EPS_{it-1} + \beta_4Size_{it} + \beta_5Age_{it} + \beta_6Leverage_{it} + \epsilon_{it} \quad 2$$

$$ROE_{it} = \beta_0 + \beta_1ERR_{it} + \beta_2EDR_{it-1} + \beta_3SRR_{it} + \beta_4BVPS_{it} + \beta_5EPS_{it-1} + \beta_6Size_{it} + \beta_7Age_{it} + \beta_8Leverage_{it} + \epsilon_{it} \quad 3$$

$$ROE_{it} = \beta_0 + \beta_1ERI_{it} + \beta_2BVPS_{it} + \beta_3EPS_{it-1} + \beta_4Size_{it} + \beta_5Age_{it} + \beta_6Leverage_{it} + \epsilon_{it} \quad 4$$

$$TobinQ_{it} = \beta_0 + \beta_1ERR_{it} + \beta_2EDR_{it-1} + \beta_3SRR_{it} + \beta_4BVPS_{it} + \beta_5EPS_{it-1} + \beta_6Size_{it} + \beta_7Age_{it} + \beta_8Leverage_{it} + \epsilon_{it} \quad 5$$

$$TobinQ_{it} = \beta_0 + \beta_1ERI_{it} + \beta_2BVPS_{it} + \beta_3EPS_{it-1} + \beta_4Size_{it} + \beta_5Age_{it} + \beta_6Leverage_{it} + \epsilon_{it} \quad 6$$

The variables in the models are described below.

**ROA<sub>it</sub>:** ROA denotes the return on asset of firm *i* at time *t*. The ROA was measured by the percentage of profit after tax to total assets and was obtained from the McGregor BFA database.

**ROE<sub>it</sub>:** OE denotes the return on equity of firm *i* at time *t*. The ROE was measured by the percentage of profit after tax to total equity, which is made up of total capital contributed by shareholders of the firms, also taking into consideration all the accumulated profits over time and was obtained from the McGregor BFA database.

**β<sub>0</sub> to β<sub>8</sub>:** This variable is known as Beta and it represents the variation of independent variables.

**TobinQ<sub>it</sub>:** Tobin's Q is the ratio of the firm's ratio at time *t*.: Tobin's Q is measured by the total market value of the firm divided by the total value of all the assets. This ratio depends on the theory of market value and replacement value.

**ERR<sub>it</sub>:** ERR denotes Environmental Responsibility Reporting of firm *i* at time *t*. In this specific study, environmental reporting was all the information related to the relationship that South African JSE- listed manufacturing firms have with the environment and relevant scores were assigned to determine the quality and the weight of the information provided in integrated annual reports. Previous literature shows that environmental reporting responsibility is a tool that has become an essential aspect to respond to an increased interest of stakeholders with regard to environmental sustainability (Braam et al. 2016). The literature expanded by explaining how environmental reporting has become predominantly recognised as a weapon to address and mitigate harm to the environment.

**SRR<sub>it</sub>:** SRR denotes the Social Responsibility Reporting of firm *i* at time *t*.

The Social Responsibility Reporting of firms from 2016 to 2020 was examined using the content analysis method, where the quantity and quality of the information provided were examined using the checklist. Therefore, environmental reporting was all the information that explain and show the relationship that firms have with society in terms of corporate investment at the time.

**EDR<sub>it</sub>:** ED<sub>it</sub> denotes Environmental Degradation Reporting of firm *i* at time *t*. Environmental Degradation Reporting responsibility was all the information that relates to the report on pollution of the environment due to the business activities of manufacturing firms, altogether

with the measurements taken to ease the impact on the environment for the benefit of both business and relevant stakeholders at the time.

**Size<sub>it</sub>**: Size<sub>it</sub> denotes firm Size *i* at time *t*. In this study, the size of firms was determined by the natural logarithm of the manufacturing firms' total assets value, which is basically made up of the sum of current and non-current assets. This is consistent with the study conducted by Amka (2020).

**Leverage<sub>it</sub>**: This variable is the leverage of firm *i* at time *t*. Firms' leverage was measured by the percentage of total debt to shareholders' equity.

**BVPS<sub>it</sub>**: BVPS represents the book value per share of firm *i* at time *t*. A book value per share represents a firms' equity to the number of outstanding shares. Book value basically indicates the firm's net asset value, which can be expressed as (total assets – total liabilities) on the basis of per share. In essence, book value per share acts as a gauge that investors use to evaluate the stock exchange amongst the firms. In logic, investors look for high-valued stock, suggesting that, ordinarily, when the market value per share is lower than the book value per share, the stock may be undervalued, which may attract new investors. In this study, the book value per share was used to measure the net asset value of manufacturing firms.

**EPS<sub>it-1</sub>**: EPS denotes the earnings per share of firm *i* at time *t*. The EPS was measured by the percentage of earnings after preference dividends to the total number of shares and was obtained from the McGregor BFA database.

### **3.10 Validity and Reliability**

Validity and reliability concepts have a strong connection, but they are not the same, rather, they demonstrate different attributes of the measuring instrument. Overall, a measuring instrument can be reliable but not valid. Although when a measuring instrument is valid in all the prospects, it is expected to be reliable even though independent reliability is not adequate to ascertain validity (Sürücü and Maslakci, 2020). Therefore, providing a valid and reliable instrument is important to ensure that the study results are accurate (Ibrahim, Hami and Abdulameer, 2020). In conclusion, validity alone means uniformity and steadiness related to all the conclusions drawn in the study, which is supposed to be constructed by another researcher (Andrade 2018).

In this study, various strategies were adopted to enhance the degree of reliability of data. This study relied on various documents containing relevant related evidence that was important for this study. In highlighting this viewpoint, this study depended on many published and accredited studies on environmental reporting. Additionally, a content analysis data collection and coding training was conducted by supervisor and a mutual understanding was reached between the student and the supervisor. During the coding process, the supervisor constantly checked and reviewed the work to ensure that the student was on the right track to ensure data validity. Furthermore, the integrated reporting evaluation matrix score was developed for the collection and analysis of data on environmental responsibility reporting, environmental degradation reporting and social responsibility reporting. This matrix was thoroughly and critically formulated to be in line and consistent with the evidence reviewed from prior studies and the content elements of the IRF and the Global Reporting Initiative IV. The initial researcher coded all the 250 reports following all the developed evaluation matrix as guidelines, and the main author was consistent with the coding guidelines to ensure validity and reliability.

### **3.11 Choosing Between Random and Fixed Effects**

In order to choose between random and fixed effects models, a researcher must run a Hausman test to test a null hypothesis. A null hypothesis favours the use of random effect, whilst the alternative hypothesis postulates that a model is a fixed effect. A fixed effects model is a statistical model where variables are fixed or non-random. This is in contravention of the random effect model, where the variables in a model exhibit random characteristics. The null hypothesis assumes no correlation exists between the unique errors and the regressors. In a case whereby a Hausman test reflects a probability greater than 0.05 ( $p > 0$ ), it suggests that the null hypothesis should not be rejected; hence the random effect is appropriate. On the other hand, when the probability is less than 0.05 ( $p < 0.05$ ), the null hypothesis should be rejected, thus, a fixed model is considered.

### **3.12 Ethical Consideration**

No ethical clearance is needed for this study as the use of secondary data prohibits the requirement of ethical clearance. The McGregor BFA database was used to collect financial

data. The non-financial information, such as environmental and social, were retrieved from JSE-listed manufacturing firms' business websites.

The use of secondary data exempts the study from obtaining ethical clearance; furthermore, secondary data does not involve physical contact with participants. With respect to this viewpoint, this is supported by the policy implemented by FRC of the Durban University of Technology where the study's main researcher is registered.

### **3.13 Conclusion of the Chapter**

This chapter discussed the methodology and research design implemented to collect data. The chapter further explained the study's target population, the basis for choosing the sample size and census, the data collection procedure, and the content analysis, which is the basis of pattern identification on the data collected. Furthermore, both descriptive and inferential research designs were adopted in this study. The use of a descriptive research design was also implemented to investigate the effect of environmental reporting on the value of listed manufacturing firms in South Africa. The quantitative research approach was adopted in this study, which is supported by the positivism theory, which appraises realism as a firm structure and supports that there is only one truth. This specific study empirically reflected the perspective and previous knowledge of the researcher. The total population of the study comprises fifty (50) JSE-listed manufacturing firms. The study depended on the annual integrated reports of the firms for the environmental reporting data and MacGregor BFA for financial data collection of manufacturing firms.



## **CHAPTER FOUR**

### **DATA ANALYSIS, INTERPRETATION AND DISCUSSION**

#### **4.1 Introduction**

The previous chapter discussed the general research methods adopted in this study. The chapter systematically perused the research design, research approach, the population of the study, the data collection procedures employed, and the data analysis method. The current chapter addresses the objectives of this study, which are to assess the impact of environmental reporting practices on the value of manufacturing firms listed on JSE. Firstly, the chapter presents and discusses the results of the environmental reporting practices of manufacturing firms. The chapter further presents and discusses the impact of environmental reporting on the value and profitability of the listed manufacturing firms.

#### **4.2 Descriptive Results**

Table 1 presents the results of the environmental reporting practices of listed manufacturing firms. The previous chapter stated that the study used a 250 firm-year observation from 2016 to 2017. The results show a mean of 4.14 for environmental responsibility reporting, 3.57 for environmental degradation reporting and 4.30 for social responsibility reporting. In light of this, according to the criteria specifically developed for the present study, a mean score of four (4) means that enough disclosures were provided. This suggests that listed manufacturing firms have made an effort to provide fair and decent information on their operations' environmental, social and degradable activities in their integrated annual reports. However, the minimum (2) and maximum values (5) remained constant throughout, mainly because, amongst the total population of all listed manufacturing firms, none of the firms' environmental disclosures was rated less than 2. Accordingly, the standard deviations of environmental responsibility reporting (0.89), environmental degradation reporting (1.113) and social responsibility reporting (0.87) were 0.89, 1.113 and 0.87, respectively.

It has been further revealed that the average Tobin's Q of the firms was 1.51, which implies that the market value of manufacturing firms was more than the book value, suggesting that over the past five (5) years, the manufacturing firms were able to increase their firm value. The maximum value of Tobin's reached a remarkable increase of 11.29, indicating an increase in

firm value. The average ROE is 2.48%, suggesting that the firms could use the equity provided by investors and shareholders to generate profit. Again, the ROA was 5.29, which indicates the assets of the manufacturing firms' strong ability to generate profit. However, the high value of total assets indicates a high capital intensity in the industry, which is confirmed by the average size of the firms equal to 30.09 billion rands, implying that the manufacturing firms should be more cautious both environmentally and socially when conducting their business activities.

In line with the total assets, the average book value per share is R4792.82, suggesting an increase in the net worth of assets. Additionally, the average EPS amounted to R489.72, indicating favourable profitability for the investors of the listed manufacturing firms. The leverage of manufacturing firms, measured by total debt to total equity, averaged 35.5%, indicating that the manufacturing firms' external investors are less than the actual or original owners' equity. Lastly, the average age of the manufacturing firms is 40 years, suggesting that the firms have been in operation for a long time. For this reason, it is the manufacturing firms' responsibility to keep levelling up the firms' disclosures pertaining to the environment to boost their credibility in the community, especially in the immediate location of their operations. This can increase their performance and business value.

**Table 4.1: Descriptive statistics**

<b>Variable</b>	<b>Obs.</b>	<b>Mean</b>	<b>Std. Dev.</b>	<b>Min</b>	<b>Max</b>
ERR	250	4.14	0.89	2.00	5.00
EDR	250	3.57	1.13	2.00	5.00
SRR	250	4.30	0.87	2.00	5.00
ERI	250	4.01	0.88	2.00	5.00
TobinsQ	175	1.51	1.42	0.10	11.29
ROE (%)	250	2.48	84.47	-976.28	787.60
ROA (%)	250	5.29	20.81	-176.75	47.22
BVPS (Rands)	250	4792.82	8986.86	0.13	50826.55
EPS (Rands)	250	489.72	1201.44	-1764.32	12044.82
Leverage (%)	248	35,55	34.79	-77.59	518.30
Age (Years)	250	40.00	28.01	12.00	128.00
Size (billions of Rands)	190	30.09	70.35	0.02	400.79

Source: Author's Computation

### **4.3 Multicollinearity Test**

In a regression analysis, a multicollinearity test is carried out to examine the level of collinearity amongst the independent variables. This test is necessary because a high level of collinearity can render spurious results. In view of this, the study conducted a multicollinearity test using a Spearman correlation analysis to determine the level of association among the independent variables. The results of the multicollinearity test are presented in Table 4.2.

**Table 4.2: Correlation results**

	<b>ERR</b>	<b>EDR</b>	<b>SRR</b>	<b>ERI</b>	<b>BVPS</b>	<b>EPS</b>	<b>Leverage</b>	<b>Age</b>	<b>Size</b>
ERR	1.000								
EDR	0.774***	1.000							
SRR	0.759**	0.634***	1.000						
ERI	0.926***	0.922***	0.852**	1.000					
BVPS	0.057**	-0.052*	-0.001**	-0.007	1.000				
EPS	0.013*	-0.115**	-0.031*	-0.060**	0.794**	1.000			
Leverage	-0.044*	0.012	-0.072	-0.031	-0.054	0.017	1.000		
Age	-0.117	-0.028	-0.050	-0.067*	0.029*	0.023*	-0.036**	1.000	
Size	0.155**	0.150**	0.082***	0.147**	0.681**	0.463	-0.015	-0.018**	1.000

Note: \*\*\* = significance at 0.01; \*\* = significance at 0.05; \* = significance at 0.1

Source: Author's Computation

Table 4.2 presents the results of the multicollinearity test, indicating the correlation level amongst the independent variables. The results are demonstrated to check the existence of multicollinearity amongst variables. Table 2 shows no serious multicorrelation issues because the correlation coefficients amongst the independent variables are less than 0.70, which is regarded as the designated benchmark to measure the correlation amongst the independent variables (Cao, Hiyoshi and Montgomery 2020). However, there is a strong correlation among the environmental reporting variables, which is EDR (0.774), SRR (0.759) and ERI (0.926). However, this poses no correlation issue because the three independent variables are used for the purpose of differentiated models. In fact, a firm that reports on environmental reporting information is likely to report on social and environmental degradation, so it is almost expected to experience high correlations among these variables, which are sometimes referred to as the components of environmental reporting. Overall, the results presented in Table 2 suggest the absence of multicollinearity mainly because all the variables are less than 0.70. Hence, the estimates emanating from the models are expected to be valid and reliable.

#### 4.4 The Level and Trend of Environmental Reporting

In this part of the study, the environmental reporting practices implemented by manufacturing firms were examined from 2016 to 2020. The fluctuating mean scores and the Wilcoxon signed rank (WSR) test results are presented in Table 4.3 and 4.4, respectively. Table 4.3 presents the results of the environmental reporting practice of JSE-listed manufacturing firms analysed in the form of descriptive analysis. In essence, Table 4.3 assesses the quality of the disclosure of environmental practices by listed manufacturing firms. Table 4.4 also uses the WSR test to present the results of the significance level of the changes in environmental reporting across the years. This section of the study addresses the first objective of the study which is to assess the environmental reporting practices of manufacturing firms listed on the JSE.

**Table 4.3: The Level and trend of environmental reporting practices**

	<b>2016</b>	<b>2017</b>	<b>2018</b>	<b>2019</b>	<b>2020</b>
ERR	3.93	3.88	3.97	4.38	4.53
EDR	3.18	3.25	3.67	3.79	3.96
SRR	4.11	4.26	4.34	4.38	4.42
ERI	3.74	3.80	3.99	4.18	4.30

Source: Author's Computation

**Table 4.4: Wilcoxon Signed Ranked Test Results**

	<b>2016-2017</b>	<b>2017-2018</b>	<b>2018-2019</b>	<b>2019-2020</b>
ERR	-0.847 <sup>b</sup> (0.397)	2.203 <sup>c</sup> (0.028)	2.704 <sup>b</sup> (0.007)	2.335 <sup>b</sup> (0.020)
EDR	1.617 <sup>b</sup> (0.106)	2.485 <sup>b</sup> (0.013)	1.591 <sup>c</sup> (0.112)	2.129 <sup>b</sup> (0.033)
SRR	2.039 <sup>c</sup> (0.041)	0.932 <sup>c</sup> (0.352)	1.691 <sup>c</sup> (0.091)	1.848 <sup>c</sup> (0.065)
ERI	0.529 <sup>b</sup> (0.597)	0.824 <sup>c</sup> (0.410)	2.013 <sup>c</sup> (0.044)	1.053 <sup>b</sup> (0.292)

*b = The sum of negative ranks equals the sum of positive ranks; and c = Based on positive ranks. Source: Author's Computation*

Table 4.3 reveals the extent of environmental reporting practices by South African listed manufacturing firms. In 2016 and 2017, the environmental responsibility reporting information presented by manufacturing firms attained a mean of 3.93 and 3.88, respectively. According to the checklist used to store the information, a score of 3 means that average information was provided to some extent. However, the mean scores of 3.93 and 3.88 are close to a score of 4 (strong information was provided to a large extent), so it is safe to say that listed manufacturing firms provided strong disclosures for environmental responsibility reporting. These results suggest that the firms adequately presented environmental reporting. Despite this, Table 4.3 indicates a reduction in ERR from 2016 to 2017. Although this reduction is regarded as insignificant, as shown in Table 4.4, where the p-value of the Wilcoxon signed ranked test is 0.397, less than the 0.05 benchmark, indicating that the level of reduction is not significant. This suggests a small decrease in the aggregate and quality of disclosures of environmental reporting information provided by listed manufacturing firms.

Furthermore, in 2017 and 2018, the environmental reporting information presented by listed manufacturing firms obtained mean scores of 3.88 and 3.97, respectively. As indicated in Table 4.4, the p-value obtained is 0.028; therefore, the increase between 2017 and 2018 is significant. This result implies that the manufacturing firms significantly improved their disclosures of environmental reporting information in 2018. Again, in 2018 and 2019, a mean of 3.97 and 4.38 was recorded, respectively. The difference between the two years shows an increase. As

anticipated, the increase is significant, as depicted in Table 4.4, where the p-value of the Wilcoxon signed ranked test is 0.007. In 2019, it is evident that the listed manufacturing firms had some improvements in their environmental reporting practices, whereby additional significant environmental information was provided.

Table 4.3 further shows that during the years 2019 and 2020, the mean score of ERR was 4.38 and 4.53, respectively. According to Table 4.4, this indicates an increase that is labelled to be significant because the probability = 0.020. This signifies that the environmental reporting practices adopted by firms improved significantly from 2019 to 2020. The results demonstrate that most of the manufacturing firms disclosed more detailed environmental reporting information in 2020, perhaps due to an increase in manufacturing firms' age and size over the years. In addition, it is highly expected that such firms will increase their environmental reporting practices because they may have accumulated some experience in reporting practices (Liu and Liu 2021). Besides, since all firms listed on the Johannesburg Stock of Exchange are compelled to disclose environmental reporting, it is highly expected to find improvements in the reports with regard to environmental reporting information progressively.

An increase in the mean values with respect to environmental reporting information is regarded as a good indication that firms are serious about the disclosures of environmental reporting (La Soa Nguyen, Nguyen and Le 2017). It is not surprising that the South African listed manufacturing firms have consistently provided relevant disclosures regarding environmental activities, considering that it has been more than five years since King Code III compelled them to include environmental and social information on their integrated annual reports. Thus, it is reasonably expected of firms to have gradually improved the attributes and the aggregate of environmental reporting practices. Hence, this study suggests that the older the firms get, the more they present a greater disclosure of environmental reporting practices, which implies a positive relationship between environmental reporting practices and firms' age.

As expected, the operations of the manufacturing industry affect the environment in many different ways. Taking charge and becoming fully responsible enough to disclose a report to stakeholders on how firms' activities affected the environment marks great corporate behaviour. Table 4.3 further presents the disclosure of environmental degradation information of the South African manufacturing firms in the JSE. As shown in Table 4.3, the environmental degradation reporting by the manufacturing firms attained a mean score of 3.18 in 2016 and

3.25 in 2017, showing an increase between the two years. However, the mean of 3.25 and 3.67 was obtained in 2017 and 2018, respectively. The change between 2017 and 2018 was significant, as indicated in Table 4.4, with a p-value of 0.013 based on the Wilcoxon signed ranked test result. This p-value reports that the difference between the reporting practice of the firms in 2017 and 2018 is significant, suggesting a great improvement in terms of the disclosures made for environmental degradation responsibility.

Furthermore, Table 4.3 reveals a mean of 3.67 in 2018 and 3.79 in 2019, indicating an increase in the level of trends of environmental practices was discovered. In reference to Table 4.4, which revealed that the p-value had increased between the two years is 0.007, suggesting that it is statistically significant. Table 4.3 further shows a mean of 3.96 in 2020, and the change between 2019 and 2020 indicates a significant increase because the p-value found in Table 4.4 is 0.033. The current study has been mindful and observant that most complex manufacturing firms have precisely contextualised and factored the average value of environmental degradation on the report.

Unsurprisingly, a related study (Karaman, Kilic and Uyar 2018) revealed that firms tend to produce more information in favour of their image. This means that firms get more accelerated to disclose environmental degradation information for their welfare. However, it has been noted that environmentally sensitive firms perceived to be very harmful towards the environment and human health due to hazardous emissions and large workforce are subjected to reports on environmental degradation (Karaman, Kilic and Uyar 2018).

Table 4.3 further shows that social responsibility reporting in 2016 and 2017 obtained mean of 4.11 and 4.26, respectively, suggesting an increase in the disclosure level between 2016 and 2017. In addition, the p-value of 0.041 was found in Table 4.4 from the Wilcoxon signed ranked test results, suggesting a significant increase. The results demonstrate that the South African listed manufacturing firms experienced increased disclosures of social responsibility reporting in 2017. For instance, firms like Adcock Ingram Holdings Limited were more involved in social projects which uplift the community, such as skills development, socio-economic development, enterprise and supplier development. In 2018 the SRR attained a mean of 4.24. The increase between 2017 and 2018 is insignificant because the p-value is 0.352. Consistently, the mean score for SRR in 2019 is 4.38 and the p-value found in the difference between 2018 and 2019 was 0.091, which indicates that the increase is not significant.



Table 4.3 further shows that the mean score for SRR in 2020 is 4.42, showing an increase over 2019. However, the increment level from 2019 to 2020 was statistically insignificant as the p-value is 0.065. The current study observed that most of the annual integrated reports kept repeating almost the same information every year, thus the reason for the steadiness in the mean obtained from 2016 and 2020. What is obvious from the results is that more and more, South African listed manufacturing firms have attempted to provide comprehensive and detailed social responsibility information. For this reason, all the means obtained from 2016 to 2020 are approximately 4.00, meaning that the firms have disclosed strong social responsibility reporting information to a large extent to fulfil stakeholders' requirements.

The results demonstrate that the South African listed manufacturing firms provided their environmental information to a large extent, which proves their accountability and transparency in disposing of hazardous materials and tools and information on the initiatives taken to reduce the environmental impact caused by manufacturing firms' activities. However, the study observed that most of the environmental information provided by South African listed manufacturing firms listed on the JSE remained relatively the same throughout the five years, even though few firms have observed marginal improvements in the format and the volume of the disclosures made. The most appealing part was that most of the integrated annual reports were independently reviewed and audited, which gave the researcher limited assurance to proceed with the data analysis. Hence, the above results seem reasonable considering that all the listed firms must prepare integrated reports that disclose environmental information.

Another reason for an increase in the presentation of environmental reporting is due to an increase in reporting guidelines and the national and international guidelines set by government authorities, financial markets, and stock exchanges (Bartels *et al.* 2016). Additionally, investors actively analyse and investigate environmental information to evaluate firms' performance when making investment decisions. As a result, it is not surprising that firms have started reporting on their environmental activities.

#### **4.4 Impact of Environmental Reporting on Financial Performance**

As emphasized, environmental reporting has increasingly gained popularity in academia and corporate environments. Regardless of the curiosity amongst scholars and many different institutions, there is brief evidence documenting the impact of environmental reporting on firm value. The gap in this study has been perused and addressed through the review of prior papers

on the impact of environmental reporting on financial performance. This section of the study presents the results of the impact of (ROA) and (ROE) on environmental reporting. This present part of the study addresses the second objective, which is to examine the relationship between environmental reporting and the profitability of manufacturing firms listed on the JSE.

#### 4.4.1 Impact of Environmental Reporting on Return on Assets

This section presents the results on the impact of environmental reporting on the return on assets of the firms. Table 4.5 assesses the impact of the individual components of environmental reporting on firms' ROA, whilst Table 4.6 estimates the impact of the combined score of environmental reporting on ROA.

**Table 4.5: Impact of Environmental Reporting on Return on Assets**

ROA	Random Effect			Fixed Effects		
	Coeff.	t-stats	p-value	Coeff.	t-stats	p-value
ERR	0.802	1.99	0.048	3.432	1.956	0.0514
EDR	-4.167	-1.61	0.107	-0.537	-1.917	0.086
SRR	2.118	6.004	0.005	1.606	2.82	0.006
BVPS	0.001	1.32	0.188	1.001	1.17	0.244
EPS	0.003	1.68	0.094	0.002	1.59	0.113
LEVERAGE	0.096	2.97	0.003	0.152	5.05	0.000
AGE	-0.020	-0.24	0.812	-0.979	-1.38	0.170
Size	-3.196	-2.16	0.048	-15.442	-2.62	0.010
Constant	26.621	1.19	0.236	127.523	2.13	0.035
Observations	190			190		
R-squared ( $R^2$ )	0.9247			0.9448		
X	0.9188			0.9212		
F-stats	138.143			115.87		
Prob. > F-stats	0.000			0.000		
Prob. of Hausman Test	0.182			0.182		
Durbin-Watson stats.	2.024			1.731		

Source: Author's Computation

**Table 4.6: Impact of Environmental Reporting Components on Return on Assets**

ROA	Random Effect			Fixed Effects		
	Coef.	t-stats	p-value	Coef.	t-stats	p-value
ERR	-3.373	1.21	0.227	2.863	0.581	0.561
BVPS	0.001	1.25	0.210	0.001	1.143	0.258
EPS	0.003	1.278	0.007	0.002	1.262	0.012
LEVERAGE	0.091	2.79	0.005	0.152	5.085	0.000
AGE	-0.031	0.37	0.712	-0.992	1.417	0.160
Size	-2.900	1.06	0.290	-15.327	2.629	0.010
Constant	36.346	1.273	0.008	135.243	2.343	0.021
Observations	190			190		
R-squared (R <sup>2</sup> )	0.9437			0.9245		
Adjusted R <sup>2</sup>	0.9321			0.9006		
F-stats	117.86			1.738		
Prob. > F-stats	0.000			0.000		
Prob. of Hausman Test	0.009			0.009		
Durbin-Watson stats.	1.622			1.926		

Source: Author's Computation

Firstly, the results presented in Table 4.5 show that the probability of the Hausman test is insignificant ( $p = 0.182$ ). For this reason, the study fails to reject the null hypothesis, leading to the random effect model being adopted for estimation. In this case, the study looked at the given co-efficient and p-values to identify the association among the variables.

Table 4.5 reveal that (ERR) is positively associated with (ROA) with a significant impact. This is expressed in terms of a positive coefficient of 0.802 and  $p = 0.048$ , which is less than 0.05, thus indicating a significant relationship suggesting that an increase in ERR results in an increase in the returns of a firm relative to its total assets used to generate the revenue. These results imply that manufacturing firms benefit from presenting environmental responsibility reporting information. Accordingly, these results suggest that environmentally sensitive firms should invest in environmentally sound practices to improve firms' financial performance. Furthermore, the results contradict the view that manufacturing firms become vulnerable when they adopt environmental reporting. Therefore, it is evident that the formulation of sound

environmental policies to build up financial performance is vital. As firms become motivated to dedicate specific resources and policies to relevant, prioritised areas of stakeholders. These results are consistent with Adinehzadeh *et al.* (2018) and Zamil and Hassan (2019), where the authors documented a positive association among the variables. Conversely, these findings contradict the findings of Ng *et al.* (2019), who reported an inverse association between environmental accounting and ROA.

Conversely, a negative and insignificant relationship between ROA and EDR is revealed in Table 4.5 where the coefficient and p-value are -4.167 and 0.107, respectively. This result implies that environmental degradation responsibility reporting decreases firms' ROA. The negative relationship between EDR and ROA is expected because manufacturing firms' activities pollute the environment, and a cost of environmental degradation is incurred as a result. This indicates an outflow of cash, increased expenses, and a decrease in assets in firms' bank accounts. In other words, the disclosure of EDR means an additional cost and resources from South African listed manufacturing firms; hence the relationship between ROA and EDR is inverse. In agreement with the evidence documented by Azman and Salleh (2020) in Malaysia, where a relationship between ROA and waste reporting was examined and the results revealed no significant relationship.

Table 4.5 further shows the relationship between social responsibility reporting and return on assets. The results (coefficient of 2.118 and p-value = 0.005) establish a positive and significant relationship between SRR and ROA, suggesting that an increase in social responsibility reporting results to a significant increase in ROA. Earlier in the current study it has been mentioned that sometimes social projects may require high capital intensive assets from firms, and that immediate spending on these projects definitely result to an outflow of cash (Hannoon *et al.* 2021). Although in the long run this is indeed a benefit to firms, of course when it is viewed from a business perspective. Take for instance, when firms dedicate some of the assets to the society, they gain an unquestionable support from the republic especially from the location of operation and from investors. Based on this approach, more investors mean more growth in business, and ordinarily in many cases assets are one of the indicators that are scrutinised to test the liquidity of any business. This view is consistent with legitimacy theory (Carroll and Shabana 2010; González-Rodríguez *et al.* 2019; Kraus, Rehman and García 2020; Al-Shammari, Banerjee and Rasheed 2021).

The implication of these results is that South African listed manufacturing firms should consider implementing solid social responsibility reporting practices as it attracts more investors to improve financial performance. Moreover, this not only prioritises firms' value but also maintains the partnership between listed manufacturing firms and their community surroundings, which will significantly help achieve the firms' profitability.

Table 4.6 also shows evidence of the association between the combined environmental reporting (ERR) score and ROA. As shown, the probability of the Hausman Test is (0.009), which is less than 0.05 and this is indicative of its significance, hence the fixed effect result is considered in this case. The results demonstrate that ERR is positively and insignificantly related with ROA. The results of the ERR show a coefficient of 2.863 and a p-value of 0.561. This shows that the relationship between ERR, and ROA is positive but not significant. This means that the environmental reporting responsibility does not significantly impact the return on assets as witnessed by the null hypothesis, because the p-value is less than 0.05. These results imply that the environmental measurements adopted by manufacturing firms promote good social and environmental wellbeing of society. These results are consistent with the results conducted by Shabbir and Wisdom (2020) and Gerged *et al.* (2021).

The book value per share (BVPS) has a positive and insignificant relationship with ROA. Thus, an increase in business value per share would not increase ROA. Besides, the result is reasonable because book value per share measures the net value of assets; hence the two variables are positively related. Furthermore, these results demonstrated a positive and significant relationship between EPS and ROA (Coeff = 0.002) and  $p = 0.012$ ). In this case, an increase in the book value of assets would significantly improve the ROA of the firms. These results further suggest that, even when manufacturing firms invest in EER, EDR and SRR activities, they still maintain reasonable profit levels with an increased value of assets, regardless of the firm size and firm age, as shown in Table 4.6, the relationship between AGE and ROE is negative but not significant. Lastly, the R-squared (R<sup>2</sup>) and the Adjusted R<sup>2</sup> are quite good, indicating that the independent variables significantly predict the model's dependent variable (regression). The R-squared suggests that the independent variables can influence up to 92% of the dependent variable.

#### 4.4.2 The Impact of Environmental Reporting on Return on Equity

This section presents the results of the impact of environmental reporting on firms' return on equity. Table 4.7 assesses the impact of the individual components of environmental reporting on firms' ROE, whilst Table 4.8 estimates the impact of the combined score of environmental reporting on ROE. The results from the fixed effect model were interpreted based on the p-value (0.034) of the Hausman test.

**Table 4. 7: The Impact of Environmental Reporting on Return on Equity**

ROE Variables	Random Effect			Fixed Effects		
	Coef.	t-stats	p-value	Coef.	t-stats	p-value
ERR	1.938	2.712	0.009	-3.707	-2.712	0.009
EDR	-9.259	-1.00	0.318	0.043	0.00	0.998
SRR	10.355	1.974	0.046	3.956	2.17	0.032
BVPS	0.001	2.16	0.038	-0.001	-0.17	0.865
EPS	0.007	0.90	0.366	0.006	1.965	0.048
LEVERAGE	1.170	7.39	0.000	1.967	11.05	0.000
AGE	0.1518	0.67	0.502	-7.661	-1.83	0.070
LnSize	-5.541	-0.65	0.514	14.305	0.41	0.681
Constant	3.850	4.06	0.000	213.071	3.60	0.000
Observations	190			190		
R-squared (R <sup>2</sup> )	0.9458			0.9352		
Adjusted R <sup>2</sup>	0.9245			0.9073		
F-stats	217.783			167.025		
Prob. > F-stats	0.000			0.000		
Prob. of Hausman Test	0.034			0.034		
Durbin-Watson stats.	2.192			2.015		

Source: Author's Computation

**Table 4. 8: The Impact of the Combined Environmental Reporting on Return on Equity**

<b>ROE</b>	<b>Random Effect</b>			<b>Fixed Effects</b>		
<b>Variables</b>	<b>Coef.</b>	<b>t-stats</b>	<b>np-value</b>	<b>Coeff.</b>	<b>t-stats</b>	<b>p-value</b>
ERR	-2.491	0.30	0.761	0.834	0.03	0.977
BVPS	0.001	0.09	0.925	-0.001	-0.18	0.858
EPS	0.008	2.03	0.0301	0.006	2.66	0.008
LEVERAGE	1.148	7.32	0.000	1.967	11.13	0.000
AGE	0.1360	0.61	0.543	-7.570	-1.83	0.070
Size	-5.081	2.60	0.005	14.304	2.41	0.006
Constant	31.178	4.50	0.000	207.665	3.61	0.000
Observations	190			190		
R-squared (R <sup>2</sup> )	0.9462			0.9271		
Adjusted R <sup>2</sup>	0.9240			0.8957		
F-stats	128.63			122.63		
Prob. > F-stats	0.000			0.000		
Prob. of Hausman Test	0.002			0.002		
Durbin-Watson stats.	1.762			1.824		

Source: Author's Computation

Table 4.7 presents the results of the impact of environmental reporting on the return on equity (ROE) of the listed firms. The relationship between ERR and ROE has been tested, and Table 4.7 suggest a significant negative relationship (coefficient = -3.707) and  $p = 0.009$ ). The current results imply that adopting environmental reporting by South African listed manufacturing firms decreases their ROE. This result may be due to the additional cost incurred in preparing environmental reporting. Moreover, it has been observed and anticipated that societies are always alert and concerned about the impact of firms' business activities; otherwise, the public always has good thoughts about firms' reputations. Hence, reporting on the environmental impacts of their operations may erode such positive perceptions about firms, which may negatively affect their performance. Thus, environmental reporting is regarded as an outflow of spending, resources and time. Consistently, (Ng *et al.* 2019) and Hanić, Jovanović and Stevanović (2021) revealed a significant and negative link between the quality of environmental information and financial performance. Conversely, as documented by Buallay

*et al.* (2020) and Emmanuel and Ifeanyichukwu (2021), environmental disclosure is positively associated with economic benefits to shareholders.

Table 4.7 shows an insignificant positive relationship between environmental degradation reporting and a return on equity coefficient of 0.043 and  $p$ -value = 0.998. This result suggests that South African listed manufacturing firms that report on their environmental conservation and degradation activities do not significantly benefit from it in terms of an increase in return on equity. Similar to the evidence reported by Horsfall and Womenazu (2022) in Nigerian oil and gas companies revealed an insignificant positive relationship between environmental cost and ROE. The possible logic behind these findings is that investors might have noticed the inconsistencies in the environmental reports; hence they may have abandoned such reports. This indicates that companies have not done enough interference in equipping and educating managers on how to present environmental information in a manner that will grab investors' and stakeholders' attention. In respect of this point of view, South African listed manufacturing firms must revamp environmental information disclosures to enhance their confidence in potential and existing stakeholders.

There are several induced factors of environmental degradation, such as excessive carbon dioxide, fossil fuels, the greenhouse gas effect, air pollution, water pollution and land pollution. Manufacturing firms' business activities result in factors which affect the environment at large. In affiliation with such environmental impacts, manufacturing firms now have to report on environmental degradation activities on their annual integrated reports. This may not assist them in terms of publicity, which can negatively affect investors' returns.

Table 4.7 further presents the impact of social responsibility reporting (SRR) on return on equity (ROE). The results revealed a positive Coefficient of 3.956 and significant ( $p= 0.032$ ) relationship between SRR and ROA, meaning that a realisation of an increase in SRR results in a positive response on ROE. These results imply that South African listed manufacturing firms have managed their social responsibility reporting well, which has increased ROE. In essence, these results support the idea that social responsibility activities, especially activities that aim to express firms' long-term commitment to the interest of stakeholders can be used as a component to uplift firms' reputation (Cherian *et al.* 2019; Hu *et al.* 2021). The study results suggests that South African listed manufacturing firms have put great initiative on social responsibility practices that uplift communities; social responsibility information has been



disclosed to a large extent, making it possible for all the stakeholders to have access to the information of their interest. This has built the confidence of individuals in many companies. By scrutinizing the annual integrated reports, the researcher observed that many firms gradually gained value over the years. This finding confirms the views of Zeng (2016), who affirmed that the higher the firms' CSR rankings, the more likely it is to enhance their market value. In accordance with the results, it is recommended that firms should invest more resources towards social responsibility resources. Although social responsibility activities are a form of expenses, they are the expenses that lead to competitive advantage, higher levels of profitability and better performance. It is then recommended that South African listed manufacturing firms must continue investing more resources in social responsibility activities to better the firm performance.

The book value per share in Table 4.7 with a Coeff=-0.001 and a p-value = 0.865 indicates an insignificant negative link. The size has an insignificant positive relationship, suggesting a negative association with the value of firms and supporting the assumption that some investors consider the net assets worth as a better indicator in weighing the potential returns of investing in particular manufacturing firms. This evidence is inconsistent with the findings of the study of Setiadharm and Machali (2017), where it is outlined, that Indonesian stakeholders pay lesser attention to accounting information and size when making investment decisions. This shows that majority of stakeholders are only interested on environmental and social information rather than financial information, perhaps there is even a possibility that the firms publish and sell low-valued stocks at expensive prices simply because the investors are more than consumed by the non-financial information. In accordance with this view point, it is better when both financial and non-information are used together, because the two set of information are complementary items.

Table 4.8 is indicative of the results of the impact of the combined environmental reporting responsibility on ROE. From the results in Table 4.8, the coefficient analysis indicates that environmental reporting is positively related (Coefficient = 0.834) with ROE, although it is not statistically significant ( $p = 0.977$ ). Environmental reporting responsibility promotes environmental sustainability; hence stakeholders are more likely to respond positively to the manufacturing firms in terms of support, which results in an increased level of revenue. However, in this instance, the relationship is insignificant, meaning that manufacturing firms incurred additional costs in the form of funds and resources to implement environmental

reporting. To highlight, most South African manufacturing firms seem to have ensured sustainable environmental conditions, especially Adcock Ingram South Africa, whereby the manufacturing team of the medication were very cautious concerning waste disposal. All the disposable items they use to manufacture the medication and how they paste written warning cautions in the area where the items were disposed indicating responsibility.

The result implies that firms' management can use environmental reporting to improve the performance of returns generated from shareholders' investments. This is crucial because the return on equity represents the profits that are apportioned amongst shareholders, and it is a convenient instrument used to measure firms' managerial performance. Return on equity is used as a measurement of the rate of return from the investment of a firms' common stock holdings. It manifests the strength of a firm in generating the returns on shareholders' capital invested. Thus, the goal of any profit organisation is to create and maximise wealth for its shareholders. Due to stakeholder pressures arising from the pollution of the environment, business is no longer run solely for economic reasons; firms are required to be mindful of the environmental stakeholder's interests. Thus, it is the firms' accountability and responsibility to fulfil the interest of stakeholders through the full disclosure of environmental responsibility reporting in their integrated annual reports in pursuit of business economic values to ensure long-term environmental sustainability and good social relation with the communities.

Looking at the control variables, the results show that the size of the firms (FSIZE) has a positive (Coeff=14.304) and statistically significant ( $p = 0.006$ ) relationship with ROE. These results are similar to previous studies; they imply that manufacturing firms should consider increasing their firm size by boosting their turnover to increase profitability levels and equity (Olawale, Ilo and Lawal 2017). Additionally, increased profitability levels result in increased spending and resources in environmental and socially associated practices. Obviously, according to the legitimate theory discussed in this study, manufacturing firms seem to use environmental and social reporting as a business strategy to manage their image by disclosing all the positive information that positions them in a relevant spotlight so that they will be recognised as responsible citizens by the societies and other stakeholders.

Meanwhile, a positive (Coefficient=1.967) and significant ( $p\text{-value} = 0.000$ ) relation with leverage was found. Manufacturing firms with high financial leverage are expected to incur higher financing and monitoring costs to ensure proper control of costs. Moreover, high-quality

disclosure on environmental reporting can be utilised as a mechanism by manufacturing firms to demonstrate to both creditors and debtholders their capacity to fulfil their financial obligations. Accordingly, high leverage can indicate a potential risk of insolvency for investors and creditors, which can lead to an increased systematic risk for manufacturing firms. Thus, manufacturing firms have to take the initiative of disclosing more detailed environmental reporting information to mitigate all the associated risks (Andrikopoulos, Samitas and Bekiaris 2014; Jensen and Meckling 2019). Finally, somewhere in Pakistan, it was argued that positive leverage serves as an indicator that the firm is in a healthy state to negotiate its liabilities (Sharif and Rashid 2014).

Table 4.8 further revealed a negative and insignificant relation between ROE and Age, similar to the result documented by (Ren *et al.* 2020). The currently discussed contradict the prior results of various studies that documented positive findings (Sarpong-Danquah *et al.* 2018; Hossain and Saif 2019; Ma *et al.* 2019; Janardhanan and Uma 2020; Okafor, Adeleye and Adusei 2021). In this regard, the authors hold that old firms are likely to disclose good quality environmental reporting information because these firms probably know what to disclose and what not, considering that these are long-established firms. Consequently, some authors documented no effect (NGUYEN *et al.* 2021; Syakhroza, Diyanty and Dewo 2021). Concerning these results, for these South African listed manufacturing firms, the researcher observed that in some instances, the age of manufacturing firms has nothing to do with the firms' profitability and the extent of the reports of environmental and social information.

Also, considering that the fixed effect estimates show that R-squared ( $R^2$ ) is 0.9271, the degree of freedom adjusted the  $R^2$  to 0.8957. The R-square results indicate that the models' independent variables could explain the dependent variable up to about 92.7%. The results (p-value of F-Stats = 0.0000 and F-statistic of 122.63).

#### **4.4.3 Impact of Environmental Reporting on Firm Value**

Table 4.9 presents the results on the impact of the individual components of environmental reporting on firms' value. On the other hand, Table 4.10 presents the results of the impact of the combined environmental reporting score on firms' value. The probability of the Hausman test is insignificant ( $p = 0.153$ ); hence the results from the Random effect estimation technique will be analysed. This part of the study addresses the third objective, which is to investigate the impact of environmental reporting on the value of manufacturing firms listed on the JSE.

**Table 4. 9: Impact of Environmental Reporting on Firm Value**

<b>Tobin's Q</b>	<b>Random Effect</b>			<b>Fixed Effects</b>		
<b>Variables</b>	<b>Coef.</b>	<b>t-stats</b>	<b>p-value</b>	<b>Coef.</b>	<b>t-stats</b>	<b>p-value</b>
ERR	-0.125	-2.49	0.014	-0.285	-2.03	0.030
EDR	-0.118	-0.73	0.463	-0.075	-0.46	0.646
SRR	0.015	2.60	0.009	0.1339	2.67	0.005
BVPS	-0.001	-8.02	0.000	-0.001	-9.28	0.000
EPS	0.001	2.63	0.011	0.001	2.26	0.023
LEVERAGE	0.003	1.52	0.128	0.002	1.27	0.205
AGE	-0.005	-0.69	0.489	-0.189	-4.83	0.000
Size	0.545	2.40	0.016	-0.409	-1.22	0.225
Constant	-0.616	-4.34	0.000	14.203	4.18	0.000
Observation	175			175		
R-squared (R <sup>2</sup> )	0.9385			0.9499		
Adjusted R <sup>2</sup>	0.9045			0.9237		
F-stats	107.673			146.86		
Prob. > F-stats	0.000			0.000		
Prob. of Hausman Test	0.153			0.153		
Durbin-Watson stats.	2.092			1.762		

Source: Author's Computation

**Table 4.10: The Impact of Combined Environmental Reporting on Firm Value**

Tobin's Q	Random Effect			Fixed Effects		
	Coef.	t-stats	p-value	Coef.	t-stats	p-value
ERR	-0.255	1.21	0.225	-0.194	0.75	0.455
BVPS	-0.001	8.02	0.000	-0.001	9.37	0.000
EPS	0.001	2.72	0.007	0.001	1.32	0.189
LEVERAGE	0.003	1.50	0.134	0.002	1.28	0.204
AGE	-0.005	0.67	0.501	-0.183	4.73	0.000
Size	0.554	2.48	0.013	-0.409	2.22	0.022
Constant	-0.541	0.32	0.748	13.873	4.18	0.000
Observation	175			175		
R-squared (R <sup>2</sup> )	0.9381			0.9153		
Adjusted R <sup>2</sup>	0.9026			0.8874		
F-stats	94.728			121.60		
Prob. > F-stats	0.000			0.000		
Prob. of Hausman Test	0.028			0.028		
Durbin-Watson stats.	1.826			1.941		

Source: Author's Computation

Table 4.9 shows the results of the impact of environmental reporting on firms' value. Concerning the coefficient of -0.125 and p-value of 0.014 > 0.05, it is clear that environmental reporting has a negative and insignificant association with Tobin's Q. Which is in contravention to the assumption that the investors value the quality of environmental reporting in accordance with the previous literature (Carandang 2020; Deswanto 2018). Furthermore, these results imply that the resources and finances used during the preparation of environmental reporting negatively impacted either share capital or net asset value. This viewpoint has been supported in a study conducted by (Li *et al.* 2019; Vijayakumaran 2019). Conversely, Carandang and Ferrer (2020) found different results, demonstrating that environmental accounting had no significant impact on firm value. Whether firms can disclose quality environmental reporting, the dependent variables will remain constant, and vice versa. Of course, research findings are influenced by factors such as the diversity in a country's historical background, the environmental strategic government delegates' structures, and the adoption of

environmental reporting differs from one firm to another. Moreover, the government requirements and accountability are perceived to be an intimidation to firms, resulting to a swift compliance with environmental regulations. Perhaps without the pressure and demand from different stakeholders, there would be very few or no environmental reporting (Mitchell and Quinn 2005) (Alshbili, Elamer and Moustafa 2021). Meanwhile, some findings (Li, Liao and Albitar 2020) suggested that when firms start implementing environmental reporting, it is expected to affect firm value negatively. However, at a specific level, environmental reporting would begin to level up the firm value positively. These results suggest that at an early stage of adopting environmental reporting would be an outflow of cash and resources. Still, when looking at the expected long-term factors, the benefits of environmental reporting would outweigh the initial spending yielding to a significant impact on firm value.

Table 4.9 tests the association between environmental degradation reporting and Tobin's Q. As reflected in Table 4.9, the coefficient of EDR is -0.118 with a p-value of 0.463, indicating a negative but insignificant connection between EDR and firm value. This implies that the influence of the other stakeholders with interest in environmental reporting degradation reporting has a relatively less significant role in firm value, probably driving the statistically insignificant EDR-valuation relationship in manufacturing firms.

In prior studies, it has been contested that the progressive increase in technological innovation leads to a rise in carbon emissions resulting in environmental degradation (Wang and Wei 2020). Thus, this eventually leads to strict environmental regulations, especially in countries like South Africa, where the disclosure of environmental reporting has been enforced to be mandatory. In a related study, the relationship between "carbon emission disclosure and firm value was tested and a significant positive relationship was set up (Hardiyansah, Agustini and Purnamawati 2021). The authors supported that such disclosure is vital as a majority of the stakeholders base their decision-making on how firms affect the wellbeing of the environment. The results meant that when a firm discloses environmental degradation, the firm value will also increase. However, this specific study revealed negative and insignificant results, suggesting that whether the firms disclose their environmental degradation results or not, the effect on firm value is negative and insignificant.

The implication of these results might be due to minimal disclosures of environmental degradation information made by 85% of South African listed manufacturing firms in such a

way that the environmental degradation reporting responsibility included in the annual integrated reports was not a detailed one, important parts such as a comprehensive plan of action to minimise environmental degradation through a thorough comparison of environmental degradation produced from one year to another. In this way, the investors can use the annual differences over the years to assess firms' relationship with the environment, amounting to a clear relationship with firm value. Therefore, it is recommended that legal officials should amend the laws that regulate the environment, tighten the monitoring and evaluation strategies, manufacturing firms should consider drafting and providing disclosure of robust environmental degradation reports, and urge firms to take part in environmental protection engagements.

Table 4.9 shows the results of the impact of social responsibility reporting (SRR) on Tobin's Q, and the results reveal a positive and significant relationship (Coeff = 0.015 and p-value = 0.009) between the two variables. These results suggest that an increase in proper and relevant presentation of environmental and social reporting responsibility information will significantly increase the value of manufacturing firms. Considering that listed manufacturing firms have made necessary disclosures of SRR information, this would assure investors to invest in manufacturing firms because social reports would also outline information about the future of manufacturing firms. This result suggests that social responsibility reporting benefits firms because it can enhance employee desires to be creative and work hard to improve productivity and performance. In addition, ERR can increase a firm's transparency; hence customers would be loyal to firms, which could lead to better firms' financial status and a good firm reputation. Conversely, other authors documented a negative relationship between SRR and firm value (Nekhili *et al.* 2017; Su, Liu and Teng 2020; Chen and Hung 2021; Hendratama and Huang 2021). The latter authors argue that an investment in social responsibility does not guarantee favourable levels of profitability.

This evidence is maintained by the stakeholder theory that postulates that SRR positively impacts shareholders' wealth because concentrating on maximising the interest and desires of other stakeholders would increase stakeholders' willingness to support firms (Bardos, Ertugrul and Gao 2020). Several researchers also document a positive relationship between SRR and firm value (Cahan *et al.* 2016; Ogachi and Zoltan 2020; Wirawan *et al.* 2020; Fuadah and Kalsum 2021; Hendratama and Huang 2021; Jadiyahappa, Iyer and Jyothi 2021; Kartika 2021; Li *et al.* 2022). This explains that firms can strategically use social responsibility reporting to

form a powerful firm value through a firm social responsibility yielding a healthy financial status in manufacturing firms. Eventually, the firm would obtain more benefits in terms of a good reputation towards the communities resulting in the attraction of new investors and unmeasured support from both local authorities and the communities. This grants a chance to manufacturing firms the ability to satisfy the demands and expectations of various individuals and institutions that are affected by manufacturing firms' operation, resulting in better levels of financial performance and firm value. In conclusion, an increase in social responsibility reporting will cause an increase in firm value.

The book value per share shows a Coefficient of -0.001 and a p-value of 0.000, indicating a negative and significant connection between variables. EPS with a Coeff= 0.001 and a p-value = 0.011, meaning that investors in manufacturing firms still use EPS as an indicator to base their decision-making. The leverage is also looking good in this case. The negative and insignificant relationship between age and firm value is revealed. A positive relationship between age and firm value is revealed where a Coefficient of 0.545 and a p-value of 0.016, suggesting that the firm size positively impacts firm value. The firm size determines firms' capabilities to meet the stakeholders' needs (Adiputra and Hermawan 2020). In this regard, firm size is a good benchmark for investors, resulting in a remarkable increase in firm value, and firm size is a variable likely to influence firm value. Taking for fact that the definition of assets states that an asset is a "resource controlled by the entity, as a result of past events and from which future economic benefits are expected to flow to the entity" (Abduxalimovna and Nabiyeovich 2021). This definition implies that assets are considered resources controlled by manufacturing firms at a historical cost and that firms expect future inflows of economic benefits. In this perspective, manufacturing firms who own assets with large book values stand a chance of excellent market capitalisation, increased firm size, profitability, and eventually increasing firm value (Luthfiah and Suherman 2018). The value R-Square of 0.9385 or 93.85% means that the independent variables of firm size influence about 93.85 % of the dependent variable of firm value. This shows that the model used for the estimation has high predictive power.

The regression results are shown in Table 4.10. The table shows the results that test the relationship between the combined environmental reporting (ERI) and Tobin's Q. These results reveal that: based on the probability value for ERR of  $0.455 > 0.05$ , it can be assumed that ERR has a negative and insignificant impact on firm value. Accordingly, BVPS show a p-



value of  $0.000 < 0.05$ , hence it can be concluded that BVPS is negatively and significantly related to firm value. EPS with a p-value of  $0.189 > 0.05$  and Leverage with a p-value of  $0.204 > 0.05$  indicating positive and insignificant relationships with ERI. Lastly, Age has a p-value of  $0.00 < 0.05$ , Size with a p-value  $0.022 < 0.05$ , indicating a negative and significant relationship. Therefore, it can be deduced that ERR with an inverse association with Tobin's Q means that it contradicts firm value. The noteworthy influence of environmental reporting scales in manufacturing industries may depend on qualitative rather than quantitative dissimilarities among the score measurements. According to these results, environmental reporting practices inversely relate to the firm value.

The findings have demonstrated that a strong firm value is not firms' motive to better their environmental reporting responsibility. Specifically, South African manufacturing firms do not consider firm value when preparing environmental reporting, as it is mandatory for all the firms to provide such reports. However, firms engaging in laudable environmental practices and performance will strengthen their environmental reporting aspects. It is so obvious that such manufacturing firms will be eager to publicise their excellent environmental performances to society. Conversely, manufacturing firms with weak environmental performance will negatively impact stock exchange prices and simultaneously badly affect the firm's value (Horn, De Klerk and De Villiers 2018). The results on the leverage suggested an insignificant positive impact, implying that the increasingly widespread possession of the firm, which is demonstrated by minimal strategic holdings, will motivate manufacturing firms to disclose quality environmental reporting; these results are in line with the results concluded by (Ananzeh *et al.* 2022). Thus, size and age also show a negative and significant relationship, implying that manufacturing firms should consider adopting environmental reporting practices that align with investors' preferences.

The fixed effect results reveal that R-squared ( $R^2$ ) is 0.9153, but with a degree of freedom adjusted the  $R^2$  to 0.8874, indicating a strong predictive power of the model amongst the variables.

#### **4.5 Summary of the Chapter**

The results demonstrated that manufacturing firms provided more positive information regarding environmental and social practices. Moreover, the researcher spotted that the firms used environmental reporting practices to boost their legitimacy to the public. This is supported by previous literature that firms use environmental reporting to display a good image to society. In a way, the firms used environmental reporting to legitimise their business activities. This part of the study sported a negative result between environmental reporting and firm value. These results further showed that the manufacturing firms disclose similar information for social and environmental reporting. The study adds to the foregoing dominant debate about environmental reporting. In the early stage, this study expands and refines the existing knowledge about the impact of environmental reporting on the value of manufacturing firms. The results of this study will therefore consolidate the existing studies in the environmental reporting research discipline by establishing and investigating the relationship between environmental reporting and firms.

## CHAPTER FIVE

### CONCLUSION AND RECOMMENDATIONS

#### 5.1 Introduction

This study aims to investigate the impact of environmental reporting on the value of South African manufacturing firms listed on the Johannesburg Stock exchange (JSE). This chapter highlights and discusses the major results and draws conclusions respectively. The present chapter further analyses the implications of findings and incorporates suggestions on improving manufacturing firms' environmental reporting. Eventually, the limitations of the study are highlighted.

#### 5.2. Summary of the study

The entire study is made up of five chapters, whereby the first chapter provided the background and the overview of the study, and the current chapter enables the organisation of the study in a manner that briefly offers the framework and outlines the major parts and leading concept of the study. Furthermore, it listed the research aims, objectives, and questions that guided the justification of the problem statement. Additionally, the problem statement of the study was thoroughly discussed to reveal the identified existing gap in the current literature, giving the significance and the need for this study.

The next chapter, Chapter Two, reviewed the existing literature on environmental reporting and was made up of discussions of the concept of environmental reporting, the development of environmental reporting, and the conceptual linkage between environmental reporting and firm performance. The chapter expanded by discussing the evolution of voluntary and mandatory disclosure and its impact on the firm profitability. The King Code III was perused, as well as other related reporting methods and standards that regulate the disclosure of environmental reporting. At this point, the literature revealed that different theories recognise environmental reporting differently. Nevertheless, various authors expressed different ideologies about environmental reporting. Some recent researchers maintain that environmental reporting is a detailed disclosure of information related to the environmental affairs of firms that communicates the relationship firms have with the environment (Demaria and Rigot 2021; Petera, Wagner and Pakšiová 2021; Rouf and Al-Faryan 2022).

Additionally, some authors advocate that environmental reporting creates value over time and is beneficial for firms in terms of good reputation (Li, Liao and Albitar 2020) and it also increases the competitive advantages of firms (Dixon-Fowler, Ellstrand and Johnson 2017). Conversely, authors such as Akumfi (2022) argue that environmental reporting is an outflow of money. Furthermore, Chapter Two discussed the three theories that underpin the study, namely: Legitimacy theory, Stakeholder theory and Agency theory. The three theories were discussed in detail to reveal the practical relationship among the main investigated variables of this present study. The literature further uncovered that adopting the currently investigated main concept has been gaining more attention worldwide and many firms and organisations have made a remarkable contribution. However, there are still challenges with regard to the adoption and disclosure of environmental reporting. Thus, firms became so mindful and took meaningful steps towards the implementation of environmental reporting.

In accordance, the third chapter discussed the prevailing research methods that outline the current methodology adopted in this specific study. Furthermore, the research paradigm and design adopted in this study were scrutinized to create a holistic understanding of how the final findings were derived. The data collection sources, procedure and the target population of the study were tackled to offer a clear context of the study. The chapter described the mechanisms used to collect data, including the procedures followed to achieve the validity and variability of the data. Furthermore, this study utilised a descriptive research design in assessing the environmental reporting practices of manufacturing firms listed on the JSE s\ . The study was conducted based on positivist research paradigm that views reality as a visible pattern and assumes that there is only one truth (Barbehön 2020). In particular, the classifications formulated by this research study reflected the researchers' perspectives or prior knowledge. The population of this study consisted of fifty (50) strictly South African manufacturing firms on the Johannesburg Stock Exchange (JSE) from 2016-2020.

Additionally, this study used sources such as MacGregor BFA and the audited integrated annual reports of the manufacturing firms. As a result, 250 integrated annual reports were scrutinised through content analysis, whereby a checklist was developed to assess the degree of significance of the provided information. Thus, the data collection was segregated into three different parts: environmental reporting responsibility, environmental degradation reporting and social responsibility reporting.

Chapter Four began by addressing the first objective, which assessed the environmental practices of manufacturing firms. The level of trend and the possible characteristics influencing the trends were carefully outlined. The chapter simultaneously reviewed the literature to draw up conclusions on the current findings of this study. The descriptive data analysis was used to assess the environmental practices of manufacturing firms. Furthermore, both random and fixed effect models were adopted to investigate the relationship among the currently investigated variables. The last part of the previous chapter further examined the link between environmental reporting and return on assets. Here, the first and second objectives were further explored, whereby the second objective examined the relationship between environmental reporting and the profitability of manufacturing firms listed on JSE. Profit was measured by ROE and the firm value was measured by Tobin's Q ratio. The current results were discussed in comparison with previous literature, and the implications were perused entirely to draw conclusions.

Finally, the current chapter of the study, aimed at summarising the entire study, pointed out the significant results and drew up a reasonable interpretation respectively. Additionally, this chapter offers recommendations to strengthen the disclosures of environmental reporting by the manufacturing firms listed on the JSE and further incorporates suggestions on the areas of focus to be improved by further researchers to refine the current knowledge and understanding of the connection between environmental reporting and firm value.

### **5.3. Summary of the Major Findings and Conclusion**

The current study addressed three objectives. The **first objective** assessed the environmental reporting practices of manufacturing firms listed on the JSE. As expected, the first objective unfolded many insights concerning environmental reporting practices. The study indicated that the practices of environmental reporting by manufacturing firms have increased over the years. This means that although King III requires all firms to be socially and environmental reporting, manufacturing firms still proved their accountability towards the environment. In essence, these results align with the legitimacy theory whereby firms keep control of their reputation or image by disclosing more quality environmental and social information, as is consistent with (Deegan 2019) and Olateju *et al.* (2021).

Moreover, these findings complemented the Agency theory in the sense that the management of manufacturing firms seemed to have taken the responsibility of disclosing more

environmental and social reporting information. Considering that the mean score on level and trend of environmental reporting practices was between 3 and 4, suggestions are that the information asymmetries were diminished to align both shareholders' and managers' interests through the disclosure of environmental reporting information and consequently reduce agency costs. In accordance, the support managers obtain from shareholders plays a prominent role in ensuring the quality of environmental reporting is being published to satisfy the needs of stakeholders.

The second objective was achieved by investigating the relationship between environmental reporting and ROE, of which ROE was used as a measurement of profitability. The regression analysis method was used to test the relationship between variables. When profitability was measured by ROE, the results revealed a negative and significant relationship. These results suggest that the adoption of environmental reporting means additional resources and funds to manufacturing firms. Thus, these results are contrary to the legitimacy theory. These results imply that investors do not consider environmental reporting as one of the factors to consider during economic decision-making. Besides, stakeholders' preferences differ, which is why manufacturing firms need to take note of majority shareholders' views regarding environmental reporting and ensure that these views are addressed and highlighted in their annual integrated report. Perhaps these results reveal that manufacturing firms are more responsible and accountable for their actions. Again, ROA revealed a positive but insignificant impact, and these results imply that environmental reporting has a direct minor beneficial impact on ROA.

The study further discovered that environmental reporting is negatively associated with Tobin's Q reflecting an insignificant effect. In particular, these findings suggest that environmental reporting is negatively related to firm value. These findings support the evidence of Jeroe (2016). Surprisingly, the study recognises that these findings are in line with previous studies administered by (Saini and Singhania 2019; Grassmann 2021). This suggests that investors disregard the environmental reporting activities of manufacturing firms during the judgement of the most suitable investment. The study's findings raise the need for all manufacturing firms to properly disclose all the environmental and social affairs that affected the firms at the time. Furthermore, manufacturing firms likely made the disclosures to satisfy the JSE requirement so that they can be recognised as accountable citizens; hence it does not interfere with the decision of investors. In conclusion, these findings imply that the total

expenditure of environmental reporting exceeds the benefits of adopting it; thus, the investigated variables set up a negative association.

#### **5.4 Recommendations and Implications of the Study**

In connection to the results of the present study, the first objective revealed that the practices of environmental reporting improve the relationship that firms have with the environment, resulting in an improved reputation and firm reputation towards society. The obtained results are consistent with the theory of legitimacy. According to these results, it is obvious that the practices of environment adopted by manufacturing firms captured the stakeholder's attention. In essence, responding to the pressures from stakeholders by disclosing the relevant environmental information following their demand was one of the economic aspects that led to positive outcomes for the South African listed manufacturing firms.

For the above-stated reasons, this study suggested that firms should commit more to responding to stakeholders' demands concerning the environment, especially primary stakeholders, by including and recognising their opinions in the corporate environmental report. Such accomplishment will undoubtedly strengthen the connection between firms and stakeholders. In this instance, manufacturing firms should consider upgrading their environmental disclosures as the benefit seems reciprocated amongst manufacturing firms and stakeholders. These results further justified that manufacturing firms should increase their dedication to environmentally friendly activities as it strengthens their reliability towards society. These findings imply that when firms maintain a civil relationship with societies, it improves firm performance and increases potential investors' interest in firms' shares. Additionally, this study put forward that manufacturing firms should dedicate capital towards environmental reporting practices to increase firm value and attract more stakeholders interested in environmental and social reporting information.

Meanwhile, the link between environmental reporting and profitability remains unresolved in the literature. Nevertheless, a pool of studies indicated a positive relationship amongst the two variables. The researcher found a positive relationship between environmental reporting and profitability when the profitability is measured with ROA, although it is not significant.

The implication of these results is that when manufacturing firms are associated with environmentally civilised activities, they gain recognition from the investors who value the

disclosures of environmental reporting. In this light, South African listed manufacturing firms dedicate resources, skills, and funds to developing and implementing environmental reporting activities.

The study further demonstrates that manufacturing firms realise an outflow of funds from their earnings during the early stage of adopting environmental reporting. Still, the long-lasting benefit of attracting investors is realised. However, when the association between environmental reporting and ROE was tested in this study, the findings suggested a significant negative relationship. Perhaps these results raise a query of how manufacturing firms can improve their Return on Equity by adopting environmental reporting. Concurrently, amongst other things, it is recommended that firms should take time to study and understand their direct stakeholders, especially those that are prominent and deliver accordingly to ensure that the expenditure costs incurred concerning environmental reporting do not exceed the expected benefit, also taking into account that the initial goal of every profit organisation is to make profits and to maximise shareholders' wealth. Furthermore, this study revealed negative results while testing the relationship between environmental reporting and firm value, which contradicts recent studies. Accordingly, assessing and investigating the financial effect of environmental reporting will be vital. This will assist in evaluating all the relevant and irrelevant expenditures of manufacturing firms and eliminate all the costs that are not needed.

Earlier on, this study highlighted that the information provided on annual integrated reports differs from one manufacturing firm to another, and obviously, it is presented in different formats, which even makes it complicated to compare the environmental reporting of manufacturing firms. , this study puts forward that the principles of the King codes should introduce requirements and standards that will promote uniformity amongst the JSE listed manufacturing firms' reports. The regularity will help overcome the unreasonable comparison between environmental reporting practices among firms. The study further recommends and emphasises that listed manufacturing firms should elicit ideas and suggestions from major stakeholders about environmental and social practices and incorporate all those ideas into the integrated annual reports.

In addition, manufacturing firms should also consider full disclosure of everything that shows their relation to the environment. It should not be the case where they write more about all the



good and provide minimal information about their negative impact. This can strengthen a solid connection between manufacturing firms with their prominent stakeholders.

### **5.5. Limitations and Suggestions for Further Studies**

This study perused and provided evidence on the association between environmental reporting and the value of manufacturing firms listed on the JSE. However, the researcher also discovered limitations that are attached to the study. This study exclusively covered South African manufacturing firms listed on the JSE, excluding other firms in other industries. As a result, the evidence of other emerging studies from other countries needs to be examined and used in the literature to a certain extent. This is because the environmental and social commands and culture differ from one country to another. As a result, this calls for further studies to expand the current study. In addition, other studies need to examine the factors influencing firms' decisions to adopt environmental reporting. Also, this study is written in English, which may be a barrier in some countries with different languages.

## References

Abduxalimovna, A. Z. and Nabiyeovich, I. I. 2021. Organization of Long-Term Asset Accounting on the Basis of International Standards. *CENTRAL ASIAN JOURNAL OF INNOVATIONS ON TOURISM MANAGEMENT AND FINANCE*, 2 (11): 86-92.

Abutabenjeh, S. and Jaradat, R. 2018. Clarification of research design, research methods, and research methodology: A guide for public administration researchers and practitioners. *Teaching Public Administration*, 36 (3): 237-258.

Acar, M. and Temiz, H. 2020. Empirical analysis on corporate environmental performance and environmental disclosure in an emerging market context: socio-political theories versus economics disclosure theories. *International Journal of Emerging Markets*,

Adiputra, I. G. and Hermawan, A. 2020. The effect of corporate social responsibility, firm size, dividend policy and liquidity on firm value: Evidence from manufacturing companies in Indonesia. *International Journal of Innovation, Creativity and Change*, 11 (6): 325-338.

Agudelo, M. A. L., Johannsdottir, L. and Davidsdottir, B. 2020. Drivers that motivate energy companies to be responsible. A systematic literature review of Corporate Social Responsibility in the energy sector. *Journal of Cleaner Production*, 247: 119094.

Ahmad, M., Waseer, W. A., Hussain, S. and Ammara, U. 2018. Relationship between environmental accounting and non-financial firms performance: An empirical analysis of selected firms listed in Pakistan Stock Exchange, Pakistan. *Advances in Social Sciences Research Journal*, 5 (1)

Akumfi, C. A. 2022. GREEN ACCOUNTING PRACTICES LESSONS FROM AN EMERGING ECONOMY; A CASE STUDY OF LISTED LIMITED LIABILITY COMPANIES IN ASHANTI REGION. KWAME NKURUMAH UNIVERSITY OF SCIENCE AND TECHNOLOGY, KUMASI.

Alipour, M., Ghanbari, M., Jamshidinavid, B. and Taherabadi, A. 2019. Does board independence moderate the relationship between environmental disclosure quality and performance? Evidence from static and dynamic panel data. *Corporate Governance: The International Journal of Business in Society*,

Alshbili, I., Elamer, A. A. and Moustafa, M. W. 2021. Social and environmental reporting, sustainable development and institutional voids: Evidence from a developing country. *Corporate Social Responsibility and Environmental Management*, 28 (2): 881-895.

Amegah, A. K. and Agyei-Mensah, S. 2017. Urban air pollution in Sub-Saharan Africa: Time for action. *Environmental Pollution*, 220: 738-743.

Amorelli, M. F. and García-Sánchez, I. M. 2021. Trends in the dynamic evolution of board gender diversity and corporate social responsibility. *Corporate Social Responsibility and Environmental Management*, 28 (2): 537-554.

Amrhein, V., Trafimow, D. and Greenland, S. 2019. Inferential statistics as descriptive statistics: There is no replication crisis if we don't expect replication. *The American Statistician*, 73 (sup1): 262-270.

Ananzeh, H., Alshurafat, H., Bugshan, A. and Hussainey, K. 2022. The impact of corporate governance on forward-looking CSR disclosure. *Journal of Financial Reporting and Accounting*,

Andrade, C. 2018. Internal, external, and ecological validity in research design, conduct, and evaluation. *Indian journal of psychological medicine*, 40 (5): 498-499.

Andrikopoulos, A., Samitas, A. and Bekiaris, M. 2014. Corporate social responsibility reporting in financial institutions: Evidence from Euronext. *Research in International Business and Finance*, 32: 27-35.

Apuke, O. D. 2017. Quantitative research methods: A synopsis approach. *Kuwait Chapter of Arabian Journal of Business and Management Review*, 33 (5471): 1-8.

Aramburu, I. A. and Pescador, I. G. 2019. The effects of corporate social responsibility on customer loyalty: The mediating effect of reputation in cooperative banks versus commercial banks in the Basque country. *Journal of business ethics*, 154 (3): 701-719.

Armstrong, N., Brewster, L., Tarrant, C., Dixon, R., Willars, J., Power, M. and Dixon-Woods, M. 2018. Taking the heat or taking the temperature? A qualitative study of a large-scale exercise in seeking to measure for improvement, not blame. *Social science & medicine*, 198: 157-164.

Aspers, P. and Corte, U. 2019. What is qualitative in qualitative research. *Qualitative sociology*, 42 (2): 139-160.

Assaad, R. H., El-adaway, I. H., Hastak, M. and LaScola Needy, K. 2022. Quantification of the state of practice of offsite construction and related technologies: Current trends and future prospects. *Journal of Construction Engineering and Management*, 148 (7): 04022055.

Atmowardoyo, H. 2018. Research methods in TEFL studies: Descriptive research, case study, error analysis, and R & D. *Journal of Language Teaching and Research*, 9 (1): 197-204.

Azman, N. A. N. N. and Salleh, S. M. 2020. Finding the Link between Corporate Financial Performance and E-Waste Reporting. *Global Business & Management Research*, 12 (4)

Baalouch, F., Ayadi, S. D. and Hussainey, K. 2019. A study of the determinants of environmental disclosure quality: evidence from French listed companies. *Journal of Management and Governance*, 23 (4): 939-971.

Baboukardos, D. and Rimmel, G. 2016. Value relevance of accounting information under an integrated reporting approach: A research note. *Journal of Accounting and Public policy*, 35 (4): 437-452.

Balluchi, F., Lazzini, A. and Torelli, R. 2021. Credibility of environmental issues in non-financial mandatory disclosure: Measurement and determinants. *Journal of Cleaner Production*, 288: 125744.

Balogh, I., Srivastava, M. and Tyll, L. 2022. Towards comprehensive corporate sustainability reporting: an empirical study of factors influencing ESG disclosures of large Czech companies. *Society and Business Review*,

Barbehön, M. 2020. Reclaiming constructivism: towards an interpretive reading of the 'Social Construction Framework'. *Policy Sciences*, 53 (1): 139-160.

Bardos, K. S., Ertugrul, M. and Gao, L. S. 2020. Corporate social responsibility, product market perception, and firm value. *Journal of Corporate Finance*, 62: 101588.

Bartels, W., Fogelberg, T., Hoballah, A. and van der Lugt, C. T. 2016. Carrots & Sticks: Global trends in sustainability reporting regulation and policy. *GRI: Amsterdam, The Netherlands*,

- Batista, A. A. d. S. and Francisco, A. C. d. 2018. Organizational sustainability practices: A study of the firms listed by the Corporate Sustainability Index. *Sustainability*, 10 (1): 226.
- Bell, E., Bryman, A. and Harley, B. 2022. *Business research methods*. Oxford university press.
- Bloomfield, J. and Fisher, M. J. 2019. Quantitative research design. *Journal of the Australasian Rehabilitation Nurses Association*, 22 (2): 27-30.
- Boeren, E. 2018. The methodological underdog: A review of quantitative research in the key adult education journals. *Adult Education Quarterly*, 68 (1): 63-79.
- Borowy, I. 2019. Before UNEP: who was in charge of the global environment? The struggle for institutional responsibility 1968–72. *Journal of Global History*, 14 (1): 87-106.
- Bose, S., Saha, A., Khan, H. Z. and Islam, S. 2017. Non-financial disclosure and market-based firm performance: The initiation of financial inclusion. *Journal of Contemporary Accounting & Economics*, 13 (3): 263-281.
- Braun, V. and Clarke, V. 2022. Conceptual and design thinking for thematic analysis. *Qualitative Psychology*, 9 (1): 3.
- Buallay, A., Fadel, S. M., Al-Ajmi, J. Y. and Saudagaran, S. 2020. Sustainability reporting and performance of MENA banks: is there a trade-off? *Measuring Business Excellence*,
- Cahan, S. F., De Villiers, C., Jeter, D. C., Naiker, V. and Van Staden, C. J. 2016. Are CSR disclosures value relevant? Cross-country evidence. *European Accounting Review*, 25 (3): 579-611.
- Cao, Y., Hiyoshi, A. and Montgomery, S. 2020. COVID-19 case-fatality rate and demographic and socioeconomic influencers: worldwide spatial regression analysis based on country-level data. *BMJ open*, 10 (11): e043560.
- Carandang, J. C. and Ferrer, R. C. 2020. Effect of environmental accounting on financial performance and firm value of listed mining and oil companies in the Philippines. *Asia-Pacific Social Science Review*, 20 (1)

- Casonato, F., Farneti, F. and Dumay, J. 2018. Social capital and integrated reporting: Losing legitimacy when reporting talk is not supported by actions. *Journal of Intellectual Capital*,
- Chen, R. C. and Hung, S. W. 2021. Exploring the impact of corporate social responsibility on real earning management and discretionary accruals. *Corporate Social Responsibility and Environmental Management*, 28 (1): 333-351.
- Cherian, J., Umar, M., Thu, P. A., Nguyen-Trang, T., Sial, M. S. and Khuong, N. V. 2019. Does corporate social responsibility affect the financial performance of the manufacturing sector? Evidence from an emerging economy. *Sustainability*, 11 (4): 1182.
- Chetty, S., Naidoo, R. and Seetharam, Y. 2015. The impact of corporate social responsibility on firms' financial performance in South Africa. *Contemporary Economics*, 9 (2): 193-214.
- Chvileva, T. and Golovina, E. 2017. Publication of reporting of metallurgical companies in context of the concept of corporate sustainable development. *Journal of Industrial Pollution Control*: 926-930.
- Clark, K. R. and Vealé, B. L. 2018. Strategies to enhance data collection and analysis in qualitative research. *Radiologic technology*, 89 (5): 482CT-485CT.
- Cortesi, A. and Vena, L. 2019. Disclosure quality under Integrated Reporting: A value relevance approach. *Journal of Cleaner Production*, 220: 745-755.
- Crede, M., Jong, J. and Harms, P. 2019. The generalizability of transformational leadership across cultures: a meta-analysis. *Journal of Managerial Psychology*,
- Creswell, J. W. and Creswell, J. D. 2017. *Research design: Qualitative, quantitative, and mixed methods approaches*. Sage publications.
- Dannels, S. A. 2018. Research design. In: *The reviewer's guide to quantitative methods in the social sciences*. Routledge, 402-416.
- Das, P. K. 2017. An introduction to the concept of environmental accounting and reporting- Indian scenario. *Imperial Journal of Interdisciplinary Research*, 3 (4): 13-22.

- Dawadi, S., Shrestha, S. and Giri, R. A. 2021. Mixed-methods research: A discussion on its types, challenges, and criticisms. *Online Submission*, 2 (2): 25-36.
- Deegan, C., Rankin, M. and Tobin, J. 2002. An examination of the corporate social and environmental disclosures of BHP from 1983-1997: A test of legitimacy theory. *Accounting, Auditing & Accountability Journal*,
- Deegan, C. M. 2019. Legitimacy theory: Despite its enduring popularity and contribution, time is right for a necessary makeover. *Accounting, Auditing & Accountability Journal*,
- Demaria, S. and Rigot, S. 2021. Corporate environmental reporting: Are French firms compliant with the Task Force on Climate Financial Disclosures' recommendations? *Business Strategy and the Environment*, 30 (1): 721-738.
- Demirel, E. and Eskin, İ. 2021. Investigation of the Effects of Environment on Financial Reporting. In: *Ethics and Sustainability in Accounting and Finance, Volume II*. Springer, 19-38.
- Deswanto, R. B. and Siregar, S. V. 2018. The associations between environmental disclosures with financial performance, environmental performance, and firm value. *Social Responsibility Journal*,
- Dixon-Fowler, H. R., Ellstrand, A. E. and Johnson, J. L. 2017. The role of board environmental committees in corporate environmental performance. *Journal of business ethics*, 140 (3): 423-438.
- Dkhili, H. 2018. Environmental performance and institutions quality: evidence from developed and developing countries.
- Domínguez, C. R., Mares, J. I. P. and Hernández, R. G. Z. 2021. Hazard identification and analysis in work areas within the Manufacturing Sector through the HAZID methodology. *Process Safety and Environmental Protection*, 145: 23-38.
- Drempetic, S., Klein, C. and Zwergel, B. 2020. The influence of firm size on the ESG score: Corporate sustainability ratings under review. *Journal of business ethics*, 167 (2): 333-360.

Dumay, J., De Villiers, C., Guthrie, J. and Hsiao, P.-C. 2018. Thirty years of Accounting, Auditing and Accountability Journal: A critical study of the journal's most cited articles. *Accounting, Auditing & Accountability Journal*,

Effendi, B. 2020. The Effect of Environmental Accounting on the Increase in Firm Value. In: Proceedings of *Conference Series*. 122-136.

Emmanuel, U. and Ifeanyichukwu, A. P. 2021. Environmental accounting disclosure and financial performance of manufacturing firms in Nigeria. *Journal of Economics and International Business Management*, 9 (2): 71-81.

Fang, K., Wei, Q. and Logan, K. K. 2017. Protecting the Public's Environmental Right-to-Know: Developments and Challenges in China's Legislative System for EEID, 2007-2015. *Journal of Environmental Law*, 29 (2): 285-315.

Finau, G. 2020. Imagining the future of social and environmental accounting research for pacific small island developing states. *Social and Environmental Accountability Journal*, 40 (1): 42-52.

Fu, L., Singhal, R. and Parkash, M. 2016. Tobin's q ratio and firm performance. *International research journal of applied finance*, 7 (4): 1-10.

Fuadah, L. L. and Kalsum, U. 2021. The impact of corporate social responsibility on firm value: The role of tax aggressiveness in Indonesia. *The Journal of Asian Finance, Economics and Business*, 8 (3): 209-216.

Gao, L., Wang, S., Li, J. and Li, H. 2017. Application of the extended theory of planned behavior to understand individual's energy saving behavior in workplaces. *Resources, Conservation and Recycling*, 127: 107-113.

Garavan, T., McCarthy, A., Sheehan, M., Lai, Y., Saunders, M. N., Clarke, N., Carbery, R. and Shanahan, V. 2019. Measuring the organizational impact of training: The need for greater methodological rigor. *Human resource development quarterly*, 30 (3): 291-303  
García-Sánchez, I.-M., Hussain, N., Khan, S.-A. and Martínez-Ferrero, J. 2021. Do markets punish or reward corporate social responsibility decoupling? *Business & Society*, 60 (6): 1431-1467.



Gerged, A. M., Beddewela, E. and Cowton, C. J. 2021. Is corporate environmental disclosure associated with firm value? A multicountry study of Gulf Cooperation Council firms. *Business Strategy and the Environment*, 30 (1): 185-203.

Ghosh, S. 2015. Communication of corporate social responsibility activities by private sector companies in India: Research findings and insights. *Metamorphosis*, 14 (2): 30-50.

Goduka, N. 2012. From positivism to indigenous science: A reflection on world views, paradigms and philosophical assumptions. *Africa insight*, 41 (4): 123-138.

Grassmann, M. 2021. The relationship between corporate social responsibility expenditures and firm value: The moderating role of integrated reporting. *Journal of Cleaner Production*, 285: 124840.

Grundler, M. R., Singhal, S., Cowan, M. A. and Rabosky, D. L. 2019. Is genomic diversity a useful proxy for census population size? Evidence from a species-rich community of desert lizards. *Molecular ecology*, 28 (7): 1664-1674.

Gupta, G. 2021. Impact of environmental accounting practices on firm performance and environmental efficiency-An empirical study with reference to the Indian Sugarcane Industry. *JIMS8M The Journal of Indian Management & Strategy*, 26 (2): 33-44.

Hannoon, A., Abdalla, Y. A., Musleh Al-Sartawi, A. and Khalid, A. A. 2021. Board of directors composition and social media financial disclosure: the case of the United Arab Emirates. In: *The Big Data-Driven Digital Economy: Artificial and Computational Intelligence*. Springer, 229-241.

Hardiyansah, M., AGUSTINI, A. T. and PURNAMAWATI, I. 2021. The effect of carbon emission disclosure on firm value: environmental performance and industrial type. *The Journal of Asian Finance, Economics and Business*, 8 (1): 123-133.

Harun, M. S., Hussainey, K., Kharuddin, K. A. M. and Al Farooque, O. 2020. CSR disclosure, corporate governance and firm value: a study on GCC Islamic banks. *International Journal of Accounting & Information Management*, 28 (4): 607-638.

Hendratama, T. D. and Huang, Y.-C. 2021. Corporate social responsibility, firm value and life cycle: evidence from Southeast Asian countries. *Journal of Applied Accounting Research*,

- Hennink, M., Hutter, I. and Bailey, A. 2020. *Qualitative research methods*. Sage.
- Hoang, T. 2018. The role of the integrated reporting in raising awareness of environmental, social and corporate governance (ESG) performance. In: *Stakeholders, Governance and Responsibility*. Emerald Publishing Limited.
- Hörisch, J., Schaltegger, S. and Freeman, R. E. 2020. Integrating stakeholder theory and sustainability accounting: A conceptual synthesis. *Journal of Cleaner Production*, 275: 124097.
- Horn, R., De Klerk, M. and De Villiers, C. 2018. The association between corporate social responsibility reporting and firm value for South African firms. *South African Journal of Economic and Management Sciences*, 21 (1): 1-10.
- Horsfall, K. and Womenazu, H. S. 2022. ENVIRONMENTAL DEGRADATION COST AND FINANCIAL PERFORMANCE OF OIL AND GAS COMPANIES IN NIGERIA. *BW Academic Journal*, 1 (1): 11-11.
- Hossain, M., Hecimovic, A. and Choudhury Lema, A. 2015. Corporate social and environmental responsibility reporting practices from an emerging mobile telecommunications market. *Australian Accounting Review*, 25 (4): 389-404.
- Hossain, M. S. and Saif, A. N. M. 2019. Impact of firm size on financial performance of banking companies in Bangladesh. *Journal of Banking & Financial Services*, 11 (2): 143-160.
- Hu, Q., Zhu, T., Lin, C.-L., Chen, T. and Chin, T. 2021. Corporate social responsibility and firm performance in china's manufacturing: A global perspective of business models. *Sustainability*, 13 (4): 2388.
- Igbekoyi, O. E., Solanke, F. T., ADEUSI, S. A., Alade, M. E. and Agbaje, W. H. 2022. Environmental Accounting Disclosure and Financial Performance of Listed Multinational Firms in Nigeria. *Global Journal of Management And Business Research*,
- Indrasari, A., NUGRAHANI, P., HAMZAH, N. and MAELAH, R. 2021. Motivational factors of implementing corporate social and environmental reporting and its impact on performance. *The Journal of Asian Finance, Economics and Business*, 8 (2): 883-892.

- Izzo, M. F., Ciaburri, M. and Tiscini, R. 2020. The challenge of sustainable development goal reporting: The first evidence from Italian listed companies. *Sustainability*, 12 (8): 3494.
- Jackson, G., Bartosch, J., Avetisyan, E., Kinderman, D. and Knudsen, J. S. 2020. Mandatory non-financial disclosure and its influence on CSR: An international comparison. *Journal of business ethics*, 162 (2): 323-342.
- Jadiyappa, N., Iyer, S. R. and Jyothi, P. 2021. Does social responsibility improve firm value? Evidence from mandatory corporate social responsibility regulations in India. *International Review of Finance*, 21 (2): 653-660.
- Janardhanan, A. K. and Uma, V. 2020. The role of internal control and firm-specific characteristics on firm value: Evidence from Indian financial services sector. *Indian Journal of Finance and Banking*, 4 (1): 117-133.
- Jensen, M. C. and Meckling, W. H. 1976. Theory of the firm: Managerial behavior, agency costs and ownership structure. In: *Corporate Governance*. Gower, 77-132.
- Jeroe, A. 2016. Integrated reporting, non-financial information and financial performance. *Erasmus University Rotterdam*,
- Khan, M.K., Zahid, R.A., Saleem, A. and Sági, J., 2021. Board composition and social & environmental accountability: a dynamic model analysis of Chinese firms. *Sustainability*, 13(19):2-18.
- Karaman, A. S., Kilic, M. and Uyar, A. 2018. Sustainability reporting in the aviation industry: worldwide evidence. *Sustainability Accounting, Management and Policy Journal*,
- Kartika, I. 2021. Corporate Governance, Corporate Social Responsibility and Firm Value: Evidence from Indonesia. *International Journal of Business Economics (IJBE)*, 3 (1): 64-81
- Kaur, P., Stoltzfus, J. and Yellapu, V. 2018. Descriptive statistics. *International Journal of Academic Medicine*, 4 (1): 60.
- Kays, A. 2022. Voluntary Disclosure Responses to Mandated Disclosure: Evidence from Australian Corporate Tax Transparency. *The accounting review*, 97 (4): 317-344.

- La Soa Nguyen, M. D. T., Nguyen, T. X. H. and Le, Q. H. 2017. Factors affecting disclosure levels of environmental accounting information: The case of Vietnam. *Accounting and Finance Research*, 6 (4)
- Lange, D. and Bundy, J. 2018. The association between ethics and stakeholder theory. In: *Sustainability, stakeholder governance, and corporate social responsibility*. Emerald Publishing Limited.
- Lear, C. H., Anand, P., Blenkinsop, T., Foster, G. L., Gagen, M., Hoogakker, B., Larter, R. D., Lunt, D. J., McCave, I. N. and McClymont, E. 2021. Geological Society of London Scientific Statement: what the geological record tells us about our present and future climate. *Journal of the Geological Society*, 178 (1)
- Lee, K.-W. and Yeo, G. H.-H. 2016. The association between integrated reporting and firm valuation. *Review of Quantitative Finance and Accounting*, 47 (4): 1221-1250.
- Lee, S. Y. and Klassen, R. D. 2016. Firms' response to climate change: The interplay of business uncertainty and organizational capabilities. *Business Strategy and the Environment*, 25 (8): 577-592.
- Li, L., Liu, Q., Wang, J. and Hong, X. 2019. Carbon information disclosure, marketization, and cost of equity financing. *International Journal of Environmental Research and Public Health*, 16 (1): 150.
- Li, Y., de Villiers, C., Li, L. Z. and Li, L. 2022. The moderating effect of board gender diversity on the relation between corporate social responsibility and firm value. *Journal of Management Control*, 33 (1): 109-143.
- Li, Y., Gong, M., Zhang, X.-Y. and Koh, L. 2018. The impact of environmental, social, and governance disclosure on firm value: The role of CEO power. *The British Accounting Review*, 50 (1): 60-75.
- Li, Z., Liao, G. and Albitar, K. 2020. Does corporate environmental responsibility engagement affect firm value? The mediating role of corporate innovation. *Business Strategy and the Environment*, 29 (3): 1045-1055.

- Liao, L., Luo, L. and Tang, Q. 2015. Gender diversity, board independence, environmental committee and greenhouse gas disclosure. *The British Accounting Review*, 47 (4): 409-424.
- Lin, S., Wang, S., Marinova, D., Zhao, D. and Hong, J. 2017. Impacts of urbanization and real economic development on CO2 emissions in non-high income countries: Empirical research based on the extended STIRPAT model. *Journal of Cleaner Production*, 166: 952-966.
- Liu, Z. and Liu, M. 2021. Quality evaluation of enterprise environmental accounting information disclosure based on projection pursuit model. *Journal of Cleaner Production*, 279: 123679.
- Luthfiah, A. A. and Suherman, S. 2018. The effects of financial performance toward firm value with ownership structure as moderating variable (the study on manufacturing companies listed in Indonesia Stock Exchange in the period of 2012-2016). *Journal of Business and Behavioural Entrepreneurship*, 2 (1): 18-27.
- Ma, Y., Zhang, Q., Yin, Q. and Wang, B. 2019. The influence of top managers on environmental information disclosure: The moderating effect of company's environmental performance. *International Journal of Environmental Research and Public Health*, 16 (7): 1167.
- Maama, H. and Appiah, K. O. 2019a. Green accounting practices: lesson from an emerging economy. *Qualitative Research in Financial Markets*,
- Maama, H. and Appiah, K. O. 2019b. Green accounting practices: lesson from an emerging economy. *Qualitative Research in Financial Markets*, 11 (4): 456-478.
- Maama, H. and Mkhize, M. 2020a. Integrated reporting practice in a developing country—Ghana: legitimacy or stakeholder oriented? *International Journal of Disclosure and Governance*, 17 (4): 230-244.
- Maama, H. and Mkhize, M. 2020b. Integration of non-financial information into corporate reporting: a theoretical perspective. *Academy of Accounting and Financial Studies Journal*, 24 (2): 1-15.

- Maarouf, H. 2019. Pragmatism as a supportive paradigm for the mixed research approach: Conceptualizing the ontological, epistemological, and axiological stances of pragmatism. *International Business Research*, 12 (9): 1-12.
- Malik, S.Y., Cao, Y., Mughal, Y.H., Kundi, G.M., Mughal, M.H. and Ramayah, T., 2020. Pathways towards sustainability in organizations: Empirical evidence on the role of green human resource management practices and green intellectual capital. *Sustainability*, 12(8): 2-24.
- Mandler, T., Sezen, B., Chen, J. and Özsomer, A. 2021. Performance consequences of marketing standardization/adaptation: A systematic literature review and future research agenda. *Journal of Business Research*, 125: 416-435.
- Mans-Kemp, N. and van der Lugt, C. T. 2020. Linking integrated reporting quality with sustainability performance and financial performance in South Africa. *South African Journal of Economic and Management Sciences*, 23 (1): 1-11.
- Marrone, M., Linnenluecke, M. K., Richardson, G. and Smith, T. 2020. Trends in environmental accounting research within and outside of the accounting discipline. *Accounting, Auditing & Accountability Journal*,
- Martínez-Ferrero, J., Banerjee, S. and García-Sánchez, I. M. 2016. Corporate social responsibility as a strategic shield against costs of earnings management practices. *Journal of business ethics*, 133 (2): 305-324.
- Meech, D. and Bayliss, T. 2021. International developments in sustainability reporting.
- Mensah, E., Frimpong, K. and Maama, H. 2017. Environmental Reporting Practices by Listed Manufacturing Firms: The Perspective of an Emerging Economy. *Asian Journal of Economics, Business and Accounting*, 2 (3): 1-12.
- Mio, C., Fasan, M., Marcon, C. and Panfilo, S. 2020. The predictive ability of legitimacy and agency theory after the implementation of the EU directive on non-financial information. *Corporate Social Responsibility and Environmental Management*, 27 (6): 2465-2476.
- Mishra, P., Pandey, C. M., Singh, U., Gupta, A., Sahu, C. and Keshri, A. 2019. Descriptive statistics and normality tests for statistical data. *Annals of cardiac anaesthesia*, 22 (1): 67.

- Mitchell, C. and Quinn, N. 2005. Environmental reporting disclosure in South Africa: A comparative study of the expectations of selected groups of preparers and users. *Meditari: Research Journal of the School of Accounting Sciences*, 13 (2): 17-33.
- Moloi, T. and Iredele, O. O. 2020. Firm value and integrated reporting quality of South African listed firms.
- Munoz, E., Zhao, L. and Yang, D. C. 2017. Issues in sustainability accounting reporting. *Accounting and Finance Research*, 6 (3): 64.
- Murguia, J. M. and Lence, S. H. 2015. Investors' reaction to environmental performance: a global perspective of the Newsweek's "Green Rankings". *Environmental and Resource Economics*, 60 (4): 583-605.
- Nekhili, M., Nagati, H., Chtioui, T. and Rebolledo, C. 2017. Corporate social responsibility disclosure and market value: Family versus nonfamily firms. *Journal of Business Research*, 77: 41-52.
- Ng, S. H., Teh, B. H., Ooi, S. H., San Ong, T. and Soh, W. N. 2019. Does environmental reporting matter? *The Journal of Developing Areas*, 53 (3)
- Nguyen, L. and Tran, M. 2019. Disclosure levels of environmental accounting information and financial performance: The case of Vietnam. *Management Science Letters*, 9 (4): 557-570.
- Nguyen, T. K. T. 2020. Studying factors affecting environmental accounting implementation in mining enterprises in Vietnam. *The Journal of Asian Finance, Economics and Business*, 7 (5): 131-144.
- Nguyen, V. H., Nguyen, T. T. C., Nguyen, V. T. and DO, D. T. 2021. Internal Factors Affecting Firm Performance: A Case Study in Vietnam. *The Journal of Asian Finance, Economics and Business*, 8 (5): 303-314.
- Nicholls, J. A. 2020. Integrating financial, social and environmental accounting. *Sustainability Accounting, Management and Policy Journal*,

Nielsen, B. B., Welch, C., Chidlow, A., Miller, S. R., Aguzzoli, R., Gardner, E., Karafyllia, M. and Pegoraro, D. 2020. Fifty years of methodological trends in JIBS: Why future IB research needs more triangulation. *Journal of International Business Studies*, 51 (9): 1478-1499.

Nishitani, K. and Kokubu, K. 2020. Can firms enhance economic performance by contributing to sustainable consumption and production? Analyzing the patterns of influence of environmental performance in Japanese manufacturing firms. *Sustainable Production and Consumption*, 21: 156-169.

Ofoegbu, G. N., Odoemelam, N. and Okafor, R. G. 2018. Corporate board characteristics and environmental disclosure quantity: Evidence from South Africa (integrated reporting) and Nigeria (traditional reporting). *Cogent Business & Management*, 5 (1): 1551510.

Ogachi, D. and Zoltan, Z. 2020. Corporate social responsibility and firm value protection. *International Journal of Financial Studies*, 8 (4): 72.

Okafor, A., Adeleye, B. N. and Adusei, M. 2021. Corporate social responsibility and financial performance: Evidence from US tech firms. *Journal of Cleaner Production*, 292: 126078.

Okoye, P. and Asika, E. R. 2013. An appraisal of sustainability environmental accounting in enhancing corporate productivity and economic performance. *International Journal of Advanced Research*, 1 (8): 685-693.

Olateju, D. J., Olateju, O. A., Adeoye, S. V. and Ilyas, I. S. 2021. A critical review of the application of the legitimacy theory to corporate social responsibility. *International Journal of Managerial Studies and Research*, 9 (3): 1-6.

Olawale, L. S., Ilo, B. M. and Lawal, F. K. 2017. The effect of firm size on performance of firms in Nigeria. *Aestimatio: The IEB International Journal of Finance*, (15): 68-87.

Olayeni, A., Ogbo, A., Okwo, H., Chukwu, B., Ifediora, C. and Ezenwakwelu, C. 2021. Green strategy effect on financial and environmental performance: A mediation analysis of product quality. *Sustainability*, 13 (4): 2115.

Olowookere, J. K., Taiwo, A. A. and Onifade, A. O. 2021. Environmental Accounting Disclosure Practices and Financial Performance of Listed Cement Companies in Nigeria. *Gusau Journal of Accounting and Finance*, 2 (2): 12-12.



Osemene, O. F., Adinnu, P., Fagbemi, T. O. and Olowookere, J. K. 2021. Corporate Governance and Environmental Accounting Reporting in Selected Quoted African Companies. *Global Business Review*: 09721509211010989.

Pandey, P. and Pandey, M. M. 2021. *Research methodology tools and techniques*. Bridge Center.

Panthee, D. 2020. *Uses and Limitations of Quantitative Research in English Language Education*.

Paoletti, J., Bisbey, T. M., Zajac, S., Waller, M. J. and Salas, E. 2021. Looking to the middle of the qualitative-quantitative spectrum for integrated mixed methods. *Small Group Research*, 52 (6): 641-675.

Park, Y. S., Konge, L. and Artino, A. R. 2020. The positivism paradigm of research. *Academic Medicine*, 95 (5): 690-694.

Pérez Rave, J. I., Jaramillo Álvarez, G. P. and González Echavarría, F. 2021. A psychometric data science approach to study latent variables: a case of class quality and student satisfaction. *Total Quality Management & Business Excellence*: 1-26.

Petera, P., Wagner, J. and Pakšiová, R. 2021. The influence of environmental strategy, environmental reporting and environmental management control system on environmental and economic performance. *Energies*, 14 (15): 4637.

Posadas, S. C. and Tarquinio, L. 2021. Assessing the Effects of Directive 2014/95/EU on Nonfinancial Information Reporting: Evidence from Italian and Spanish Listed Companies. *Administrative Sciences*, 11 (3): 89.

Qian, W., Tilt, C., Dissanayake, D. and Kuruppu, S. 2020. Motivations and impacts of sustainability reporting in the Indo-Pacific region: Normative and instrumental stakeholder approaches. *Business Strategy and the Environment*, 29 (8): 3370-3384.

- Radhouane, I., Nekhili, M., Nagati, H. and Paché, G. 2018. The impact of corporate environmental reporting on customer-related performance and market value. *Management Decision*,
- Rahman, M. S. 2020. The advantages and disadvantages of using qualitative and quantitative approaches and methods in language “testing and assessment” research: A literature review.
- Ren, S., Wei, W., Sun, H., Xu, Q., Hu, Y. and Chen, X. 2020. Can mandatory environmental information disclosure achieve a win-win for a firm’s environmental and economic performance? *Journal of Cleaner Production*, 250: 119530.
- Renz, S. M., Carrington, J. M. and Badger, T. A. 2018. Two strategies for qualitative content analysis: An intramethod approach to triangulation. *Qualitative health research*, 28 (5): 824-831.
- Rezaee, Z. 2016. Business sustainability research: A theoretical and integrated perspective. *Journal of Accounting literature*, 36: 48-64.
- Rezaee, Z. 2017. *Business sustainability: Performance, compliance, accountability and integrated reporting*. Routledge.
- Rezaee, Z., Dou, H. and Zhang, H. 2020. Corporate social responsibility and earnings quality: Evidence from China. *Global Finance Journal*, 45: 100473.
- Rezaee, Z. and Tuo, L. 2019. Are the quantity and quality of sustainability disclosures associated with the innate and discretionary earnings quality? *Journal of business ethics*, 155 (3): 763-786.
- Rouf, M. A. and Al-Faryan, M. A. S. 2022. Does corporate governance affect environmental reporting? *PSU Research Review*, (ahead-of-print)
- Ruan, L. and Liu, H. 2021. Environmental, social, governance activities and firm performance: Evidence from China. *Sustainability*, 13 (2): 767.
- Rupley, K. H., Brown, D. and Marshall, S. 2017. Evolution of corporate reporting: From stand-alone corporate social responsibility reporting to integrated reporting. *Research in Accounting Regulation*, 29 (2): 172-176.

Sahin, S. and Mete, J. 2021. A Brief Study on Descriptive Research:: Its Nature and Application in Social Science. *International Journal of Research and Analysis in Humanities*, 1 (1): 11-11.

Saini, N. and Singhania, M. 2019. Performance relevance of environmental and social disclosures: The role of foreign ownership. *Benchmarking: An International Journal*,

Sarpong-Danquah, B., Gyimah, P., Afriyie, R. O. and Asiamah, A. 2018. Corporate governance and firm performance: An empirical analysis of manufacturing listed firms in Ghana. *Accounting and Finance Research*, 7 (3): 111-118.

Sarstedt, M. and Danks, N. P. 2022. Prediction in HRM research—a gap between rhetoric and reality. *Human Resource Management Journal*, 32 (2): 485-513.

Schreier, M. 2018. Sampling and generalization. *The SAGE handbook of qualitative data collection*: 84-97.

Shad, M. K., Lai, F.-W., Fatt, C. L., Klemeš, J. J. and Bokhari, A. 2019. Integrating sustainability reporting into enterprise risk management and its relationship with business performance: A conceptual framework. *Journal of Cleaner Production*, 208: 415-425.

Sharif, M. and Rashid, K. 2014. Corporate governance and corporate social responsibility (CSR) reporting: an empirical evidence from commercial banks (CB) of Pakistan. *Quality & Quantity*, 48 (5): 2501-2521.

Sharma, D., Bhattacharya, S. and Thukral, S. 2019. Resource-based view on corporate sustainable financial reporting and firm performance: evidences from emerging Indian economy. *International Journal of Business Governance and Ethics*, 13 (4): 323-344.

Silva, S. 2021. Corporate contributions to the Sustainable Development Goals: An empirical analysis informed by legitimacy theory. *Journal of Cleaner Production*, 292: 125962.

Şimsek, H. and Ozturk, G. 2021. Evaluation of the relationship between environmental accounting and business performance: the case of Istanbul province. *Green Financ*, 3: 46-58.

- Soyemi, K. A., Okewale, J. A. and Olaniyan, J. D. 2021. Environmental responsiveness and firm value: Evidence from Nigeria. *Acta Universitatis Sapientiae, Economics and Business*, 9 (1): 133-155.
- Stolowy, H. and Paugam, L. 2018. The expansion of non-financial reporting: an exploratory study. *Accounting and Business Research*, 48 (5): 525-548.
- Su, R., Liu, C. and Teng, W. 2020. The heterogeneous effects of CSR dimensions on financial performance—a new approach for CSR measurement. *Journal of Business Economics and Management*, 21 (4): 987-1009.
- Syakhroza, A., Diyanty, V. and Dewo, S. A. 2021. Top management team (TMT) age diversity and firm performance: the moderating role of the effectiveness of TMT meetings. *Team Performance Management: An International Journal*.
- Tahajuddin, S., Xin, Z., Kassim, A. W. M. and Noordin, R. 2021. Social Stakeholders' Pressure on Environmental Accounting Reporting in Small and Medium Enterprises—Evidence from China. *International Journal of Research in Engineering, Science and Management*, 4 (1): 82-87.
- Uher, J. 2021. Quantitative psychology under scrutiny: Measurement requires not result-dependent but traceable data generation. *Personality and Individual Differences*, 170: 110205.
- Usono, N. J. 2022. Relationship between Capital Structure and Financial Performance of US Retail Bank. Walden University.
- Vallone, C. 2022. The Role and Expectations of Stakeholders in the New Non-financial Disclosure Regulations. In: *Non-financial Disclosure and Integrated Reporting*. Springer, 383-391.
- Van Baalen, S. and Mobjörk, M. 2018. Climate change and violent conflict in East Africa: Integrating qualitative and quantitative research to probe the mechanisms. *International Studies Review*, 20 (4): 547-575.
- Vijayakumaran, R. 2019. Efficiency of working capital management and firm value: evidence from Chinese listed firms. *International Journal of Financial Research*, 10 (6): 133-144.

- Vollero, A., Conte, F., Siano, A. and Covucci, C. 2019. Corporate social responsibility information and involvement strategies in controversial industries. *Corporate Social Responsibility and Environmental Management*, 26 (1): 141-151.
- Vuong, Q.H., La, V.P., Nguyen, H.K.T., Ho, M.T., Vuong, T.T. and Ho, M.T., 2021. Identifying the moral–practical gaps in corporate social responsibility missions of Vietnamese firms: An event-based analysis of sustainability feasibility. *Corporate Social Responsibility and Environmental Management*, 28(1):30-41.
- Vourvachis, P. and Woodward, T. 2015. Content analysis in social and environmental reporting research: trends and challenges. *Journal of Applied Accounting Research*,
- Wang, H. and Wei, W. 2020. Coordinating technological progress and environmental regulation in CO2 mitigation: The optimal levels for OECD countries & emerging economies. *Energy Economics*, 87: 104510.
- White, K., Habib, R. and Hardisty, D. J. 2019. How to SHIFT consumer behaviors to be more sustainable: A literature review and guiding framework. *Journal of Marketing*, 83 (3): 22-49.
- Wirawan, A. W., Falah, L. J., Kusumadewi, L., Adhariani, D. and Djakman, C. D. 2020. The effect of corporate social responsibility on the firm value with risk management as a moderating variable. *Journal of Asia-Pacific Business*, 21 (2): 143-160.
- Ye, M., Wang, H. and Lu, W. 2021. Opening the “black box” between corporate social responsibility and financial performance: From a critical review on moderators and mediators to an integrated framework. *Journal of Cleaner Production*, 313: 127919.
- Yu, Y., Zhang, J.Z., Cao, Y. and Kazancoglu, Y., 2021. Intelligent transformation of the manufacturing industry for Industry 4.0: Seizing financial benefits from supply chain relationship capital through enterprise green management. *Technological Forecasting and Social Change*, 172: 2-12.
- Zahid, M., Rahman, H. U., Ali, W., Khan, M., Alharthi, M., Qureshi, M. I. and Jan, A. 2020. Boardroom gender diversity: Implications for corporate sustainability disclosures in Malaysia. *Journal of Cleaner Production*, 244: 118683.

Zamil, G. S. and Hassan, Z. 2019. Impact of environmental reporting on financial performance: Study of global Fortune 500 companies. *Indonesian Journal of Sustainability Accounting and Management*, 3 (2): 109-118.

Zeng, T. 2016. Corporate social responsibility, tax aggressiveness, and firm market value. *Accounting Perspectives*, 15 (1): 7-30.

Zhou, S., Simnett, R. and Green, W. 2017. Does integrated reporting matter to the capital market? *Abacus*, 53 (1): 94-132.

Zhou, Y., Wang, X. and Yuen, K. F. 2021. Sustainability disclosure for container shipping: A text-mining approach. *Transport Policy*, 110: 465-477.

## TURNITIN REPORT

THE IMPACT OF ENVIRONMENTAL REPORTING ON THE VALUE OF SOUTH AFRICAN MANUFACTURING FIRMS LISTED ON THE JSE  
Nolwando L Mgilane

### ORIGINALITY REPORT

13%

SIMILARITY INDEX

11%

INTERNET SOURCES

10%

PUBLICATIONS

5%

STUDENT PAPERS

### PRIMARY SOURCES

1	<a href="http://ulspace.ul.ac.za">ulspace.ul.ac.za</a> Internet Source	1%
2	<a href="http://www.researchgate.net">www.researchgate.net</a> Internet Source	<1%
3	Haruna Maama, Ferina Marimuthu. "chapter 26 Climate Change Accounting and Value Growth of Financial Institutions in West Africa", IGI Global, 2021 Publication	<1%
4	<a href="http://link.springer.com">link.springer.com</a> Internet Source	<1%
5	<a href="http://uir.unisa.ac.za">uir.unisa.ac.za</a> Internet Source	<1%
6	<a href="http://researchcommons.waikato.ac.nz">researchcommons.waikato.ac.nz</a> Internet Source	<1%
7	Haruna Maama, Ferina Marimuthu. "Integrated reporting and cost of capital in	<1%