



PhD thesis

The impact of environmental accountability on firm corporate lobbying behaviour: an empirical investigation of US listed firms
Khan, M.

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**THE IMPACT OF ENVIRONMENTAL ACCOUNTABILITY ON FIRM
CORPORATE LOBBYING BEHAVIOUR
AN EMPIRICAL INVESTIGATION OF US LISTED FIRMS**

A thesis submitted in partial fulfilment of the requirements of Middlesex University for
the degree of Doctor of Philosophy in Accounting and Finance

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January 2024

DECLARATION

I declare that the entirety of this thesis has been constructed and organised by myself.

I also declare that all the information and data within this thesis has been obtained and presented in accordance to university regulations and university ethical standards.

Mohammed Ibrahim Khan

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ABBREVIATIONS

CBM – Community-Based Monitoring

CDP – Carbon Disclosure Project

CEO – Chief Executive Officer

CSR – Corporate Social Responsibility

D – Dummy

EPA – Environmental Protection Agency

ETS – Emission Trading Scheme

EU – European Union

GHG – Greenhouse Gases

GLS – Generally Least Squares

IT – Information Technology

IV – Instrumental Variable

JSE – Johannesburg Securities Exchange

LM – Lagrange Multiplier

NASA – National Aeronautics and Space Administration

NGO – Non-Governmental Organisation

NPRI – National Pollutant Release Inventory

OLS – Ordinary Least Squares

ROA – Return on Assets

SCAR – Standardized Cumulative Abnormal Returns

2SLS – Two-Stage Least Squares

SME – Small and Medium Enterprises

TRI – Toxic Release Inventory

UK – United Kingdom

UNFCCC – United Nations Framework Convention on Climate Change

US – United States

ABSTRACT

This thesis aims to investigate an understanding into the behaviour of firms in relation to the environment contextualized within the political arena of the US. By employing a quantitative research approach, the thesis consists of three empirical studies (covering firm level data between 2010 to 2020) based on four theoretical underpinnings, namely; public choice, tollbooth, legitimacy and stewardship.

The first study sampled US firms and looked at their corporate lobbying spending. After running both the fixed effect and random effect models along with the Hausman test to determine which model was best applicable to the hypothesis, the random effect model illustrated optimal results concluding that firms that lobby more tend to be poor environmental performers and their corporate lobbying habit creates a protection against environmental non-conformity. The study also found that leadership experience helped firms to lobby as experience brings knowledge of knowing the tricks of the trade.

The second study analysed the behaviour of high lobbying US firms and the level of commitment they have towards the environment. As high corporate lobbying equated to poor environmental performance, this study conducted a pooled OLS regression model and found that high lobbying firms have greater commitment to the environment as now need to get back-up on their feet after suffering from being poor performers; demonstrating commitment towards improving their relationship to the environment. It was concluded that corporate lobbying acts as a tool to buy time in order for improvements to be made.

Building upon that, the third study sampled US firms to analyse the genuineness of those firms depicting environmental commitment. After running a pooled OLS

regression model, it was concluded that those firms that depict commitment to the environment are more environmentally friendly and are genuinely looking to improve their impact and relationship with the environment sincerely through their actions rather than just simply announcing and reporting empty words.

This thesis makes an overall contribution to the field of accounting by analysing the various factors of environmental accountability collectively; environmental performance, environmental commitment and environmental friendliness along with establishing its connection to politics. Furthermore, contribution is also made by the fact that this thesis investigates the inclusive behaviour and nature of firms towards jurisdictions when environmental accountability is at stake.

CHAPTER 1:

Introduction to Thesis

1.1 | INTRODUCTION

The concept of business operations throughout history has been generally linked to financial implications; economic activity, taxation, profitability and so on and so forth. Shareholders want to know the avenues by which firms generate income, preserve it and how it is spent. As a result, financial transparency of firms has been a great area of scrutiny. For the Government, economic activity is imperative for tax purposes whilst for investors, a firm's economic activity is an illustration of return from making an investment and as for managers of a firm, economic activity is an indication of finance and cashflow viability in running the firm. However, now with environmental issues on the rise, attention from stakeholders has now shifted within the past decade to the environmental impact caused by firms (Santamaria *et al.*, 2020; Balluchi *et al.*, 2021). Just as profitability in relation to firms (i.e. financial information) is important, stakeholders now want to see sustainability and ethical behaviour (non-financial information) from firms (Balluchi *et al.*, 2021). One may ask, 'Why is climate change such an important topic and what relation does it have to the accountability of firms?' Scientist have affirmed that climate change impacts all types and forms of ecosystems that is required for the survival of life Schwarzenbach *et al.* (2010). When firms through their day-to-day operations emit carbon or greenhouse gases, it contributes to climate change. Fundamentally, climate change disrupts the balance of nature causing temperature patterns to shift which makes the weather generally warmer (Penuelas *et al.*, 2013). Even though warm weather is beneficial for life, certain species also require cold to survive (Morison and Morecroft, 2006). Secondly, firms emitting waste accommodates more pollution in the air; the same air breathed by all living organisms. Despite many adapting, much life wears away due to not being able to adapt and

extinction occurs as a result of climate change and pollution (Penuelas *et al.*, 2013) caused by firms.

Hence with the rise of climate change, the United Nations developed the United Nations Framework Convention on Climate Change (UNFCCC)¹ to devise the Paris Agreement (UNFCCC, 2023) in their COP21 (2015) meeting held in Paris, France with the objective of uniting nations to create a global response to curbing climate change². The agreement is predicated upon the following key features and aspects; lowering global temperature below 2 degree Celsius (long-term temperature goal), striking a balance between anthropogenic emissions and removal by carbon sinks (climate neutrality), encourage higher ambition for climate change by preparing, communication and preserving a national determined contribution (NDC), and conserving GHG sinks and reservoirs (sinks and reservoirs) (UNFCCC, 2023). The Paris Agreement describes the relationship firms should have with the environment in two ways; *“i) reducing greenhouse gas (GHG) emissions and thereby the adverse climate related impacts of their operations on people and the planet; and ii) strengthening the resilience of companies and their supply chains in order to address and adapt to climate change - including impacts on workers, local communities and the natural environment”* (OCED, 2021). In the interest of reducing climate change, the authorities may place restrictions upon firms and how they operate. In response to these restrictions and limitations, firms can easily influence decision-making in their favour by using the tool of corporate lobbying by entering the political arena.

The world has already seen the repercussions of corporate lobbying in scandals like that of the former prime minister of the UK David Cameron where he lobbied senior

¹ The process of the UN in reducing climate change.

² 4.2.2.i explains the relationship between the US and the Paris Agreement with further details.

ministers behind the scenes in favour of the firm he worked for using his former ministerial authority (Makortoff, 2021). In the US, the former president Donald Trump during his presidency revoked an agreement he initially signed declaring that anyone appointed in the federal government cannot lobby for any firm they worked for within the past five years (Solendar, 2021). His successor Joe Biden was too under the spotlight shortly after but from the opposite side; around 4000 lobbyists were working spending \$30 million³ to destroy a climate change plan integrated within a proposed social bill by Joe Biden (Broadwater, 2021). These are just a few cases that have received spotlight from the media and even though corporate lobbying is not considered illegal, the question of being ethical arises. These cases demonstrate a clear relationship between the environment, and corporate lobbying with firms being the key moderator in the relationship. On the other side of the spectrum, pressure groups are calling for governments to take greater action against firms who detriment the environment (Zarzycka *et al.*, 2021) simply for their vested interest in making sales. One of the most prominent pressure groups; Just Stop Oil has vowed to take rapid action via civil resistance across the globe to protect the environment in the 21st Century. To show their determination, the group works worldwide within different nations such as the US, Italy, Sweden, Switzerland, Australia, France, Germany, Austria, Norway, New Zealand and Scotland. All of these nations making up their international network illustrate their determination to put things right in their view of the environment and create environmental awareness within society through putting pressure on authorities and carbon intensive firms (i.e. BP, Shell) to stop production of non-renewable resources through peaceful protests (Just Stop Oil, 2023). With

³ Open Secrets have listed lobbyists and the amount contributed to the Biden Administration: <https://www.opensecrets.org/federal-lobbying/top-recipients-details?cycle=2020&id=N00001669>

pressure mounting, climate change has become a sensitive area with issues raised from all angles. This type of pressure will unquestionably pressure firms to take some type of action in order to remain one step ahead. Hence, firms will look to restore political connections with (Shevchenko, 2020) authorities to show they have the backing of the Government. As a result, the option of corporate lobbying opens up for firms.

Firms will lobby politicians within the Government to have laws passed in their favour i.e. lessen restrictions in the production of carbon. If the lobbyist hired by the firm has a strong relationship with the Government, firms can hope that their corporate lobbying will be successful as acquaintance can bring benefits (Shevchenko, 2020). Thus, the issue of accepting lobbying proposals should be raised i.e. what implications will arise for the economy if a corporate lobbying proposal is accepted? Despite the fact that corporate lobbying is present within the framework of politics, there is no doubt that the authorities are now beginning to see the great implications posed by climate change. Scientists have already warned that the Gulf stream that runs from the tip of Florida, US through the Atlantic to Europe has weakened within the past 40 years (Thrower, 2023). In 2019, NASA recorded that the level of carbon within the Earth's atmosphere was at roughly 412 parts per million (ppm) (Buis, 2019). Four years later, it was reported that the level of carbon had risen to nearly 419 parts per million (ppm) in 2023 (Bloomberg, 2023). Scientists have now developed what is known as the 'carbon clock' to measure real-time estimates of the rising of carbon within the atmosphere (Bloomberg, 2023). Despite initially the US walking away from the Paris Climate Agreement in 2017, statistics like this resulted in a U-turn later in 2021 under the Biden Administration (The White House, 2021). Under Joe Biden, the US have revised their perception of climate change through this agreement, the objective is to

half carbon emissions by 2030 and to obtain a complete net zero target by 2050 (Jenkins *et al.*, 2021) within the US. In order for this to be achieved, the US Government need to regulate the interaction firms have with the environment.

The relationship between firms and the political arena remains one which is sensitive and whilst fingers can be pointed directly at firms for being the culprits for impacting the environment negatively, the topic is greater than just a simple blame game. Firms that are poor performers in relation to the environment need to find a way to avoid being penalised for non-conformity against environmental regulations. Corporate lobbying is seen as an escape route as firms can lobby their way through in their favour. However, when these poor performing firms fall under the spotlight, their legitimacy can be jeopardised. In order to solve the problem, they now need to demonstrate a level of commitment to changing and accordingly must show that they are working towards improvement. In connection to environmental commitment, can corporate lobbying be utilised as tool to bringing positive change in the environment by allowing firms time to improving? Thus, this thesis aims to provide a more comprehensive understanding into the interaction between the political arena i.e. corporate lobbying, the environment and the needs of firms by presenting three interlinked empirical studies.

The objective of this introductory chapter is to provide a succinct outline of the research conducted within the three empirical studies that make up this thesis. The remainder of this chapter is organised as follows; the next section outlines the background of studies; section 1.3 identifies the research questions and objectives; section 1.4 entails the research motivation behind the studies, section 1.5 describes the research rationale and significance followed by section 1.6 which maps out the structure of the thesis.

1.2 | BACKGROUND OF STUDIES

The demand of transparency for non-financial elements of accounting within the past few decades (Santamaria *et al.*, 2020) have given rise to an increased amount of literature examining the relationship between firms and the environment whilst also looking at the level of accountability established within the correlation (Santamaria *et al.*, 2020). Research has been conducted on individual environmental topics including environmental performance, environmental commitment and environmental friendliness (Schwarzenbach *et al.*, 2010; Tang and Wang, 2017; Balluchi *et al.*, 2021).

Schwarzenbach *et al.* (2010) argues that the preservation of the environment is imperative to ensure life and ecosystems are sustained; both which are key drivers to the economy. Therefore, without a protected environment, the economy would suffer. As a result, studies like that conducted by Balluchi *et al.* (2021) illustrate how stakeholders are calling for greater analyses and scrutiny into understanding the impact firms have upon the environment. Sukhare and Voronchikhin (2020) argue that due to the deterioration of the environment from economic impact, firms are being called to take more responsibility. In response to this demand, firms are developing strategies to lower emissions, reduce carbon footprints and become greener (Rohani and Jabbour, 2023). All of these factors within CSR and sustainability reporting make up a firm's environmental performance and as such, several studies within literature (Horvathova, 2012; Yadav *et al.*, 2016; Tang and Wang, 2017; Khan *et al.*, 2020) depict the impact of firm environmental performance; both positive and negative.

Positive environmental performance can reap various benefits for firms including more investment being injected into the firm, growth in sales and enhanced productivity (Ganda, 2018; Li *et al.*, 2018). On the other hand, poor environmental performance from firms can bring about negative repercussions; numerous studies (Fithriani *et al.*,

2019; Jeriji and Louhichi, 2020; Silva, 2021) have shown how poor environmental performance can inflict financial detriment to a firm; penalties for non-compliance and so as to avoid this, firms will look for ways out. Bertrand *et al.* (2012) argues that with political influence, firms can reduce the environmental burden because if authorities see a financial gain for themselves, they will have no problem facilitating firms highlighting the importance of political awareness and connections for firms.

Therefore, a firm has a choice between three costs; investing in its environmental and CSR efforts, paying a financial penalty for non-environmental compliance or as an alternative to this, paying the authorities via political connections legally to relax environmental laws. As research has established (Belghitar *et al.*, 2014), it can be costly to demonstrate positive environmental performance and hence, firms will weigh the financial implications to see which is cost-effective; should money be put into ensuring the firm performs positively towards the environment meeting all environmental regulations or ignore environmental performance and be hit with a hefty fine for non-compliance? Or to divert fines and penalties away, should firms make a payment to the authorities to ease environmental obligations through permissible means?

Unquestionably, whichever approach a firm takes towards the environment in terms of finance from the above three options stated, there will be repercussions and from them is the issue of legitimacy. Literature has shown that a firm's legitimacy can be compromised if poor performance is shared under negative spotlight (Freedman and Jaggi, 1988; Zhongfu *et al.*, 2011; Hassan and Romilly, 2018). Within the framework of the legitimacy theory, firms will work hard to preserve their image. However, that effort is questionable; are firms working for themselves to ensure that negative media attention is kept far away from them or are they sincere stewards towards preserving

the environment? Abandoning stewardship to the environment according to Schwarzenbach *et al.* (2010) will mean that the economy and all its players i.e. firms will suffer in the long-term as a preserved environment plays a key role in the successful execution of business operations within all of the sectors of the economy; primary, secondary and tertiary whilst maintaining the optimum balance to supply and demand. Thus, Reichart and Phillips (2000) echo the call of stakeholders for firms to take greater responsibility by discussing an element of morale; whilst everyone makes mistakes, how are firms working to improve and rectify themselves once they have made an error? As a result, a deeper study is required to analyse this enhanced relationship between firms and the environment. Wesseh and Lin (2018) argue that literature pertaining to environmental interaction and impact i.e. environmental performance and environmental commitment produce mixed findings. In order to assess environmental accountability of firms; the relationship between all environmental elements needs to be analysed; environmental performance, environmental commitment and environmental friendliness.

Whilst accounting literature is rich describing the impact of environmental efforts on a firm's legitimacy, studies illustrating the connection between firms and the environment within a political context are limited. Furthermore, the limitation within literature also extends to much research having been conducted using data provided by firms i.e. CSR or sustainability reports and not external data (Rohani and Jabbour, 2023) which can limit reliability. Thus in order to address these limitations, this thesis pioneers research looking at the association between firms and the environment by connecting environmental performance, environmental commitment, environmental friendliness and political influence (corporate lobbying) to understand their interrelated relationships not only by using the legitimacy and stewardship theories, but also by

extending accounting literature by placing the relationship between firms and the environment within the tollbooth and public choice theoretical framework. With that having been said, the next section explains the research questions and objectives of the empirical studies within the thesis.

1.3 | RESEARCH QUESTIONS AND OBJECTIVES

The overarching objective of this thesis is to provide a comprehensive overview of the relationship between firms and the environment within the political arena of the US. Firms have needs but so too does the environment; should the actions of firms detriment the environment? The objective of this research is to better understand how the interaction between firms and the environment can be placed in equilibrium. To understand this, this research will focus on four key drivers and their link one to another; 1) corporate lobbying, 2) environmental performance, 3) environmental commitment and 4) environmental friendliness.

Many firms use natural non-renewable resources for their operations in order to ensure that economic performance goals are met to please shareholders. However, through using natural non-renewable resources, firms knowingly or unknowingly impact the environment through emission and pollution. As a result, firms fall under scrutiny from pressure groups to take responsibility for their actions calling upon the Government to take harsher measures to punish poor environmental performers. Penalties and fines have financial repercussions on firms and if that was not impactful enough, negative publicity is drawn all over these firms attracting media attention. With the impact compounded, firms may see detriment; loss of market share, loss of sales and institutional shareholders withdrawing their investment. All of this together in turn tarnishes the image of the firm. How can a protect its image from this whole process? Firms displaying poor environmental performance need an escape route and the best way is through political connections; corporate lobbying.

Through corporate lobbying, poor performing firms can have environmental legislations relaxed and in fact legislations passed in their favour to avoid being penalised. Hence, the following research question has been developed:

RQ1: Do firms with poor environmental performance tend to spend more on corporate lobbying?

The above research question looks at the relationship between environmental performance and corporate lobbying. By understanding this correlation, it allows the researcher to analyse the corporate lobbying habits of firms along with their influence upon political connections. Research question 1 may provide the understanding that poor performing firms and their corporate lobbying spending habits be construed negatively i.e. firms looking for a way out to avoid penalties and hence, the attention has still not been averted. Despite this being a perspective, what if research perceived the correlation from the opposite angle to draw balance and fairness? Rather than looking down upon poor environmental performing firms, can corporate lobbying assist firms to path improvement? Rather than corporate lobbying being construed as an escape route to facilitate firms in being less active to help the environment, can it be perceived as a tool to enhance improvement? To improve and step up from performing poorly requires time and something which cannot be achieved in the short-term. Thus, the concept of corporate lobbying acting as a tool to buy time cannot be dismissed. In spite of that, in order to demonstrate this, firms need to show a level of commitment to improving. Therefore, the next research question is as follows:

RQ2: Do firms that lobby more have a higher level of commitment to the environment?

This research question is discussed in chapter 4

In identifying weakness in their relationship to the environment i.e. poor environmental performance, this can detriment a firm's legitimacy resulting in severe repercussions i.e. loss of sales, loss of investors etc (Jeriji and Louhichi, 2020). That being so, firms need to work fast to limit damage to reputation and hence need to portray that they are working towards improving. Thus, this empirical chapter focuses upon that

declaration of commitment. Once a firm declares commitment to improving their relationship with the environment, its claim must be substantiated with practical elements of change and improvement. Stakeholders do not want to merely see announcements from firms declaring commitment to the environment as an attempt to 'greenwash' but rather want to know actually what the firm is doing to deliver that commitment; has there been a reduction pollution caused by the firm to live up to their pledge of being committed to the environment? For that reason, the next research question focuses upon the genuineness of a firm and their claim to be committed to the environment:

RQ3: Are firms that are more committed to the environment have a greater level of environmental friendliness?

This research question is discussed in chapter 5

The above research question constitutes the investigation of the final area of research within this thesis. Once a firm identifies and understands that it has a deficiency in its environmental performance (being identified as a poor performer by its stakeholders), then it needs to look for ways to improve. But mere looking and stating is not sufficient but rather, it must establish improvement by reporting practical means the firm is taking to become better. Whilst this maybe expected from the firm, it is pertinent to also appreciate the fact that the firm cannot be expected to change in a short space of time as improvement may require time. Therefore, in establishing a measurement of fairness, this third research question aims to investigate the sincerity of firms in their attempt to improving their impact on the environment with practical implementation.

1.4 | RESEARCH MOTIVATION

Research motivation entails the interest and ambition the researcher possesses in conducting research (Turner and Patrick, 2008). Traditional accounting within literature focused solely upon economic performance and the financial viability of firms (Oswald, 1997). Whilst profitability and generating returns for shareholders was and still is important, research has now expanded into other areas of governance and management; primarily non-financial issues (Puspitaningtyas *et al.*, 2018). As focus had been given to firms seeing as they were the central figure in the economy, importance is now being given to the wider surrounding and context of the economy beyond firms. However, that importance is again not simply financial but also non-financial that involves ethical behaviour from firms, the impact of firms upon others and the question of responsibility being placed on firms for the impact experienced around them. One of the most developing areas of non-financial interest is the environmental impact of firms (Bolton and Kacperczyk, 2021). Despite the study of the environment being related to science and nature; an area of study by biological scientists, the environment has entered into the realms of accounting because of the connection it has to the economy i.e. the impact of firms on the environment.

As a result, firms are being called to take responsibility for their actions in relation the environment as fears grow of the environment deteriorating at the hands of the economy (Sukhare and Voronchikhin, 2020). Thus, stakeholders and institutional shareholders who have an interest in 'green investment' i.e. firms that operate ethically to benefit the environment are now demanding transparency from firms to detail and explain the impact their operations have upon environment (Santamaria *et al.*, 2020; Balluchi *et al.*, 2021). Thus, the general motivation for research behind this thesis stems from the importance of environmental study; the effects that entities i.e. firms

have upon ecosystems and the role the environment plays in developing those entities. The environment is no doubt key to every sphere of life; the economy, politics and the general public. Therefore, we are all stakeholders to the environment regardless of our role within society. It is therefore important that there is a level of accountability connected with the impact we have upon the environment.

The research motivation is focussed upon two key areas in relation to firms and their impact; previous literature has focused greatly upon legitimacy and disclosure (Alsaifi *et al.*, 2020a) however, there is a lack of information pertaining to understanding the political connection between firms and the environment; when firms operate, do they operate in the best interest of the environment or just for their self-vested interest? Should all forms of legitimacy be construed as negative and can a firm's stance to the environment change over time? This research focuses upon the environmental performance of firms and their tendency to lobby the Government. Secondly, following Kennard's (2020) echoing of stakeholders calling for greater responsibility, when firms make a mistake, how much responsibility is taken to rectify the situation? To 'apologise' and clarify the mistake requires a simple announcement however, how much is a firm willing to go to in order to put matters right? This research looks at the commitment level of firms towards the environment when they perform poorly and how genuine that commitment is through practical results.

More research motivation is discussed within the empirical studies of this thesis. The next subsequent section discusses the significance of the research conducted and its rationale.

1.5 | RESEARCH RATIONALE & SIGNIFICANCE

The rationale and significance behind this thesis is predicated upon the interaction between firms and the environment. The environment has never been a greater concern than how it is perceived today in the 21st century (Hayat *et al.*, 2023). The governance, administration, management and operations of firms unquestionably impact the environment. Stakeholders firmly believe that firms are to impact the environment in a positive way depicting morale (Reichart and Phillips, 2000). Despite this, there is a growing concern that firms are not fulfilling their potential in benefitting the environment (Rohani, 2016). Even though the interaction may seem quite simple, it can be complicated by which firms through their operations detriment the environment knowingly or unknowingly. To tackle this, authorities may put in place restrictions or penalties in order to limit negative impact upon the environment (Shevchenko, 2020).

As a result, firms who are non-compliant to these regulations are faced with a predicament. On one hand if they continue with non-compliance, it can be very costly being penalised continuously along with receiving backlash from the media by being put in the spot light for negative publicity. On the other hand, if they give up their operations impacting the environment negatively, it could bring about other repercussions i.e. loss in quality of production leading to drop in market value, loss of customers etc. Hence, firms will look for legal loopholes i.e. corporate lobbying to remain compliant (Harstad and Svensson, 2011). Corporate lobbying from this angle can be perceived as unethical if firms are lobbying for things against stakeholder interest. However, from a different angle, it can be perceived as a genuine tool to buy time for improvement as poor performing firms cannot improve within a short space of

time. Yet how sincere is this methodology and how committed are these firms to improving their relationship with the environment?

Academic research has analysed the relationship between various accounting components; carbon performance and economic performance; investment and fraud detection. However, a gap within literature remains between environmental accountability and its correlation to the political arena; the corporate lobbying behaviour of firms. Therefore, this thesis aims to address the gap within literature by connecting the issues of environmental accounting; environmental performance, environmental commitment, environmental friendliness and corporate lobbying.

The upcoming section describes the overall structure of the thesis.

1.6 | STRUCTURE OF THE THESIS

The thesis has been structured into six chapters and follows the ‘three paper’ PhD model by which the three studies (three empirical chapters) contained within the thesis build upon each other but can be read and understood separate from each other. Before the empirical chapters, chapter 1 covers the introduction and provides a background of all three studies, research questions and objectives, research motivation and research rationale and significance. It concludes by outlining the structure of the thesis.

Chapter 2 describes the overarching research paradigm embodied throughout all empirical chapters. The principles of research paradigm are highlighted and the various research paradigms (pragmatism, interpretivism, positivism and post-positivism) are discussed albeit one research paradigm covers all empirical chapters in this thesis with justification.

Chapter 3 presents the first empirical chapter that looks at the relationship between poor environmental performing firms and their tendency to lobby the Government. The chapter also looks at the factor of CEO experience to determine whether it can better a firm’s ability to lobby or not. Current literature is reviewed and the theoretical framework is discussed through the lens of the public choice and tollbooth theories. The methodology followed is outlined and the results are discussed through analysis of data using the random and fixed effect models. A general conclusion is provided to summarise the chapter.

Chapter 4 presents the second empirical chapter that builds upon the results of the previous empirical chapter by looking at the relationship between corporate lobbying and environmental commitment. Current literature is reviewed and the theoretical

framework is discussed through the lens of the legitimacy theory. The methodology followed is outlined and the results are discussed through analysis of data using the pooled OLS regression model. The data is reviewed by a number of econometrics models to test for heteroscedasticity. A general conclusion is provided to summarise the chapter.

Chapter 5 presents the third and final empirical chapter that builds upon the previous two empirical chapters by analysing the relationship between environmental commitment and environmental friendliness. The methodology followed is outlined and the results are discussed through analysis of data using the pooled OLS regression model. The data is reviewed by a number of econometrics models to test for heteroscedasticity. A general conclusion is provided to summarise the chapter.

Chapter 6 provides an overarching conclusion to the entire thesis by revisiting the aims and objectives of all three studies, the implications the research has, limitations and also discussing avenues of future research.

CHAPTER 2:

Research Paradigm and Methodology

2.1 | INTRODUCTION

The objective of this chapter is to establish the overarching research paradigm and research methodology followed within each of the empirical studies within this thesis. Both the research paradigm and research methodology are important to understand as it shows the perspective of the research and the direction the research has gone towards (Patel and Patel, 2019).

This chapter provides a general overview into what research paradigm entails, its building blocks that it is predicated upon and the different types of research paradigms taken in conducting research. Furthermore, the research paradigm embodied within this thesis will be affirmed and the assumptions of the research paradigm will be applied into the context of the three empirical studies that make up the thesis. Following on from that, the research methodology will be discussed and its link to the research paradigm followed; the method used to ascertain data, the context of research and sampling.

2.2 | RESEARCH PARADIGM

The study of behaviour amongst entities organizations or human beings requires embodying a research paradigm (Kankam, 2019). Since its first usage by Thomas Kuhn in 1962 (Schensul, 2012 cited in Kankam, 2019), researchers have provided various explanations as to what research paradigm constitutes. Kyriacou (2019) defined research paradigm as, 'a philosophical system whose core assumptions or beliefs about the world are shared by a large number of scientists and which contains a number more or less compatible theories, models or methods'. Kuhn (cited in Kankam, 2019) described research paradigm as a combined group of variables, ideas and problems that are ascribed with agreeing methodological approaches and tools. Similarly, Jackson (2003, p. 37 cited in Kankam, 2019) defined research paradigm as, *"a set of ideas, assumptions and beliefs that shaped and guided the activity of a particular scientific community"*. Babbie (2014, p. 31 cited in Kankam, 2019) however held the view that *"paradigms do not explain anything, but they provide logical frameworks within which theories are created."*

In essence, research paradigm involves comprehending the realism of research and how it is conducted in the worldly sphere. Kausik and Walsh (2019) consider research paradigm as conceptual and practical tools researchers utilise to explain research problems. Previous literature (Johnson and Onwuegbuzie, 2004; Abdul Rehman and Alharthi, 2016; Khaldi, 2017) discuss three main research paradigms; 'Pragmatism', 'Interpretivism' and 'positivism'. In recent times, a fourth research paradigm was developed as an extension of positivism known as 'post-positivism'. Each type of research paradigm is principled upon four areas (building blocks); 1) ontology, 2) epistemology, 3) methodology and 4) methods:

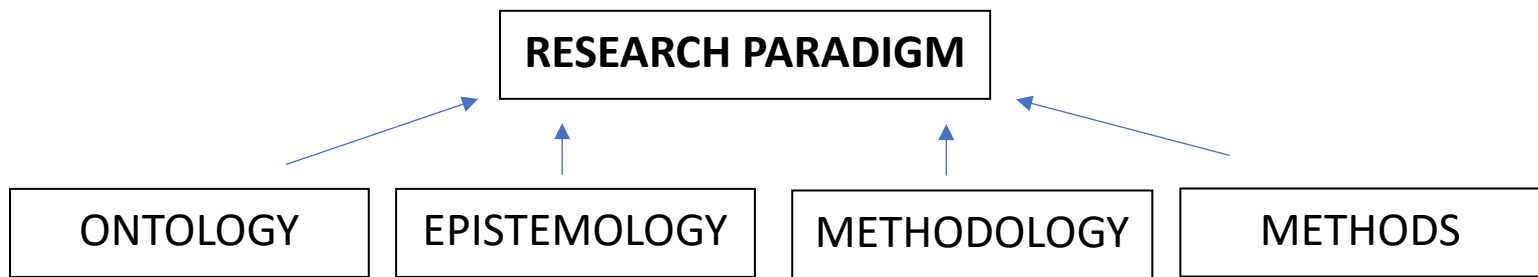


Figure 2.1: The building blocks of Research Paradigm

Ontology defines the conventions researchers hold that lead them to question and research the truth of reality and its existence. Once existence is established, the branch of ontology looks to analyse the connection between entities and see how their existence impacts interaction. The next building block of research paradigm is epistemology which has been defined as “*the branch of philosophy that studies the nature of knowledge and the process by which knowledge is acquired and validated*” (Gall *et al.*, 2003, p. 13). Methodology is the procedure followed to determine how the research will be conducted and stemming from that is the fourth building block; methods; the way data will be collected and ascertained by the researcher.

2.2.1 | Adopting different Research Paradigms

Modern day philosophers have coined ‘worldview’ as a synonym for paradigm (Kaushik and Walsh, 2019). It is important to note that whilst there are many research paradigms or worldviews within the field of research, the four main research paradigms used by accounting researchers are Pragmatism’, ‘Interpretivism’, ‘positivism’ and ‘post-positivism’ (Khaldi, 2017). Each research paradigm has its assumptions with both advantages and disadvantages and hence, it is therefore noteworthy to understand that there is no ‘right’ or ‘wrong’ research paradigm within research. As each research paradigm is a philosophical system, the paradigm acts as a school of thought that implants conventions of basic beliefs about how the world operates and

functions. Ultimately, the research paradigm embodied within any research is reflected through the beliefs and methodology of the researcher and the context of their research (Hussey and Hussey, 2009).

The first of the main research paradigms is pragmatism which is principled upon the idea that *“theories can be both contextual and generalised by analysing their transferability to another situation”* (Creswell, 2009, p. 4 cited in Tran, 2016). The transferability concept found within this research has permitted researchers to argue that anyone following this school of thought will take an abductive approach; moving between induction and deduction. In addition to this, researchers within this school of thought also argue the validity of combining between quantitative and qualitative data and state that both can be applied to research within one study which many researchers have argued to be conflicting. Fundamentally, research embodying a pragmatism research paradigm will allow the researcher to see which research method works best for the investigation and hence, researchers can mix between different methods within the same investigation (Kaushik and Walsh, 2019). Likewise, pragmatist researchers are not required to remain consistent when conducting studies if they feel another method is more suitable or better adapted to the next research.

The second research paradigm is interpretivism. This research paradigm distinguishes human beings from the physical phenomena as the paradigm postulates that human beings cannot be examined in the same way as social phenomena (Alharahsheh and Pius, 2020). Interpretivism assumes that the investigating researcher interacts with the contents of that being researched and hence, the researcher is not independent. Therefore, the interpretivist researcher assumes that the research is value-laden (personal opinions and conclusions are made pertaining to the subject of research) hence acknowledging that bias can be present within the sample of study. As a result,

interpretivism construes reality as being subjective with multiple perspectives (Collis and Hussey, 2009). Another key feature of the interpretivism research paradigm is the assumption within methodology; interpretivism follows an inductive approach by which theories are developed following specific observation of data. The interpretivist holds the opinion that social phenomena is intangible and hence cannot be quantified and thus, looks at the complexity of the social phenomena (Rohani, 2016). By observing data, researchers can then establish a patterns and trends from which theories are further developed (Collis and Hussey, 2009) and by following this approach, inductive reasoning creates new theories for researchers to work with. Thus, interpretivist data is more qualitative driven. Contrastingly, the positivist approach is the opposite of interpretivism and that which makes up the research paradigm for this thesis. Understanding the research paradigm of a study will help make the research more meaningful to the reader (Patton, 2002) and thus, the forthcoming sub-section has been developed to detail positivism and its key facets followed by an overview of the research methodology undertaken within this thesis.

2.2.1.i | Positivism and Post-Positivism

The positivist approach contrasts interpretivism which under the phenomenology approach (a part of interpretivism) is a socially constructed approach that is subjective and hence, positivism measures the social phenomena; reality is formed rather than discovered by the researcher and thus making the observer inclusive of what is observed. Within the last century, post-positivism has developed as an extension of positivism (McGregor & Murnane, 2010). With the development of research, new theories and ideas have been postulated and so as to make positivism more coherent and elastic to fit more studies, post-positivism is a more contemporary approach to positivism. Post-positivism aligns its' belief with positivism in understanding reality and

modernism whilst a feature of this school of thought extends to arguing that knowledge cannot be impartial and that it is socially constructed; similar to that of the way of the interpretivist (Henderson, 2011).

Conversely, the positivist approach theorises that the observer is independent from the observation and through this separation (epistemological assumption), the researcher is able to discover reality through the application of scientific methods. As Abdul Rehman and Alharthi (2016, p. 53) describe, “*positivists strive to understand the social world like the natural world. In nature, there is a cause-effect relationship between phenomena, and once established, they can be predicted with certainty in the future.*” In order to better understand and contrast the differences between both antithetical research paradigms, the subsequent table outlines the key assumptions of positivism and interpretivism:

Table 2.1: **Key assumptions of the differences between positivism and interpretivism**

Assumptions	Positivism	Interpretivism
Ontological <i>(Nature of reality)</i>	Objective, tangible, single	Socially constructed, multiple
Methodological <i>(Process)</i>	Deductive	Inductive
Epistemological <i>(Relationship between researcher and researched)</i>	Researcher and researched are both independent	Interaction between researcher and that which is researched
Axiological <i>(Role of Values)</i>	Value-free and unbiased	Value-laden and biased
Rhetorical <i>(Language or Tone)</i>	Formal and based upon set definitions	Informal with no set definitions

(Source: Hussey and Hussey, 2009, pg. 48)

2.2.2 | Research Paradigm of Thesis

The research paradigm of this thesis is positivism. The research approach was founded by French philosopher Auguste Comte (Abdul Rehman and Alharthi, 2016) in the nineteenth century. The positivist approach stems from foundationalism (belief in scientific research holding a dogma of hypotheses being proven by regulated observations that are value free) and empiricism (knowledge should be learnt from experience). In understanding the research paradigm, Bryman (2008) highlighted four key attributes of positivism; 1) Phenomenalism, 2) Deductivism, 3) Inductivism and 4) Objectivity

Deductivism is a methodological assumption of positivism and hence through ‘cause and effect’, generalisations create postulation that ultimately leads to comprehension and explanation (Collis and Hussey, 2009). The second feature of positivism is phenomenalism which entails the confirmation and acceptance of information to be substantiated by science. Through science, laws are established which is essentially the third feature of positivism; inductivism; knowledge is sought by assembling facts that underpin laws. Once a law is established, researchers will align their theory with the law predicated by science and hence, the research and the researcher are both free from being biased which is the fourth feature of positivism; objectivity.

Despite the research paradigm being established, positivism has received a number of criticisms; Richards (2003) considered administering scientific methods to social phenomena in order to ascertain laws that regulate them as simple-minded implying that positivism is outdated. Chua (1986) further disparaged the positivism research paradigm by explaining that it is deficient in evaluating institutional structure i.e. the case of a firm exploiting the market through bribing the market. Despite the drawbacks being highlighted, positivism benefits from advantages that outweigh its drawbacks;

as the researcher is independent from the research, it eliminates the issue of being bias. The theories underpinning a study embodying a positivist approach are based upon established laws confirmed by science. Therefore, when a researcher embodies positivism as the research paradigm in their investigation, they are impartial and hence, this enhances the reliability of the research conducted. Secondly, the positivist approach entails using large sample sizes which increase its precision as anomalous can be reduced to a very minimal or dealt with accordingly. Furthermore, larger sample sizes utilised by positivist researchers enhance precision within an investigation lowering the chances of reporting false negative or false positive findings. Thus, a positivist approach study can then be relied upon when applying the research to a different context. More importantly, this deductive approach is well-structured; a hypothesis is proposed and a sample size is confirmed. Thereafter, data is collected and organised to allow statistical models to be run to amass empirical evidence which is then analysed. A theory is derived that acts as the driver to explain the effect of the independent variable on the dependent variable i.e. to explain causality. Certain additional variables (extraneous) are controlled to carefully analyse cause and effect along with running different tests⁴ to identify interference errors. Then in presenting the research, the positivist researcher writes in a formal style using a passive voice with set definitions in contrast to the interpretivist researcher who writes in an informal style echoing a personal voice with limited definitions (Hussey and Hussey, 2009).

The positivism paradigm is the best fit for this research as a deductive approach was followed in order to develop interlinked hypotheses. Based upon this, data was then collected and organised to run models in order to test and affirm these hypotheses.

⁴ The test used in this investigation to identify this error is 2SLS which is discussed in more detail in section 3.44 of empirical study one

As positivist research utilises large sample sized, this research contained large datasets containing many observations. The upcoming sub-sections will further apply the assumptions (ontological, methodological, epistemological and rhetorical) of positivism to the research conducted within this thesis.

2.2.2.i | Ontological assumption

Under the positivist approach, social reality is objective and can only be understood as one entity. On the other hand, the interpretivist views social reality as socially constructed and hence, social reality is subjective and therefore, there are multiple interpretations as everyone has their view and take (Alharahsheh and Pius, 2020).

The studies within this thesis embody ontological objectivity as the social reality is single; to investigate the relationship between corporate lobbying, environmental performance, environmental commitment and environmental friendliness. In addition, the social phenomena is observable and can be measured; corporate lobbying (expenditure) environmental performance (carbon emission), environmental commitment (CDP scores) and environmental friendliness (hazardous toxic waste release). Regardless of the researcher's views or understanding, all the data is available and has been extracted from external databases and hence, the researcher is independent from the research.

2.2.2.ii | Methodological assumption

The methodological assumption of positivism assumes cause and effect within the investigation through a deductive process (Hussey and Hussey, 2009) involving utilising large quantities of data to test hypotheses postulated whilst interpretivism is heavily based upon an inductive approach (i.e. developing a theory). Once the data is

organised and models are run accurately, results are presented. Thereafter, the results are explained to understand the relationship between variables.

Within this thesis, three main hypotheses were established to test a number of theories via the deductive process; environmental performance on corporate lobbying, corporate lobbying on environmental commitment and environmental commitment on environmental friendliness. The data collected within this research to test the hypotheses is quantitative and of large quantity; under the deductive process, emphasis is given to quantitative data within the positivist research paradigm and therefore, Saunders *et al.* (2009) claims that the most appropriate methods of investigation within positivism are experiments by conducting cross-sectional⁵ and longitudinal studies i.e. panel data⁶ which all three empirical chapters of this thesis embody as datasets.

2.2.2.iii | Epistemological and Axiological assumptions

The epistemological assumption of the positivist approach concentrates on the relationship between the researcher and the research; the researcher views the social phenomena as being there and through observation and investigation, knowledge can be gained. As a result, the researcher is again independent from that which is being investigated. This contrast the interpretivist view which holds that social phenomena is created and through its interpretation, a person can understand knowledge of the world. Hence, positivism research is value-free (Hussey and Hussey, 2009).

This thesis embodies the researcher being independent from the research. Data was collected via archival study from established data sources based upon availability.

⁵ Data analysed at a specific point in time.

⁶ Panel data is also known as Longitudinal data involving observing multiple individuals/firms over multiple time intervals

Thereafter, its analysis was conducted by running a number of independent econometrics models along with tests for endogeneity and heteroscedasticity⁷ to which thereafter, the findings were discussed. To further illustrate independence of research from the researcher, the variables used in this research were present before the research was conducted and they are still present and extractable post-completion of the research.

2.2.2.iii | Rhetorical assumption

The rhetorical assumption of positivism focuses upon the language used in conveying the research conducted. As the positivist approach is objective, positivism embodies a passive tone of conveyance (Alharahsheh and Pius, 2020) to illustrate that the research is unadulterated and free from personal opinion as followed within this thesis. Contrastingly, the interpretivist provides their interpretation on the research findings and hence, their opinion is reflected in the research.

This research collected and organised data once hypotheses were developed via the deductive process. Thereafter, a number of econometric models were executed to test the samples and the findings are conveyed in a passive and formal manner. Thus, the reader understands that the findings of this research are not from the researcher's opinion but what the data presents in either affirming or rejecting the initial hypotheses postulated.

To further understand the methodology embodied within the three empirical studies of this thesis, the research methodology will be discussed in the subsequent section.

⁷ To enhance validity and precision to the findings

2.3 | RESEARCH METHODOLOGY

To fully comprehend research conducted, there are four stages of the research procedure (Hussey and Hussey, 2009) that a researcher must clearly explain and apply to their investigation; firstly, the purpose needs to be established i.e. why the research has been undertaken. For this thesis, chapter one explains the general purpose of the research conducted for which it then compliments the specific research purposes of each empirical study which can be found within the introductory and literature review sections of each individual empirical study. The next three stages of research procedure are process, logic and outcome. The logic stage of the research has been explained within the theoretical framework of each individual study and as for the outcome stage of the research procedure, the findings of each empirical study highlight the outcomes achieved upon completion. This section of the research is focussed upon the second stage of the research procedure; process which is explained by discussing the methodology embodied within the research.

As stated previously, one of the building blocks of research paradigm is 'methodology'; how the research will be conducted to investigate whether the hypothesis postulated can be affirmed or rejected. The methodology applied within this research are broken down into three areas; archival study, context and sampling; all three which will be discussed in the upcoming sections.

2.3.1 | Archival Study

One of the forms of longitudinal data is 'archival study' which has been embodied within all three empirical studies of this thesis. Archival study involves extracting data from historical sources i.e. archives to facilitate analysis of textual materials (Ventresca and Mohr, 2017). It can also be utilised by going through contemporary document and

data to compliment other research methods i.e. field study and hence its application extends to digital databases as well (Ventresca and Mohr, 2017).

Das *et al.* (2016) claims that archival study is under-valued and hence, underutilised arguing that the observation of multi-disciplinary undertakings including knowledge management systems, business history and social network studies have illustrated that there is a lot of benefit within archival study that is yet to be explored.

The usage of archival study eliminates bias as the researcher is independent from the data which has already been collected. This thesis has utilised archival study within each empirical study. Within the first empirical study, corporate lobbying expenditure data was extracted from 'Open Secrets'; a database managed by the Center of Responsive Politics within the US; a non-profit and unprejudiced D.C.-based organization aiming to create awareness to voters on the influence money has within the US political arena. In addition to this, data was also extracted from the 'Carbon Disclosure Project' (CDP) for the first empirical study in this thesis to ascertain carbon emission levels to proxy environmental performance.

CDP data of carbon emission scopes 1 and 2 were collected for 2010 to 2020 along with corporate lobbying expenditure data for the first empirical study. The usage of CDP data extended to empirical studies two and three as the database was used to extract environmental commitment data proxied by CDP score; a score issued by CDP to firms responding on how transparent their interactions are with the environment. Each empirical study contains more detail of how CDP data was utilised specifically for that specific empirical study.

Moving on, empirical study three also involved utilising archival study by extracting data from the Environmental Protection Agency (EPA) which holds a database on the

hazardous toxic waste release of US firms. The EPA was setup by congress to monitor the levels of pollution produced by firms and hence, it is a section of the US Government. The data within the database was collected from 2011 to 2021 and organised accordingly.

2.3.2 | Research Population

Establishing the context of research is pivotal as it provides comprehension and applicability of the research (Patel and Patel, 2019). By explaining the background of the context used in conducting the research, the reader is able to understand the objective and motivation of the investigation. The context of this research is the US; all three empirical studies within this thesis are contextualized upon US firms; the first empirical study looks at the environmental performance of US firms and their tendency to lobby the US Government in power (republican or democrat), the second empirical study looks at the environmental commitment of those US firms in relation to their level of environmental performance and the third empirical study focuses upon their degree of environmental friendliness.

The US has been chosen as the context of this thesis for two primary reasons along with data availability and understandability; the first is that they are currently the second largest global emitters of greenhouse gases and hence, their impact on climate change is huge releasing 4.4 billion tonnes of greenhouse gases within the atmosphere. This cannot have simply arisen solely due to the human population living in the US but has come as a result of the actions of firms. Secondly, corporate lobbying is rampant within the US with reports of over \$3bn being spent on corporate lobbying each year between 2010 to 2020 (Opensecrets, 2023).

The subsequent section will discuss how samples were utilised from US firm data in order for the investigation to be carried out.

2.3.3 | Research Sampling

A sample is described as a subset extracted from a population (Hussey and Hussey, 2009). Once it is cleansed and organised, it forms the dataset of a study. Sampling falls into two broad categories; probability and non-probability (Hussey and Hussey, 2009). Probability sampling involves randomly selecting a sample for the research which can be done in the form of simple sampling and stratified sampling (creating sub-groups within the sample data based upon characteristics). Non-probability sampling on the other hand involves specifying a selection to choose from and hence, certain selections have more chance of being chosen than others. Non-probability sampling comes in the form judgemental sampling and natural sampling.

Judgemental sampling involves having a criteria for selection prior to starting the investigation and hence, the sample is selected based upon the judgement of the researcher. Natural sampling involves choosing a sample that the researcher has very little control over in the process of selection due factors beyond their control. In application, all three empirical studies within this thesis utilise natural sampling and the uncontrollable factor is limited data; because of the lack of availability of data, the research had to be conducted with data that was accessible albeit data being available to establish a large sample size.

In accordance with the positivism research paradigm, the research entailed large sample sizes. For each of the empirical studies, raw data was extracted, cleaned and organised. For empirical chapter one, environmental performance data was extracted from CDP and additional firm data was ascertained from Bloomberg between the years

of 2010 to 2020. Initially, a huge sample of firms were extracted however, after merging both datasets, 300 US firms remained due to CDP being deficient in holding environmental performance data. This was further reduced to 223 US firms after financial firms were dropped in line with previous literature due to financial firms having different reporting procedures. To prevent any discrepancy in the results, financial firms were dropped leaving a final figure of 223 US firms (both carbon intensive and carbon non-intensive) from which 1169 observations arose. Despite the drop, the study did have an adequate large sample size.

In empirical studies two and three, natural sampling was utilised and again due to the lack of data availability, the sample sizes were reduced. From the 223 US firms, 63 US firms were dropped in empirical study two as these 63 firms did not have CDP scores proxying environmental commitment. As a result, 160 US firms formed the sample size for empirical study two with 1158 observations. Within the final empirical study, 80 firms formed the sample size as many firms did not produce toxic waste release data to the EPA. Empirical study three had 582 observations.

With that being said, the lack of data availability contributed to the embodying of natural sampling within this research. The lack of data is always a challenge for researchers and a further challenge is using data from multiple databases for the same research as it may create problems for merging. Nonetheless, despite the challenges faced with data management and sampling, adequate sample sizes were produced and used for each empirical study within the capacity of this thesis.

The subsequent sections; 2.4 and 2.5 explain the data collection and data analysis methods.

2.4 | DATA COLLECTION METHODS

Earlier mentioned, archival study was embodied across all three empirical studies. Whilst each empirical study details the method followed within its individual chapter, this section aims to outline the overarching data collection methods utilised in encompassing archival study within this thesis.

Data collection methods entail explaining how information is obtained to be used in research and thereafter, the explanations that can be derived from the methodology and analytical approach taken within the research (Paradis *et al.*, 2016). The data collection methods utilised will differ from investigation to investigation depending upon the style of research; qualitative or quantitative. Qualitative data collection methods include interviews and focus groups; interviews allow achieving a greater depth of information through discussion than simple questionnaires however, it can be very time consuming to conduct (Paradis *et al.*, 2016). On the other hand, focus groups allow researchers to obtain multiple perspectives rather than a single viewpoint on a subject matter (Paradis *et al.*, 2016). In spite of this, focus groups will require a moderator to moderate opinions to ensure coherency.

As for quantitative research, data collection methods include surveys, experiments and observations (Paradis *et al.*, 2016). Despite quantitative data collection methods being prone to statistical errors, it is advantageous by the fact that it can quickly be obtained and with relative ease, research can be conducted (Hussey and Hussey, 2009). Similar to research paradigm, a single style of research cannot be considered uppermost because each research style serves its own purpose; qualitative research works to understand a concept whilst quantitative research aims to test or affirm a hypothesis (Streefkerk, 2023). Depending upon the nature of research, a researcher

may choose to use mixed methods of data collection by undergoing a mixture of quantitative and qualitative data collection methods within a single piece of research to suit the needs of the investigation (Axinn and Pearce, 2006).

As established, this thesis is predicated upon quantitative research and hence, the data collection methods utilised involved extracting data from surveys and observations conducted (secondary research). The time period investigated within this research ran from 2010 to 2020. Empirical study one focused upon two variables; the impact of firm environmental performance on corporate lobbying spending. As stated previously, corporate lobbying spending was proxied by lobbying expenditure obtained from 'Open Secrets'. Environmental performance was proxied by scope 1 and scope 2 carbon emission (aggregated) and extracted from the CDP database. Both sets of data were extracted for US firms between 2010 to 2020.

The CDP database acts as a source of environmental information pertaining to firms who wish to respond to the questionnaire sent out by CDP. The database is impartial and free from any governmental interjection as data is created from voluntary responses submitted by firms. To ensure impartiality is maintained in receiving responses, CDP maintain a robust procedure in managing responses with a three-step process; 1) the data will first be reviewed by the 'scoring team' once received from the firm, 2) reputational checks are carried to identify if there are any factors that will hinder a firm from being awarded a high score and then finally, 3) the 'scoring steering' committee will then internally moderate the score given to the firm.

Each year, voluntary response increases for CDP and hence, the database has grown (CDP, 2012). Whilst this is beneficial for contemporary research, it highlights one of the challenges present in using CDP data for previous years in particular, preceding

2010 as much data was absent. In addition to this, CDP questionnaires differ from certain years to other years due to issues being limited because as time goes on, the needs of firms develop and hence, their interaction with the environment changes and thus, the questions within the CDP questionnaire alter to conform with time i.e. scope 3 emission standards did not come into effect till 2011 (GHG Protocol, 2023). As a result, carbon emission data was extracted year by year between 2010 and 2020 and then placed together to create a set of coherent environmental performance data for US firms. A number of control variables embodying financial and governance data were then extracted from Bloomberg. All three sets of data were then merged together to create a complete set of data for the first empirical study.

For empirical study two, the dataset created in empirical study one was utilised however was enhanced with additional data. Empirical study two built upon the findings of empirical study one and surrounded itself around the research question of whether poor environmental performing firms were committed to the environment. As environmental performance data was already prepared from the previous empirical study along with the control variables, environmental commitment data was required and obtained again from CDP; aforementioned, environmental commitment was proxied by CDP score; a score given by CDP to responsive firms on how good and transparent their interactions are with the environment. After manually collecting this data from CDP, this was then added to the existing dataset.

The essence of empirical study three was to analyse the relationship between environmental commitment and environmental friendliness. As environmental commitment data was already organised, environmental friendliness data for US firms was extracted from the EPA database; Environmental Protection Agency. Environmental friendliness was measured by firms' hazardous toxic waste release.

Data was extracted from the EPA database manually and then merged with the existing database. Once merged, firms with missing data were dropped to prepare a full comprehensive dataset. The succeeding section discusses the data analysis methods deployed to analyse the data collected to answer the research questions postulated.

2.5 | DATA ANALYSIS METHODS

The data within this thesis is panel data; a combination of time series and cross-sectional data; observing multiple firms over a wide time range. The panel data consists of economic information and thus, econometric models are required to analyse the data (Weiner *et al.*, 1993).

A number of econometric models were utilised across the three empirical studies including fixed effect model, random effect model and pooled OLS regression model. Empirical study one utilised the fixed effect and random effect models. The fixed effect model presumes that all units are affected by one shared effect. This is different to the random effect model which undertakes the assumption that each unit is affected by a different underlying effect that are spread and hence, a study can either be optimal for a fixed effect model or random effect model, not both. In order to determine the effect model for empirical study one, the Hausman test⁸ was executed to see which of the two models were adequate⁹ for the dataset and the random effect model proved to be successful for the first hypothesis of the study. As for testing the sub-hypothesis, the Hausman test was conducted again and the random effect model demonstrated optimal fit. Both the random effect and fixed effect models enhance precision to the study as they both consider heterogeneity; understanding that the cross-sectional units are distinct and different from each other without assuming that all units within the dataset are homogenous.

⁸ The Hausman test (founded by Jerry A Hausman in 1978) is used to check whether a linear regression ($Y = \beta X + c + \epsilon$) is best suited for a fixed effect model or a random effect model. The null hypothesis would confirm that we use the random effect model as it is more systematic however, the alternative hypothesis states that the fixed effect model be used as the random effect model is more unwavering. That having been said, the Hausman test will help in choosing the ideal model out of the two for the study.

⁹ If the $\text{Prob} > \chi^2$ equates to > 0.05 , the best fit model for the study is the fixed effect model, anything greater would denote that random effect model is optimum.

Moving on, the data analysis methods used for both empirical studies two and three was the pooled OLS regression model (standard ordinary least square); a baseline model providing a representation of the dataset to estimate the unknown parameters within a linear regression model (Hidayat and Abduh, 2012). The pooled OLS regression model generates a precise and comprehensible regression analysis that can be used in comparison to other complex models (Abdulazeez, 2020). After testing the model with the datasets of both empirical studies, the pooled OLS regression model was able to predict the relationship between the variables (i.e. regress) by confirming the hypotheses and hence, it was the best suited model for both empirical studies.

One of the main criticisms of the pooled OLS regression model is that it assumes little or no multicollinearity and heteroskedasticity¹⁰ (Sureiman and Manger, 2020). To deal with this problem, correlation matrixes were constructed in both empirical studies to address the issue of multicollinearity. To deal with the issue of heteroskedasticity, the Breusch-Pagan and Cook-Weisberg tests¹¹ (including robustness checks) were run in both empirical studies along with drawing up scatter plot graphs to obtain a visual distribution of the residuals.

¹⁰ Unequal residual variances over the range of values

¹¹ These tests have been explained in empirical studies two and three

2.6 | SUMMARY

This chapter provided an insight into different research paradigms used by researchers. Considering the points mentioned previously within this chapter, positivism served as the research paradigm of this thesis and thus, through taking a quantitative approach based upon a hypothetico-deductive¹² method, the positivist research paradigm in these studies look to test hypotheses by using and controlling different factors whilst keeping our own personal opinions and biases out.

This chapter also provided an overview of the research methodology; the usage of archival study within the empirical studies along with the context being the US and after discussing the different types of sampling, the method of sampling chosen for all empirical studies was natural sampling.

¹² Reasoning and observation used to test proposed hypotheses

CHAPTER 3:

**Impact of environmental accountability and strategies of firms on
their corporate lobbying behaviour**

(Empirical Study 1)

3.1 | INTRODUCTION

Traditionally, economic performance has been the central focus within previous literature and the main goal of many researchers (Oswald, 1997; Puspitaningtyas *et al.*, 2018). However, it has been argued that economic performance does not alone fulfil the complete representation of a firm and as a result, the central business model has undergone structural transformation (Puspitaningtyas *et al.*, 2018). It is very unlikely that firms can truly increase and substantiate their brand value and profitability without forecasting the effect on the environment (He *et al.*, 2017). Hence, accounting research has greatly shifted towards understanding the non-financial implications of firms in response to the demand from stakeholders (Kassinis and Vafeas, 2006; Kotane, 2015; Sukhare and Voronchikhin, 2020; Santamaria *et al.*, 2020; Balluchi *et al.*, 2021).

One of the most growing areas of non-financial interest is the environmental impact of firms (Bolton and Kacperczyk, 2021). The term 'environmental performance' has been envisaged as quite generic with many researchers using various definitions, however one of the most comprehensive definitions present in academia is that environmental performance refers to, "*the effects of business operations and products on the natural environment, such as resource consumption, waste generation and emissions*" (Alvarez, *et al.*, 2014, pg. 7809). The benefit provided by good environmental performance from firms has been investigated by several studies (Horvathova, 2012; Yadav *et al.*, 2016; Tang and Wang, 2017; Khan *et al.*, 2020). From the stakeholder theory perspective, firms should create value for all stakeholders simultaneously rather than solely for shareholders. Stakeholder groups such as NGOs, environmental advocacy groups and so forth pressurize firms for a greater accountability of their effects towards the environment and hence, calling upon the Government for greater

scrutiny (Alt *et al.*, 2014; Talbot and Boiral, 2014; Mousa and Hassan, 2015; Zarzycka *et al.*, 2021). In order to appease stakeholders, firms should improve their environmental performance or they may face financial and non-financial sanctions from different stakeholders' groups. In a study conducted by Kassinis and Vafeas (2006), the internal heterogeneity of stakeholder groups are tested with environmental performance at plant level. The results show that positive environmental performance through reduced toxic emissions pleased stakeholders. Furthermore, another study conducted by Baah *et al.* (2021) in which the green production practices of 216 Ghanaian firms (SMEs) were analysed through questionnaires concluded that a greater level of environmental performance enhanced a firm's ability to adopt more green production practices. Not only that but the investigation also proved that through incorporating green production practices within a firm's operation, firm reputation is also developed. These research articles highlighting positive benefits of enhancing environmental performance can motivate firms to strive in becoming 'greener'. However, the issue arises for firms on the opposite side of the spectrum who are poor environmental performers needing to ingratiate authorities in order for their business interests to be met (i.e. to have bills passed in their favour). Yu and Yu (2011) argue that the most persuasive strategy that impacts corporate bill passing by the Government is lobbying with political parties. With that being the case, firms with poor environmental performance may see corporate lobbying as a solution; firms that find it difficult or costly to conform with environmental bills may find it easier and cheaper to lobby. Hence, if a bill pertaining to relaxing environmental regulations is passed through parliament in their favour, a firm is in automatic conformation to the law and thus cannot be penalised for non-conformity.

With the US being the second greatest emitting nation in the globe and having walked away from participating in the COP21 Agreement held in Paris back in 2015 (Gillis and Popovich, 2017), America will function as the context of this study. Whilst environmental legislations in the political arena extend to the encouragement of the preservation of the environment i.e. Clean Air Act, the Endangered Species Act, the Montreal Protocol, the Clean Water Act, and Reformation Plan No. 3 of 1970 (Cardoni, 2010), the environmental regulatory framework in the US does not mandate compulsion for firms in disclosing data pertaining to their environmental impact and hence, there is a lack of Governmental pressure upon firms to improve their environmental performance (Stanny, 2013).

A lack of authoritative supervision can allow firms to become lax towards the environment and as a result, poor performers are not pushed to exert effort in improving. Whilst penalties may drive some reaction from firms, it may not necessarily be the correct responses as firms may focus solely on saving their reputation rather than looking for ethical ways to benefit the environment. On that account, do poor environmental performers lobby more? With very minimal focus given in this area, we have found that no previous research has connected the environmental performance aspect of firms to corporate lobbying behaviour within the political arena and thus, this empirical study will aim to investigate whether a relationship is present between poor environmental performers amongst large US firms and their tendency to lobby.

The main contributions of this investigation are two folds; firstly, the research will depict how poor environmental performing firms physically spend their money to appease jurisdiction. Secondly, the sheer amount of wealth expended by US firms in their bid to lobby will be uncovered. The remainder of this chapter is organised as follows; the next section defines the theoretical background and develops the hypothesis; section

3.3 explains the sample, empirical model, and variables' measurement; section 3.4 presents the results followed by the discussion and conclusion in section 3.5.

3.2 | THEORETICAL BACKGROUND AND HYPOTHESIS DEVELOPMENT

This section will delve into previous literature within the field of environmental accounting. Thereafter, the theoretical framework and the theories acting as the foundation of this research will be introduced followed by the development of the hypotheses.

3.2.1 | The Role of Environmental Performance

Environmental performance can help firms acquire many benefits (some which have been briefly discussed in the introductory section of this investigation) and thus the interaction a firm has with the environment is greatly significant. Scholars of academia have documented the various positive effects of enhanced environmental performance for firms. The most common positive impact of good environmental performance is strong economic performance. Agan *et al.* (2016) investigated the impact of enhanced environmental performance upon the economic performance of 314 Turkish plant-based firms within the manufacturing sector. Through conducting a partial least square regression model, the study found that enhanced environmental performance positively impacted a firm's economic performance. With healthier economic performance, firms can become stronger within the market thus gaining a competitive advantage. Furthermore, enhanced economic performance gratifies shareholders as this can mean greater return on their investments and hence, this research has also portrayed that apart from better environmental performance directly impacting economic performance positively, it can indirectly please shareholders who may wish to invest more within the firm. Other previous studies within academic literature have also supported the fact that greater environmental performance can enhance a firm's economic performance (Purnomo and Widianingsih, 2012; Horvathova, 2012; Angelia and Suryaningsih, 2015; Khan *et al.* 2020).

Interlinked closely with positive economic performance, enhanced environmental performance has also proven to attract investment. The study conducted by Yadav *et al.* (2016) investigated the impact of environmental performance upon investor perception. The study was predicated upon the 'Green Ranking'¹³ project by which the largest publicly traded American firms are ranked in accordance to their overall environmental performance based on eight key performance indicators; 1) Combined Energy Productivity Score, 2) Combined GHG Productivity Score, 3) Combined Water Productivity Score, 4) Combined Waste Productivity Score, 5) Green Sanctions, 6) Sustainability Pay Link, 7) Sustainability Board Committee and 8) Audited Environmental Metrics. The study illustrated that potential investors reacted positively with higher rankings i.e. better environmental performance leading to substantial positive standardized cumulative abnormal returns (SCARs). In another similar study, Konar and Cohen (2001) sampled US S&P 500 firms and discovered that positive environmental performance is closely associated with creating market value; attracting the eye of potential shareholders. The study also found that poor environmental performance correlated negatively with the intangible asset value of firms thus making investors hesitant to capitalise. Thus, environmental performance has proven to positively impact existing shareholders (through enhancing economic performance) as well as attracting prospective shareholders (by creating market value).

Another benefit procured through good environmental performance is the achievement of efficiency. Horvathova (2012) investigated the effect of positive environmental performance of a firm and its ability to innovate i.e. to further enhance new CSR avenues. To benchmark environmental performance, the researcher

¹³ The ranking is conducted by a panel of experts and academics based on six core principles; transparency, objectivity, public data, comparability, engagement and stakeholders.

deployed pollution emission levels (obtained from CENIA¹⁴ and Czech information agency of the environment). The research portrayed a homogenous relationship which indicated that Czech firms were able to innovate more if their wastage was decreased through reducing their production of pollution. This was something that investors paid great attention to as a reduction of pollution emittance accelerating innovation and efficiency will no doubt indirectly enhance reputation and financial performance. Ultimately, poor performance means a deterioration in reputation and as a result, poor environmental performing firms will be pressurized into seeking aid from political means.

Firms corresponding to the environment poorly may come as a result to the unwillingness of incurring costs as enhancing a firm's environmental performance and sustainability can be quite prohibitive (Horvathova, 2012). This in turn creates a greater problem for poor performing firms as it can then land them into the danger zone of being penalised if regulations are not met. In an investigation conducted by Habib and Bhuiyan (2017), the primary findings (based on 5249 firm-year observations over the years of 2004 to 2014) illustrated that firms within the European Union that performed poorly in the environmental aspects of CSR; greenhouse gas and hazardous waste emissions were more likely to be impeded by monetary penalties (the data was extracted from the European 500 Index found within the Bloomberg database). Not only can these penalties and fines be more costly, it also places the spot light of shame on firms which climactically damages their brand value. In the exploratory study conducted by Karpoff *et al.* (2005), the research sampled 478 cases of environmental violations in America between the years of 1980 and 2000. The data

¹⁴ Czech Environmental Information Agency – An independent body that collects and manages environmental data for Czech Republic firms

was obtained from the Wall Street Journal Index's Crime listing and the research depicted that those firms convicted of non-compliance to environmental legislations suffered detrimentally in terms of their reputation as their market value plummeted.

Phillippe and Durand (2011) sampled 90 US firms during the period of 2001 and 2004¹⁵ to test the impact of non-conforming behaviours from an environmental aspect on firm reputation. They concluded that firms operating within environmentally sensitive industries who failed procedural conformity saw their reputation tarnished. Researchers Romero *et al.* (2018) assessed the influence of financial penalties upon publicly traded firms through 172,835 observations from 1995 to 2011 by the US Environmental Protection Agency for non-compliance to environmental legislations. The research postulated two hypotheses; firstly, that these fines have no impact on firms as they make allowances for these penalties and the secondly, that firms' reputations are drastically stained as a result of regulatory breaches. The research conformed to the latter and concluded that reputation was heavily damaged from penalties or taxes awarded for environmental regulatory breaches and as result, earnings weakened due to a lack of investment from investors who preferred to invest in efficient firms. With that having been said, firms with poor environmental performance need to please authorities to have corporate bills passed in their favour.

3.2.2 | Corporate Lobbying

Aforementioned, Yu and Yu (2011) argue that the most persuasive strategy that impacts corporate bill passing by the Government is lobbying with political parties. According to the US Lobbying Disclosure Act of 1995, corporate lobbying has been

¹⁵ The researchers focused on these years as it succeeded the Enrol scandal in America as well as the Johannesburg Earth Summit in 2002 from which economies stressed greater importance of the implications of firms upon the environment

defined as, “*any non-exempt oral or written communication on behalf of a client to executive and legislative branch officials. A non-exempt communication is defined as lobbying contact if it is about the formulation, modification, or adoption of federal laws, executive orders, Government contracts, etc.*” A more summarised explanation of corporate lobbying entails, “*the transfer of information in private meetings and venues between interest groups and politicians, their staffs, and agents*” (Figueiredo and Richter, 2014, pg. 164).

A plethora of evidence indicates that corporate lobbying is greatly pervasive in the US with 84% of corporate lobbying expenditure figures coming from corporations and trade associations at the federal state level (Figueiredo and Kim, 2004). In particular, the Democrats have shown to favour and accept corporate lobbying more than the Republicans (Furnas *et al.*, 2019; Gangitano, 2019) but this comes as no surprise as they embody a philosophy of liberalism whilst favouring the idea of gaining i.e. progressive taxes, less expenditure on military issues, lobbying (Diffen, 2022). In essence, firms will work with lobbyist groups in attempt to identify the solution to their problems (i.e. poor environmental performance). Once a connection has been established, firms will then pay lobbyists to study their firm and then arrange meetings with influential politicians. In these meetings, lobbyists will argue on behalf of the firm for mutually beneficial changes in regulations (Richter *et al.*, 2009) whilst sharing key information pertaining to the firm (which may also be of private nature however, can be influential). This is known as ‘opportunistic lobbying’. Whilst it may seem like bribery, corporate lobbying is completely legal and permissible. It must be noted that this relationship between firms and lobbyists must be yielded upon trust as lobbyists can be exposed to sensitive nature pertaining to a firm and its secrets. Larger firms are more likely to lobby (using interest groups) in comparison to smaller firms due to

being well-funded (Figueiredo and Richter, 2014) as well encompassing a greater share of the market. Whilst firms within developing economies may practice bribery, firms within developed economies with strong political stability like US practice lobbying (Harstad and Svensson, 2011). In fact, Giovannoni and Campos (2007) argue that corporate lobbying and bribery are substitutes one to another; if a firm lobbies and the authorities accept this, there is no need to bribe and hence, stay on the correct side of the law.

Corporate lobbying has also been categorized as a defensive mechanism (Richter *et al.*, 2009); a firm's lobbying expenditure may increase when their appointed lobbyist identifies an area of progression. If these opportunities are beyond the scope of the 'in-house' lobbyist, firms may choose to hire specialists for that specific opportunity but again, a firm will need to assess the viability of commissioning the external lobbyist in preserving the firm's secrets.

In looking at previous lobbying literature to understand the effectiveness of corporate lobbying, antecedent researchers have focused on various areas (Figueiredo and Richter, 2014); firstly, researchers have looked at lobbying affecting international trade such as tariffs (Grasse & Heidbreder 2011; Tung 2011 cited in Figueiredo and Richter, 2014). Secondly, researchers have also looked at how corporate lobbying can help interest groups obtain a budget from the Governments by agreeing contracts (Kelleher & Yackee 2009 cited in Figueiredo and Richter, 2014). Furthermore, another area of lobbying literature has researched the relationship between corporate lobbying and tax benefits; firms that lobby tend to pay less tax or obtain some sort of tax credits from the Government (Richter *et al.*, 2009). In addition to this, other studies have focused upon the effect of corporate lobbying on judicial confirmations (Caldeira & Wright 1998 cited in Figueiredo and Richter, 2014). Finally, lobbying themed studies

have highlighted how lobbying impacts financial and accounting regulations and fraud detection (Yu and Yu, 2011; Salehi and Norouzi, 2022). This final area is where our research is going to contribute to. Can corporate lobbying provide a way out for firms with poor environmental performance through changing laws and regulations? How effective is lobbying? Whilst literature is rich in the field of lobbying, Figueiredo and Richter (2014) have argued that the effectiveness of corporate lobbying is one of controversy as it depends upon the econometrics models executed by the researcher. Nonetheless, the subsequent section will discuss in depth some of the key literature in the area that have demonstrated lobbying to bring about positive benefits.

3.2.3 | Combating Poor Environmental Performance: Corporate Lobbying, Interest Groups, Leadership Experience and Environmental Performance

As this study primarily places focus upon environmental performance, it is imperative that the investigation is viewed through the lens of how lobbying impacts accounting and environmental practices. However, as we have not found any previous studies having focused upon the effect of poor environmental performance on corporate lobbying, this section will draw upon previous literature that highlight the benefits achieved by firms lobbying the Government. Firstly, Richter *et al.* 2009 investigated the lobbying expenditure of US firms between the years of 1998 and 2005 by obtaining corporate lobbying data from the Center of Responsive Politics. Not only did the researchers find that corporate lobbying had increased from \$1.44 billion to \$2.47 billion over the period of investigation, but those firms that lobbied were able to obtain tax benefits and essentially pay lower taxes by 0.5% to 1.6%. A similar contemporary study by Lin (2020) concluded the same; the investigation which obtained data from Fortune's America's Most Admired Companies (AMAC) between the years of 2008 and 2017 discovered that firms lobbying benefited from paying lower taxes. Similarly,

the research by Yu and Yu (2011) which sampled US firms between the years of 1998 and 2004 concluded that firms that lobby were 38% less likely to be discovered by authorities and thus, firms are able to postpone or delay the negative market reaction. To successfully lobby, Bertrand *et al.* (2012) conditions two key components; expertise and acquaintance; both predicated upon experience; the more experienced a firm or its management are, the greater accessibility it has to expertise and acquaintance. Expertise in the area of corporate lobbying means that the lobbyist cannot be deficient in their knowledge of corporate lobbying but rather, be firm-grounded in the area or issue of lobbying. As for the second component of successful lobbying; acquaintance, experience can to bring about connections to politicians and political parties with influence (Bertrand *et al.*, 2012). Bertrand *et al.* (2012) further argued that both components (expertise and acquaintance) are inter-linked stating that expertise of the lobbyist leads to acquaintance because influential and powerful politicians are bound to merit proficiency hence when firms have an upright lobbyist in position, acquaintance will follow too. Consequently, when a firm has this connection with the authorities, benefits arise for the corporation. In a contemporary study by Brown and Huang (2020), the investigation model analysed US 12,427 firm-year observations between the years of 2009 through to 2015 and concluded that firms connected to the Government can get more regulatory relief. Hence, research like this encourages poor performing firms to strengthen their relationship with officials (i.e. to have the opportunity to lobby) in order to avoid receiving monetary penalties.

To illustrate the progression of corporate lobbying and to understand how it can help poor environmental performers, a recent press release (Laville, 2019) reported that

the largest national oil firms¹⁶ expended \$200 million annually in lobbying efforts to block climate change. This article substantiates the great effectiveness of corporate lobbying as it has proven to show that a firm can have their environmental interests met through politicising their efforts. With that being the case, if firms can lobby to have their environmental interests met, why cannot firms performing poorly in terms of their interaction with the environment reach out to the Government to have their interests met through relaxing environmental laws and penalties? What is the decisive factor for the Government to accept or reject the lobbying proposal?

In order to understand whether poor environmental performing firms lobby more, a person need to understand the theories that principle this issue. Therefore, the next section will outline the theoretical framework that this investigation is founded upon.

3.2.4 | Theoretical Framework

The theoretical framework is the structural foundation that guides the research investigation built upon a theory or set of interrelated theories (Eisenhart, 1991). As for what theory constitutes, then is a set of principles that base a practice, idea or activity (Grant and Osanloo, 2014). In essence, the absence of a theoretical framework creates unclarity within the vision of the research. In this study, the 'Public Choice' and 'Tollbooth' theories have been used to justify the relationship between corporate lobbying and environmental performance and to investigate whether poor environmental performing firms lobby more.

The Public Choice theory can help to better understand how politicians and authorities accept corporate lobbying if they see a self-gain. The Tollbooth theory will further examine how tight and rigid regulations from authorities can actually backfire and fail

¹⁶ BP, Shell, ExxonMobil, Chevron and Total

due to firms having difficulty in complying with laws and thus in order to remain in control, authorities accept corporate lobbying. Despite morality dictating the idyllic situation and championing a perfect market, the economy is well aware of its real state being far from that and in order to understand this, the above two theories play a crucial role. Whilst previous studies are saturated with the legitimacy theory in looking at the nature of firms and their compliance with guidelines i.e. CSR reporting, Carbon performance etc, this study aims to understand the environmental-related performance of firms and the nature of lobbyists using theories found within the science of politics thus combining politics and environmental accounting together.

The subsequent sub-chapters will delve into both theories in order to understand their principles in greater detail through explaining their main concepts. Thereafter, the sub-chapters will focus upon how these theories have been applied to various contexts by studying previous literature within social sciences.

3.2.4.i | Public Choice Theory

Having understood previous literature, it can be hypothesised that firms with flawed environmental performance lobby more to influence legislators to pass favourable legislations and lower regulations. This is consistent with the Public Choice theory (Buchanan, 1986 cited in Shaw, 2002) which aims to establish an aspect of political behaviour; the theory holds economist principles of entities operating in the political marketplace being motivated via self-interest in opposition to meeting the needs of public interest. Even though firms, lobbyists or even politicians may have concern for others, the principal objective is vested interest or self-concern and minimising direct loss. The theory was first postulated and founded by James M. Buchanan and Gordon Tullock in 1986 (Buchanan, 1986 cited in Shaw, 2002) and since then, it has acted as

a premise in social sciences such as economics and politics along with a number of other theories postulated; the game theory, decision theory and social choice theory.

The theory has two roots; 'positive analysis' and 'normative purposes'. Starting with the latter, normative purposes envelope the idea that politicians and legislators are to strive in improving constitutional rules and rectifying public economics. With this being the objective of what ought to be done, positive analysis takes into consideration the true reality of political behaviour and counter argues that despite morality having a theoretical approach i.e. public interest, politicians and legislators will actually work in their favour. That being the case, all parties involved in the economy will utilise the market within the political arena for the self-interest natured goals. Whilst decisions maybe against public democracy, the power to choose and make decisions gives politicians the sense of being authoritative and influential again, portraying the self-interested nature. The funds belonging to the public are utilised and hence, there is no financial expense incurred by politicians. This then creates the platform for politicians to form into lobbyists and thus, the opportunity to maximise wealth opens up for them. Hence economists like Stigler (Crew and Rowley, 1988) held the view that waste in the economy is generated due to errors inhabited by individuals intending maximization. The following diagram presents an illustrative figure of the Public Choice Theory:

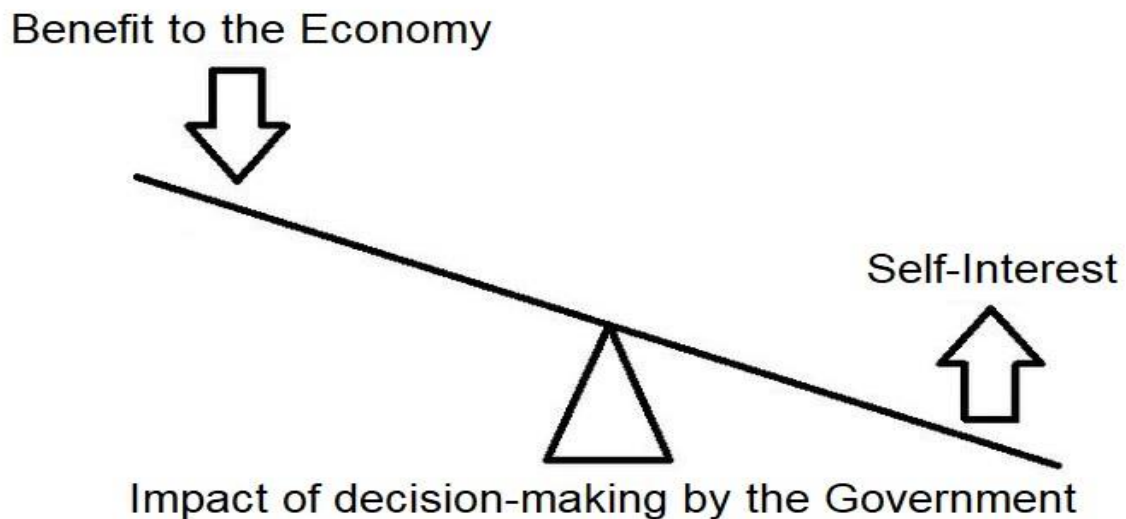


Figure 3.1: **Public Choice Theory (Theoretical Framework)**

In our context, morality will dictate that firms lobby to improve their performance and benefit their stakeholders and society at large however, the Public Choice theory sheds the light of reality of firms lobbying for their vested self-interest. In addition to this, legislators should be encouraging firms to bring merit to the market but in reality, the Public Choice theory will underpin the fact that the Government will look to see how the ventures of firms bring benefit to Public Administration. Therefore, from the perspective of the Public Choice theory, if lobbying expenditure from firms brings income for the authorities, the Government will happily accept the financial gain turning a blind eye towards the actual purpose and objective of the firm lobbying.

3.2.4.ii | Tollbooth Theory

If a legislation acts as an impediment for a firm, rather than committing a criminal offence of attempting to bribe the Government for nonconformity, firms can escape by legally lobbying (Harstad, and Svensson, 2011). This in turn can be supported through another theory known as, 'Tollbooth Theory' (Djankov *et al.*, 2002) which postulates that economies with heavy regulation (i.e. tougher penalties) 'crack under strain' when they reach a tipping point from consistent noncompliance from firms; Bureaucratic

Governments (like that of Democrats) will eventually accept lobbying if they see a benefit for themselves. This can lead to Governments deregulating (i.e. a deregulation reform) their economy and turning a blind eye to essentially what can be considered malpractices committed by firms. A deregulation reform founded by this theory meant that there was too much burden on the economy thus giving rise to neo-liberalism; restructuring policies to ensure that they are market-orientated i.e. lowering barriers to entry, liberalizing capital markets. Therefore, politicians who envelope this theory champion deregulation to a great degree. The following diagram presents an illustration of the theory:

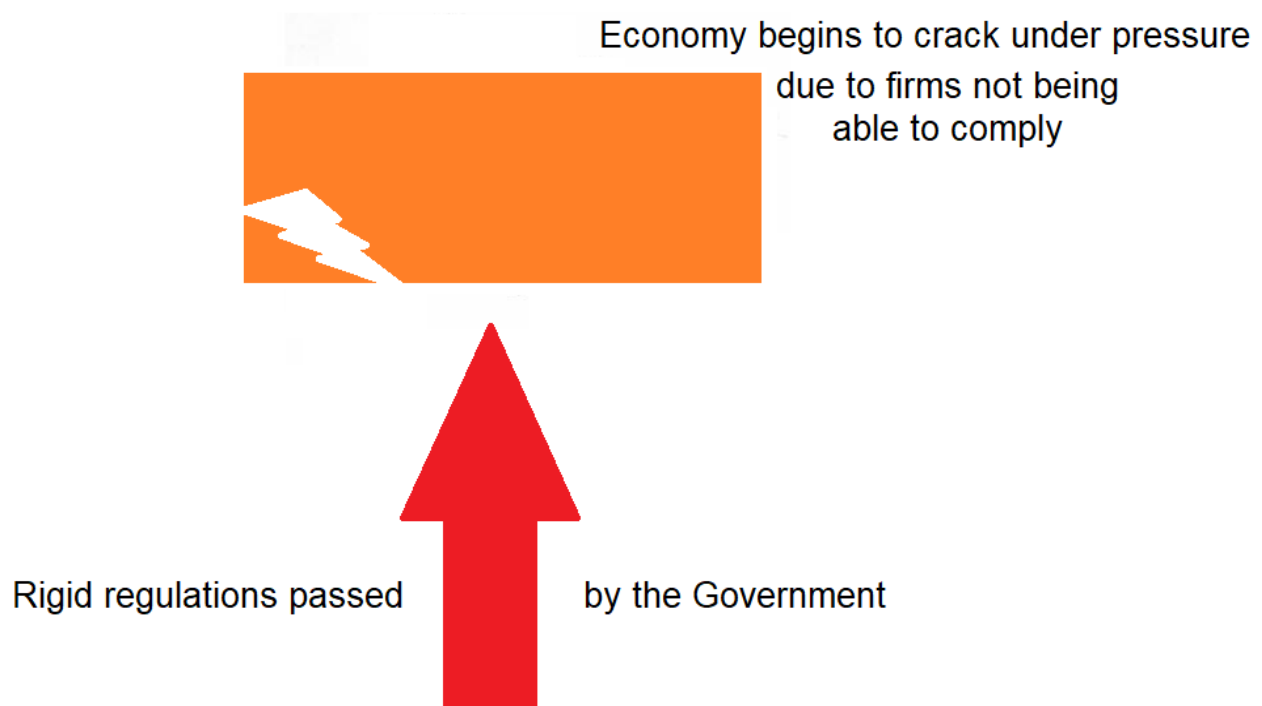


Figure 3.2: Tollbooth Theory (Theoretical Framework)

The theory was first postulated by Simon Djankov in 2000 who also constructed an experiment to test and prove his theory; the investigation included 75 start-up firms and found that nations with heavy entry regulations were more likely to decontrol laws

in comparison to nations that were not too bureaucratic for entrepreneurs wanting to enter the market. To this contrast, the research illustrated that to open up a business in Austria, 12 procedures were required to be followed which can take up to 154 days to complete whilst the entrepreneur was required to pay a start-up fee of \$11,612 to the Government. On the other hand, it only took 2 days to setup a business in Canada (Djankov *et al.*, 2002) with the entrepreneur only being required to pay \$280 to the Government. In another study to understand the premise of the Tollbooth theory and its practical reality, Yakovlev and Zhuravskaya (2007) conducted an investigation of 2000 Russian firms (over 20 different Russian regions) between the years of 2001 and 2004 using micro-level panel data. Substantial regulation made firm operation complicated in Russia however, when regulation liberalized (i.e. inspection, registration and licensing), there was a positive impact on business employment, a reduction of business administrative expense and ease of market penetration. The study also portrayed that deregulation was encouraged in Russian regions with powerful industrial lobby.

In further understanding the key concepts of this theory, Hopkins (1998) identified three main areas of regulations through the Tollbooth theory that can undergo deregulation reform; firstly, Economic regulation pertaining to pricing, marketing and firm entry; how difficult is it to enter into a market or what costs need to be incurred to start-up an enterprise? Or how can price controls impact existing businesses? Entities that have difficulty complying to stringent economic regulation can lobby to have them removed. The second area is social regulation affecting all industries and markets. This area includes health and safety and environmental issues and thus if a firm sees that the costs incurred to maintain health and safety regulations or regulations pertaining to their impact on the environment or vice versa (environmental impact on

firms), firms can lobby for deregulation. Lastly, the third area of deregulation highlighted by Hopkins is regulation in processes which is connected to the bureaucratic state of the Government; if a firm feels there is too much red tape involved in operating within the market, i.e. completing complex tax returns, lobbying becomes an option to liberalise these laws.

With that having been said, both theories fundamentally support the backdrop of this research; the Public Choice theory supports the ideology that every participant of the economy works for their self-vested interest. Firms may choose to lobby in order to have environmental regulations eased and if the Government see a benefit of self-gain i.e. money coming in, the Public Choice theory underpins that the Government will accept the lobbying regardless of whether it brings benefit or not to the society. Do the lobbying proposals improve the environment? Are the lobbying proposals morally correct? These are questions you would think that need to be considered by the Government before accepting corporate lobbying proposals as the objective of the Government should be in favour of all stakeholders of the society however according to the Public Choice theory, the only contemplating question for the Government is, “does the lobbying proposal benefit me financially?” From the perspective of the firm, if environmental regulations are too stringent and costly to abide by, is there any way out? The Tollbooth theory postulates that once an economy becomes ‘too-regulated’ or ‘over-regulated’ without giving any flexibility to the players in the market, firms will see lobbying (for easing environmental regulations) as a cheaper option involving no illegal activity. The theory further postulates that if the Government will accept corporate lobbying proposals as it falls within the law and also involves less red tape in comparison to a firm being penalised for non-conformity of environmental laws. The

next section develops the hypothesis of this study by providing further elaboration on the theories organised for this research.

3.2.5 | Hypothesis Development

Previous literature has illustrated that firms prefer to lobby especially when their capital is low. Overtime, Governments may 'raise the bar' to the extent that a firm will prefer to lobby for deregulation (Harstad and Svensson, 2011) rather than complying with stringent environmental accountability legislations and thus, firms will incentivise lobbying in their favour to encourage the Government to relax environmental laws, hence conforming to the Tollbooth Theory. On an account of this, when firms who perform poorly in relation to the environment are held at question, rather than striving to make a change and improve, will look to utilise the lobby card to make their poor performance more acceptable. If the authority in power encouraging accessibility sees a benefit, they will accommodate this lobbying. Given the importance of the impact of corporate lobbying, we join the discussion to contribute to the relationship between firm's environmental issues and lobby within the political sphere of the US economy whilst considering the factor of leadership experience. That having been said, the following hypothesis have been devised:

H1: Ceteris paribus, firms with poor environmental performance tend to spend more on corporate lobbying.

As previously discussed, effectual corporate lobbying necessitates expertise and acquaintance; both built on experience. Previous literature (Davidson *et al.*, 2006; Unsal, *et al.*, 2016; Rudy and Johnson, 2016; James, 2019) has demonstrated that firm experience can successfully impact corporate lobbying as experienced firms tend to have more 'wisdom' that allows them to know the 'tricks of the trade'. James (2019)

investigated the impact of leadership experience by analysing 11,537 firms and concluded that it has strong effects on a performance of a company; i.e. tax planning. Another study conducted by Ali and Zhang (2015) found that younger leadership try to favourably influence the market's perception of their ability and overstate in earnings management. On the flip side, the study also found that older CEOs tend to be more experienced and do not hastily overstate in earnings management. This study shows that 'older' leadership are more experienced and patient knowing full well of the repercussions that may arise from their firm's actions.

A lengthy tenure of leadership can bring about stability and ultimately, build experience that can reap connections with expert lobbyists. A longer established leadership board will know what expertise entails whilst a 'younger' management may fall for any attractive marketing pitch that may not substantiate its claims. That having been said, the following second hypothesis have been devised:

H2: Ceteris paribus, leadership experience influences the relationship between firms' environmental performance and corporate lobbying

3.3 | METHODOLOGY

This section will outline the procedure embarked upon to collect data and the methodology pursued in producing this investigation. The research methodology is pivotal to explain as it gives the reader a clear picture of the key steps taken by the researcher in going through the study carried out to solve the initial problem or answer the question that principles the investigation (Patel and Patel, 2019). In stressing its importance, Ellen, p. 3 (1984) described methodology as, “*an articulated, theoretically informed approach to the production of data*”.

Prior mentioned, archival study is the research methodology embedded within this dissertation. The research was conducted between the period of 2010 and 2020 for US listed firms from various industries and sectors. As the paradigm of this research has already been addressed, this section will discuss the following; sample selection, measurement of variables, data management and empirical data analysis.

3.3.1 | Sample Selection

The data collection begins with all the US firms reported in the CDP database during 2010 - 2020. The US firms have been chosen as the sample of this study for two primary reasons; they lead in being the second highest polluters of carbon emission in the world¹⁷ and in addition to this, corporate lobbying has shown to be widespread amongst the US political arena. Secondly, in order to understand the full potential of carbon emission, the data required in this study had to be sourced from a comprehensive database; Carbon Disclosure Project (CDP). The CDP is a charitable body that works to survey the globe's largest firms on their interaction and impact on the environment. The voluntary responses from these firms have helped build a wide-

¹⁷The BP Statistical Review of World Energy 2021 report (70th edition) stated that America emitted 4.4 billion tonnes in 2020.

ranging database of climate change information. CDP data professes the largest number of US firms who have made their interaction with climate change visible to the public. Year by year, the organization grows through more corporate firms joining and cooperating in disclosing their effects towards the environment (CDP, 2012). Previous studies (Qian and Shaltegger, 2017) have affirmed that CDP data has produced the largest record of national corporate greenhouse gas emission data and thus, US public-listed firm data was extracted from CDP data.

The sample period for this investigation ran from 2010 to 2020. This is because the availability of CDP data prior to this period was inadequate in terms of the number of firms responding to the survey and thus, the comparison between the years would have been difficult to align, limiting the study. Furthermore, the onset of this sample period saw the growth of business entities giving importance to controlling corporate environmental effect and thus the urgency to manage carbon performance became present (Qian and Shaltegger, 2017). In the last year of the sample period; 2020, the world saw a staggering figure of 32 billion tonnes of carbon emission being released into the atmosphere (BP, 2021); a record that will be broken if emission trends continue.

The data was cleaned and organised to omit missing information After successfully completing the merge, 300 firms remained enveloping 1895 observations. In emulating previous literature, the financial firms were then excluded¹⁸ from the study leading to 223 firms and 1169 observations remaining as the final complete set of panel data.

¹⁸ Previous literature exclude financial firms from their samples as the reporting practice and procedure for financial firms are different to that of non-financial firms. However, adding or subtracting these firms to the study will not bias the results (Boubaker *et al.*, 2019)

3.3.2 | Measurement of Variables

A variable is a factor that can alter and or can have multiple values i.e. varying (Kaur, 2013). There are different types of variables however the main variables used within this research are the independent (also including control variables) and dependent. The independent variable is the determinant whilst the dependent variable is the resultant. Kaur (2013) stated, *“If the independent variable is an active variable then we manipulate the values of the variable to study its effect on another variable.”* It is imperative for a researcher to explain the variables used within their study in order to depict a clear relationship.

3.3.2.i | Dependent Variable

For the dependent variable, the lobbying expenditure data of US firms was derived from the Center of Responsive Politics (Open Secrets)¹⁹ in following the trend of previous studies conducted (Scheuerel, 2008). As the data extracted was in individual years, the corporate lobbying expenditure data was merged manually to create a large and complete data set of lobbying expenditure for US firms from 2010 to 2020.

3.3.2.ii | Independent Variable

A number of previous literatures have discussed various measurement tools for environmental performance for quantitative research including consumption, wastage levels, ecological impact etc. (Ilintich *et al.*, 1998; Trommer and Schultze, 2011; Dieste *et al.*, 2019) but the optimal and most consistent benchmark is carbon emissions and thus, we extracted carbon emission²⁰ data from the Carbon Disclosure Project (CDP)

¹⁹ Open Secrets managed by the Center of Responsive Politics; a non-profit and unprejudiced D.C.-based organization aiming to educate voters on the influence of money in politics.

²⁰ Carbon is the most common emission of firms; 100 global firms have contributed to 71% of global emissions just from carbon production (Riley, 2017) and hence it has been used in this investigation

to deploy within this empirical study in order to benchmark environmental performance.

Carbon emission data of scope 1²¹ and scope 2²² was extracted from CDP data measured in metric tonnes and summated to provide an aggregate set of carbon emission data. Both scopes were included in this study as both are consequential in carbon accountability thus providing a more comprehensive picture of the firms included. The raw data was then cleaned and merged with corresponding variable data.

3.3.2.iii | Control Variables

A number of extraneous control variables (financial and governance) were observed.

These variables were extracted from Bloomberg²³:

Table 3.1: **Summary of control variables**

Variable:	Definition & Measure:	Source:
Debt to Equity	Total Debts / Total Assets	Bloomberg
Return on Assets	Net Income / Total Assets	Bloomberg
Capital Intensity	Capital Expenditure / Total Assets	Bloomberg
Cash Holding	(Cash + Short-Term Security) / Total Assets	Bloomberg
Firm Size	Log of Market Value	Bloomberg
CEO Age	Age in Years	Bloomberg
Carbon Intensiveness	Dummy variable = 1 if firm operates within a carbon intensive industry and 0 if firm operates within a non-carbon intensive industry	Carbon Disclosure Project
CEO Gender	Dummy variable = 1 if CEO is Female and 0 otherwise	Bloomberg

²¹ These are emissions classified by CDP to be directly produced by a firm; combustion, boilers, furnaces etc.

²² These are emissions which are indirectly produced by a firm e.g. Purchasing of heat and electricity

²³ A software containing financial information pertaining to global firms

Political Influence	Dummy variable = 1 if the head office of the firm is located within a Democratic state and 0 if the head office of the firm is located within a Republican state	Open Secret (Center of Responsive Politics)
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Debt to equity and cash holding variables are important as their consideration help investors to identify high risk firms as they relate to the level of debt contained within the firm and its ability to meet payment (Rohani, 2016). Thus, cash holding identifies how much cash is available to firms i.e. to meet their short-term obligations and then how much they have at their disposal to consider corporate lobbying. Finance no doubt is a key factor for corporate lobbying and hence firm size has also been included as larger firms will tend to have more money available to spend (John and Adebayo, 2013). In addition to this, firm size has also been included as larger firms can have influence on the authorities due to their larger stake in the market (Shevchenko, 2020).

As for return on assets, capital intensity and CEO age, the objective of including these variables is to consider governance as these variables demonstrate the effectiveness of leadership because if the firm is progressing positively, it will be as a result of leadership steering the firm in the right direction by making the correct financial and management decisions (Halimatusadiah *et al.*, 2015). This study also contained categorical variables that had different values without numerical relationships; CEO Gender, Political Party and Carbon Intensiveness. Hence in order to involve them in the empirical data analysis, they were converted into dummy variables; carbon intensiveness takes the value of '1' if the sampled firm belongs to a carbon intensive

industry²⁴ and '0' if otherwise; CEO gender takes the value of '1' if the sampled firm has a female CEO and '0' if otherwise and lastly, political influence takes the value of '1' if the firm's head office is located within a democratic leading state or '0' if otherwise.

The objective of controlling all of these variables were to ensure results are skewed and also help in providing clarity to the relationships held between the intended variables (Brannick and Spector, 2011) by observing a range of both governance and financial variables.

3.3.3 | Econometric Approach

To explore the outcome of environmental performance upon lobbying, the following equation predicated the regression analysis:

$$\text{Corporate Lobbying} = \alpha + \beta_1 \text{Environmental Performance} + \beta_2 \text{Leverage} + \beta_3 \text{ROA} + \beta_4 \text{Capital Intensity} + \beta_5 \text{Cash Holding} + \beta_6 \text{Firm Size} + \beta_7 \text{CEO Age} + \beta_8 \text{CEO Gender Dummy} + \beta_9 \text{Political Influence Dummy} + \beta_{10} \text{Carbon Intensive Dummy} + \varepsilon$$

In the above equation, corporate lobbying is the dependent variable whilst environmental performance is the independent variable. The proxy used for the independent variable is carbon emission.

To estimate the above-mentioned equation, a number of econometrics models (descriptive statistics, correlation matrix, random effect model and Hausman test) are run to analyse the data. These are explained in detail in the sections below.

²⁴ According to the Carbon Disclosure Project; carbon intensive industry sectors contain energy, industrial, material and utilities whilst non-intensive industry sectors include financial (dropped), consumer discretionary, consumer staple, health care and IT & telecommunication (Refer to Appendix 1)

3.4 | RESULTS

This section will exhibit the results obtained from this study after having tested the hypotheses postulated. The remainder of this section presents the descriptive statistics, correlation matrix comparing the variables in the dataset, the econometrics models run to test both hypotheses and addressing the issue of endogeneity.

3.4.1 | Descriptive Statistics

Table 3.2: Descriptive Statistics

Variables	Obs.	Mean	Std. Dev.	Min	Max
Lobbying Amount	1391	0.281	1.486	0.000	35.586
Carbon Emission	1391	10.193	27.928	0.000	620.200
Debt	1210	0.302	0.186	0.000	2.439
ROA	1391	0.062	0.077	-1.227	0.373
Capital Intensity	1390	0.049	0.037	0.002	0.366
Cash Holding	1391	0.104	0.104	0.000	0.692
Firm Size	1389	10.164	1.187	5.930	14.492
CEO Age	1387	56.234	5.740	37.000	78.000
Carbon Intensive (D)	1391	0.902	0.298	0.000	1.000
CEO Gender (D)	1387	0.068	0.251	0.000	1.000
Political Influence (D)	1355	0.863	0.344	0.000	1.000

The above table illustrates the descriptive statistics of this chapter within the investigation. Carbon Emissions produced from scope 1 and scope 2 emissions was used as a proxy to measure environmental performance. From the table, Carbon Emission had a mean score of 10% with a standard deviation of 27.928. With the standard deviation illustrating the variability of the set of data, this low standard deviation depicts that the data is concentrated around the mean. The dependent variable ranges from 0% to 36% illustrating the diversity of firms utilised within this study as a mixture of carbon intensive and non-intensive were included.

A number of control variables were utilised; debt illustrated the financial stability of firms in terms of their leverage and thus, the range of 24% conforms with our study as the study does not include financial geared firms which traditionally tend to have more debt and incur greater amounts of interest. Cash holding and firm size had very similar means and standard deviations both with large ranges; 69% was the range for cash holding illustrating that firms behave differently when it comes to holding onto cash (i.e. some reinvesting the funds whilst others store in reserves). CEO age produced the largest range of 78% illustrating that firms included within this study were of different ages and thus, different generations. However as for the standard deviation of firm size which was 1.187, the high statistic showed that the data is quite spaced out in comparison to the standard deviations of much of the other variables included within this study.

Three dummy variables were executed within this study; Carbon intensiveness, CEO gender and political influence. It was imperative to include carbon intensiveness as a dummy variable within this study as it contributed to the backdrop of this study as carbon emission is the explanatory variable. The mean of this dummy variable was 90% whilst the standard deviation ranked 0.298. Again, the low standard deviation of the carbon intensiveness dummy variable like the other two variables of CEO gender and political influence shows the data to be clustering around the mean.

3.4.2 | Correlation Matrix

The correlation matrix illustrates the coefficient relationship between the various variables in a study and in particular, the correlation between two variables (all possible pair of variables) whilst excluding the other variables that maybe present within the investigation.

Table 3.3: **Correlation Matrix**

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
(1) Lobbying Amount	1											
(2) Carbon Emission	0.092**	1										
(3) Debt to Equity	-0.012	-0.045	1									
(4) ROA	0.008	-0.035	0.002	1								
(5) Cash Holding	-0.053	-0.122***	-0.061*	0.157***	1							
(6) Firm Size	0.188***	0.109***	0.100***	0.292***	0.075*	1						
(7) CEO Age	0.024	0.009	-0.046	0.009	0.016	0.063*	0.271***	1				
(8) Capital Intensity	-0.003	0.178***	-0.073*	0.202***	0.235***	-0.039	0.034	0.108***	1			
(9) Carbon Intensiveness (D)	0.052	0.055	0.146***	-0.072*	0.079**	0.026	0.052	0.051	-0.041	1		
(10) CEO Gender (D)	0.046	0.046	0.000	-0.034	-0.037	0.012	0.061*	-0.038	-0.014	0.033	1	
(11) Political Influence (D)	0.043	0.044	-0.051	-0.058*	0.112***	0.025	0.085**	0.101***	0.027	0.196***	-0.013	1

* p<0.05, ** p<0.01, *** p<0.001

The correlation matrix demonstrates that the dependent variable correlates negatively with debt (-0.012), cash holding (-0.053) and capital intensity (-0.003) respectively whilst correlating positively with the other variables.

As for the independent variable; carbon emission depicted some significant correlations with cash holding (-0.122), firm size (0.109), and capital intensity (0.178). Negative correlations were depicted for debt to equity and ROA whilst the others variables correlated positively with carbon emission. As for a firm's leverage, ROA impacted debt positively but the correlation was not significant. But as for cash holding, firm size, capital intensity and carbon intensiveness, the correlations were significant.

ROA correlated significantly with a number of variables; cash holding (0.157), firm size (0.292), capital intensity (0.202), carbon intensiveness (0.072) and political party (0.058). However, the correlations between ROA and CEO Age or CEO Gender were not significant. Moving onto the coefficients for cash holding, firm size correlated with a significant correlation of 0.075 depicting larger firms to hold greater cash reserves. As for capital intensity, carbon intensiveness and political party, the correlations were all significantly positive.

For firm size, the only significant (and also happening to be positive too) correlation was CEO Age (0.403) depicting a link between certain characteristics of a firm's management and its size. In considering the governance variables, CEO Age was positively and significantly impacted by capital intensity (0.101) and political party (0.108). The dummy variables did not have any significant correlations with capital intensity (carbon intensiveness: -0.041, CEO gender -0.014 and political influence 0.027).

Overall, firm size and capital intensity had the greatest number of significant correlations within the correlation matrix whilst the CEO Gender had the least number of significant correlations. The correlation matrix also helps to detect multicollinearity; the issue of multicollinearity arises when the independent variables within an investigation correlate together i.e. there is a high correlation (1.0) between all the independent variables causing interference in the final results and making them biased, thus affecting reliability. As the table illustrates, multicollinearity was not an issue in this investigation and hence did not impact the validity of the results.

3.4.3 | Data Analysis

The data applied within this study is panel data²⁵. Panel data within the field of econometrics is analysed and interpreted by the random and fixed effect estimator models.

The fixed effect model assumes that all units are affected by one common effect whilst the random effect model holds the assumption that each unit is affected by a different underlying effect that are distributed and hence, a study can either be best fit for a fixed effect model or random effect model, not both. In addition, these two models consider heterogeneity²⁶ and do not assume that all panel data units within the study are the same; homogenous. After classifying the firms of the study into carbon intensive and carbon non-intensive²⁷, both fixed effect and random effect models were

²⁵ Panel data is also known as Longitudinal data involving observing multiple individuals/firms over multiple time intervals. Stata (a statistical software designed for data science) was utilised to conduct the empirical data analysis of this investigation

²⁶ In panel data, this refers to the cross-sectional units being unique and different from each other.

²⁷ According to the Carbon Disclosure Project; carbon intensive industry sectors contain energy, industrial, material and utilities whilst non-intensive industry sectors include financial (dropped), consumer discretionary, consumer staple, health care and IT & telecommunication. This classification was forwarded in following previous literature (Cho *et al.*, 2012) because it is understood that the carbon conduct and performance of these two groups differ due to disparate environmental exposure.

run and the estimates were stored. The Hausman test²⁸ was executed to see which of the two models were effective for both groups of firms. If the Prob>chi2 equates to >0.05, the best fit model for the study is the fixed effect model, anything greater would denote that random effect model is optimum. As the Prob>chi2 = 0.074 for all the firms sampled along with further Prob>chi2 = 0.120 for the carbon intensive firms and the Prob>chi2 = 0.995 for carbon non-intensive firms, the estimator best fitted to this study proved to be the random effect model. The following tables display the random effect model regressions and outcome of the Hausman tests:

²⁸ The Hausman test (founded by Jerry A Hausman in 1978) is used to check whether a linear regression ($Y = \beta X + c + \epsilon$) is best suited for a fixed effect model or a random effect model. The null hypothesis would confirm that we use the random effect model as it is more systematic however, the alternative hypothesis states that the fixed effect model be used as the random effect model is more unwavering. That having been said, the Hausman test will help in choosing the ideal model out of the two for the study.

Table 3.4: Impact of Environmental Performance on Corporate Lobbying (Random Effect Model)

Variables	Panel A: (All Firms)	Panel B: (Carbon Intensive Firms)	Panel C: (Carbon Non-Intensive Firms)
Carbon Emission	0.004* (0.035)	0.004* (0.038)	0.013*** (0.000)
Debt to Equity	0.093 (0.705)	0.080 (0.828)	0.001 (0.981)
Return on Assets	-0.778 (0.202)	-0.833 (0.229)	0.406 (0.151)
Capital Intensity	-1.867 (0.143)	-2.090 (0.149)	-1.093* (0.020)
Cash Holding	-1.000* (0.029)	-1.176* (0.021)	0.043 (0.792)
Firm Size	0.246*** (0.000)	0.276*** (0.000)	0.013 (0.426)
CEO Age	0.002 (0.777)	0.002 (0.847)	-0.000 (0.788)
Carbon Intensiveness (D)	0.180 (0.218)	- -	- -
CEO Gender (D)	0.268 (0.171)	0.271 (0.211)	-0.022 (0.746)
Political Party (D)	0.155 (0.263)	0.210 (0.212)	0.030 (0.284)
Constant	-2.578* (0.000)	-2.655*** (0.000)	-0.082 (0.725)
No of Observations	1169	1032	137
Adj. R-Square	0.053	0.054	0.262

p-values in parentheses

* p<0.05, ** p<0.01, *** p<0.001

Table 3.5: **Hausman (1978) specification test (Panel A: All Firms)**

	Coef.
Chi-square test value	15.67
P-value	0.074

Table 3.6: **Hausman (1978) specification test (Panel B: Carbon Intensive)**

	Coef.
Chi-square test value	14.08
P-value	0.120

Table 3.7: **Hausman (1978) specification test (Panel C: Carbon Non-Intensive)**

	Coef.
Chi-square test value	1.74
P-value	0.995

NOTES: The models are estimated with panel data. *, ** and *** indicate significance at 0.05, 0.01 and 0.001 levels respectively. The sample period is from 2010 to 2020. **Lobbying Amount** is the amount expended by firms (dependent variable) measured in US dollars (millions) **Carbon Emission** is the proxy for environmental performance (independent variable) measured in metric tonnes with scope 1 and scope 2 emissions aggregated. **Debt to Equity** is a ratio displaying a comparison between a firm's total debt and its total equity. **ROA** is a ratio measuring the return a firm can achieve from its assets (*Net Income / Total Assets*). **Capital Intensity** benchmarks a firm's financial efficiency by comparing how well its capital invested is doing in relation to revenue generated (*Capital Expenditure / Total Assets*). **Cash Holding** is a ratio ($[Cash + Short-term security] / Total Assets$) illustrating how liquid a firm's total assets are²⁹. **Firm Size** is measured by taking the logarithm of market value. **CEO Age** is the age of the CEO measured in years. **Carbon Intensiveness** is a dummy variable ($1 = carbon\ intensive\ and\ 0 = carbon\ non-intensive$) used to classify the firms; the firms have been classified by determining which industry sector they operate within in accordance to CDP. **CEO Gender** is a dummy variable ($1 = male\ and\ 0 = female$) used to identify the gender of the CEO in position. **Political Influence** is a dummy variable ($1 = Democratic\ and\ 0 = Republican$) which records the political arena the head office of firms operate from.

The random effect GLS regressions illustrates a statistically significant positive correlation between carbon emitted and corporate lobbying for all panels within the data sample; all firms (coefficient=0.004, $p < 0.05$), carbon intensive (coefficient=0.004, $p < 0.05$) and carbon non-intensive (coefficient=0.013, $p < 0.001$) illustrating that for

²⁹ A firm's total assets will consist of short-term, long-term assets, liquid and non-liquid assets. The most liquid asset is cash which is imperative for a firm in assessing its obligation to meet its short-term liabilities.

every 1 tonne of increase in carbon emission i.e. the greater the amount of carbon emitted, the greater the tendency a firm has to lobby by \$0.004 million (for all firms and carbon intensive firms) and \$0.013 million (carbon non-intensive). This follows previous literature (Rohani *et al.*, 2016) which declare non-intensive firms to be more poorer performers in relation to carbon intensive firms and hence, poor performance may motivate them to lobby more. Further analysis for the above regression table also shows that firm size has a significantly positive correlation with corporate lobbying within the dataset of all firms (coefficient=0.246, $p<0.001$) and with carbon intensive firms (coefficient=0.276, $p<0.001$); the bigger a firm is, the more they lobby as larger firms will have access to more disposable funds. A third significant correlation depicted from the above regression was found with cash holding for the dataset of all firms (coefficient=-1.000, $p<0.05$) and carbon intensive firms (coefficient=-1.176, $p<0.05$). Despite the correlation being negative, this can be interpreted to mean that the more funds a firm holds in term of their cash reserves, the less it lobbies; if more money is preserved within the firm, less is available to dispose on lobbying.

The only other significant correlation though negative for carbon non-intensive firms was capital intensity (coefficient=-1.093, $p<0.05$). Whilst the capital intensity depicts the financial efficiency of a firm measuring its possessed assets in accordance with its turnover, a negative relationship means that for every 1% capital intensity, a carbon non-intensive firm lobby less by -1.093. This is logical in the sense that a stronger capital intensity means a firm is more financially efficient and hence does not need to lobby the Government to have laws passed in their favour.

3.4.4 | Addressing Endogeneity

Endogeneity refers to when the independent variable correlates to the error term of the dependent variable³⁰ caused by three main reasons; measurement errors, reverse causality by which the dependent variable impacts the explanatory variable and omitted data. In application of this investigation, reverse causality can be impactful in the sense that firms that lobby may feel they do not need to exert any effort in benefiting the environment and hence may perform poorly. A second cause of endogeneity within this investigation could have been as a result of omitted data; some data was missing from the control variables. From the analytical tools used within the field of econometrics to test for endogeneity is the Two-stage least squares regression analysis (2SLS). The analysis consists of two stages;

1. Within the first stage, the endogenous variable (i.e. the problematic variable) is regressed on the instrumental variable.
2. The second stage then involves using the estimated values from stage one to replace the values produced by the endogenous variable to run a new linear regression model.

Previous literature has stipulated that for a variable to be considered as instrumental, it must fulfil three key conditions:

- a) Exclusion Restriction: The variable selected to act as instrumental cannot have a direct causal effect on the dependent variable
- b) Relevance: The variable selected to act as instrumental should be connected to the independent variable
- c) Exogeneity Assumption: The instrumental variable is random assigned

³⁰ The margin of error within the model highlighting the difference between theoretical values and the actual values.

In this investigation, we firmly believe that carbon emission (endogenous variable) is connected with industry (instrumental) because certain firms are more sensitive to carbon emission over others depending upon the industry sector they operate within. Hence, gathering carbon data of industries and extracting an industry score from the average carbon emitted per industry sector will provide a more comprehensive picture of the carbon interaction within industries and also compare to individual firm carbon levels. This is also in accordance with previous literature (Bose *et al.*, 2021) which has experimented the effect of industry carbon emissions upon various elements i.e. ability to acquire, credibility etc in relation to firm carbon emission. Hence, previous literature has emphasised upon communal reduction from industry sectors rather than individual firm reduction. Whilst firm carbon emissions and industry average carbon emission correlate together, the industry average which acts as the instrumental variable in the investigation does not impact lobbying i.e. the dependent variable as lobbying is more centred towards specific firms and their spending and hence, all conditions have been met for research and development to qualify as the instrumental variable. Using the SIC codes to differentiate the industry sectors, the carbon emission of the firms were aggregated to find the total emission per industry sector and then an average was calculated by taking the mean.

The remaining control variables were actioned as exogenous variables³¹. In emulating previous literature (Coles *et al.*, 2008; McKnight and Weir, 2009), the instrumental variable is lagged by a year³². The following table depicts the 2SLS regression model

³¹ These variables do not correlate with the error term and within this investigation, the control variables will act as the exogenous variables when running the 2SLS regression analysis and act as instrumental variables for themselves.

³² The lag provides more robust estimates and prevents heteroscedasticity

presenting both the first and second stages along with a critical reviewal of the validity of the IV instrument selected through a number of tests.

Table 3.8: 2SLS

Variables	First Stage	Second Stage
Carbon Emission	0.018* (0.025)	0.017* (0.028)
Debt to Equity	0.148 (0.614)	0.084 (0.772)
Return on Assets	-0.816 (0.289)	-0.752 (0.317)
Capital Intensity	-3.864* (0.038)	-3.398 (0.057)
Cash Holding	-0.889 (0.146)	-1.048 (0.077)
Firm Size	0.257*** (0.000)	0.252*** (0.000)
CEO Age	0.005 (0.612)	0.007 (0.463)
Carbon Intensive (D)	0.124 (0.503)	0.160 (0.369)
CEO Gender (D)	0.418 (0.085)	0.326 (0.165)
Political Influence (D)	0.141 (0.403)	0.130 (0.422)
Constant	-2.743*** (0.000)	-3.259*** (0.000)
No of Observations	958	958
Adj. R-Square	0.002	0.073

p-values in parentheses

* p<0.05, ** p<0.01, *** p<0.001

Table 3.9: **Review of IV Instrument**

Underidentification test (Anderson canon. corr. LM statistic):	72.931
Chi-sq(1) P-val	= 0.000
Weak identification test (Cragg-Donald Wald F statistic):	77.210
Stock-Yogo weak ID test critical values:	
10% maximal IV size	16.38
15% maximal IV size	8.96
20% maximal IV size	6.66
25% maximal IV size	5.53
Sargan statistic (overidentification test of all instruments):	0.000
(Equation exactly identified)	

NOTES: The models are estimated with panel data. *, ** and *** indicate significance at 0.05, 0.01 and 0.001 levels respectively. The sample period is from 2010 to 2020. **Lobbying Amount** is the amount expended by firms (dependent variable) measured in US dollars (millions) **Carbon Emission** is the proxy for environmental performance (independent variable) measured in metric tonnes with scope 1 and scope 2 emissions aggregated. In this 2SLS model, it is the endogenous variable that is instrumented by the **Average Industry Carbon Emission**; Using the SIC codes to differentiate the industry sectors, the carbon emission of the firms was aggregated to find the total emission per industry sector and then an average was calculated by taking the mean. **Debt to Equity** is a ratio displaying a comparison between a firm's total debt and its total equity. **ROA** is a ratio measuring the return a firm can achieve from its assets (*Net Income / Total Assets*). **Capital Intensity** benchmarks a firm's financial efficiency by comparing how well its capital invested is doing in relation to revenue generated (*Capital Expenditure / Total Assets*). **Cash Holding** is a ratio (*[Cash + Short-term security] / Total Assets*) illustrating how liquid a firm's total assets are³³. **Firm Size** is measured by taking the logarithm of market value. **CEO Age** is the age of the CEO measured in years. **Carbon Intensiveness** is a dummy variable (*1 = carbon intensive and 0 = carbon non-intensive*) used to classify the firms; the firms have been classified by determining which industry sector they operate within in accordance to CDP. **CEO Gender** is a dummy variable (*1 = male and 0 = female*) used to identify the gender of the CEO in position. **Political Influence** is a dummy variable (*1 = Democratic and 0 = Republican*) which records the political arena the head office of firms operate from.

Within the first stage of the 2SLS, the instrumental variable is regressed on the dependent variable; lobbying whilst including all the control variables. Thereafter in the second stage, the new estimated values are utilised to replace the old estimated values (produced by carbon emissions) to run a linear regression model.

³³ A firm's total assets will consist of short-term, long-term assets, liquid and non-liquid assets. The most liquid asset is cash which is imperative for a firm in assessing its obligation to meet its short-term liabilities.

With firm carbon emission instrumented by the industry average carbon emission, the 2SLS depicts a significantly statistical positive relationship between the independent variable and dependent variable in both stages (coefficient=0.018, $p<0.05$ and coefficient=0.017, $p<0.05$) which further supports the main model of this investigation; the random of effect model. This corroboration further enhances the validity of this investigation to depict that firm carbon emission and lobbying are correlated. To further enhance the validity of the random effect model, firm size again proved to be statistically significant during both stages (coefficient=0.257, $p<0.001$ and coefficient=0.252, $p<0.001$) in this 2SLS regression model; larger firms lobby more.

In addition to this, there was a statistically significant correlation though negative for Capital Intensity for the first stage (coefficient=-3.864, $p<0.05$); a stronger Capital Intensity means a firm is more financially efficient and hence does not need to lobby the Government to have laws passed in their favour.

3.4.4.i | Underidentification Test

The underidentification test executed by the Anderson canonical correlation LM statistic illustrates whether the instrumental variable selected is relevant enough to act as the instrument. The null hypothesis of this test is that the instrumental variable is underidentified however, the test has proven to be significant as the Chi-sq(1) P-val =0.000 thus rejecting the null hypothesis.

3.4.4.ii | Weak Identification Test

The weak identification test identified by Cragg-Donald Wald F statistic tests whether the instrumental variable can define the endogenous variable and act as a suitable replacement to have explanatory power. If any of Stock-Yogo weak ID test critical

values exceed the F statistic of the Cragg-Donald Wald F statistic test i.e. 77.210, then the instrumental variable is classified as weak. In this investigation, none of the critical values surpass the F statistic

3.4.4.iii | Overidentification Test

The overidentification test executed by the Sargan statistic checks to see whether the instrumental variable correlates to the error term i.e. whether the instrumental variable is exogenous. The null hypothesis illustrated in this investigation shows that the instrumental variable is exogenous.

In considering all the above tests, the industry carbon emission has proven to be a good instrumental variable.

3.4.5 | Leadership Experience

Moving onto the second hypothesis investigated within this study, it has previously been stated that successful corporate lobbying firms require expertise and acquaintance (Bertrand *et al.*, 2012; Blau *et al.*, 2013); both which are built upon experience; the more experienced a firm or its management are, the greater accessibility it has to expertise and acquaintance. In the context of lobbying, it has already been established that firms that perform poorly tend to lobby more however, does leadership experience play a role in this? Do experienced firms have more knowledge and know the 'tricks' to lobby successfully in order to have bills passed in their favour? To consider these points and identifying this knowledge gap within literature, the following second hypothesis has been developed:

H2: Ceteris paribus, leadership experience influences the relationship between firms' environmental performance and corporate lobbying

To test this hypothesis, CEO Age was used as a proxy for leadership experience to follow the trend of previous literature (Waelchli and Zeller, 2013; James, 2019). There are two different models analysing two groups of CEOs (older CEOs and younger CEOs) with the regression running on sub-samples; the firms sampled within this investigation were ordered in terms of the age of their CEOs with the youngest CEO being 37 years of age and the oldest being aged 78. With 41 years difference between the oldest and the youngest CEO within the dataset, the sample displayed the age range of CEOs to be large and expansive. An average was taken of the ages; 56 years old and the data was sampled into two groups split into two groups; the first group contained CEOs aged between 37 years of age and 56 years of age (the younger CEOs) whilst the second group sampled CEOs aged between 57 years of age to 78 years of age (the older CEOs).

The panel data econometrics models; fixed effect and random effect models were run and the estimates were stored. The Hausman test³⁴ was executed to see which of the two models were effective for both groups of firms. As stated previously, if the Prob>chi2 equates to >0.05, the best fit model for the study is the fixed effect model, anything greater would denote that random effect model is optimum. As the Prob>chi2 = 0.748 for the firms with CEOs aged 37 to 56 years and the Prob>chi2 = 0.340 for the firms with CEOs aged 57 to 78 years, the estimator best fitted to this additional hypothesis proved to be the random effect model (the same model best suited for the

³⁴ The Hausman test (founded by Jerry A Hausman in 1978) is used to check whether a linear regression ($Y = \beta X + c + \epsilon$) is best suited for a fixed effect model or a random effect model. The null hypothesis would confirm that we use the random effect model as it is more systematic however, the alternative hypothesis states that the fixed effect model be used as the random effect model is more unwavering. That having been said, the Hausman test will help in choosing the ideal model out of the two for the study.

main hypothesis of this study). The following tables display the random effect model regressions and outcome of the Hausman tests:

Table 3.10: Leadership Experience influence on Corporate Lobbying (Random Effect Model)

Variables	Panel A: (CEO aged 37 – 56)	Panel B: (CEO aged 57 – 78)
Carbon Emission	1.393 (0.458)	1.208** (0.006)
Debt to Equity	-0.160 (0.538)	0.803 (0.580)
Return on Assets	-1.586 (0.054)	-0.316 (0.724)
Capital Intensity	1.169 (0.480)	-4.244* (0.028)
Cash Holding	-7.250 (0.173)	-0.891 (0.243)
Firm Size	2.972*** (0.000)	0.166* (0.026)
Carbon Intensiveness (D)	2.653 (0.113)	0.574 (0.814)
CEO Gender (D)	0.160 (0.569)	0.357 (0.264)
Political Influence (D)	1.277 (0.403)	0.189 (0.448)
Constant	-2.769*** (0.000)	-0.180* (0.012)
No of Observations	580	589
Adj. R-Square	0.077	0.060

p-values in parentheses

* p<0.05, ** p<0.01, *** p<0.001

Table 3.11: Hausman (1978) specification test (CEO aged 37 – 56)

	Coef.
Chi-square test value	3.470
P-value	0.748

Table 3.12: Hausman (1978) specification test (CEO aged 57 – 78)

	Coef.
Chi-square test value	6.796
P-value	0.340

NOTES: The models are estimated with panel data. *, ** and *** indicate significance at 0.05, 0.01 and 0.001 levels respectively. The sample period is from 2010 to 2020. **Lobbying Amount** is the amount expended by firms (dependent variable) measured in US dollars (millions) **Carbon Emission** is the proxy for environmental performance (independent variable) measured in metric tonnes with scope 1 and scope 2 emissions aggregated. **Debt to Equity** is a ratio displaying a comparison between a firm's

total debt and its total equity. **ROA** is a ratio measuring the return a firm can achieve from its assets (*Net Income / Total Assets*). **Capital Intensity** benchmarks a firm's financial efficiency by comparing how well its capital invested is doing in relation to revenue generated (*Capital Expenditure / Total Assets*). **Cash Holding** is a ratio ($[(\text{Cash} + \text{Short-term security}) / \text{Total Assets}]$) illustrating how liquid a firm's total assets are³⁵. **Firm Size** is measured by taking the logarithm of market value. **CEO Age** is the age of the CEO measured in years (*older CEOs = 37 – 56 years old and younger CEOs 57 – 78 years old*). **Carbon Intensiveness** is a dummy variable (*1 = carbon intensive and 0 = carbon non-intensive*) used to classify the firms; the firms have been classified by determining which industry sector they operate within in accordance to CDP. **CEO Gender** is a dummy variable (*1 = male and 0 = female*) used to identify the gender of the CEO in position. **Political Influence** is a dummy variable (*1 = Democratic and 0 = Republican*) which records the political arena the head offices of firms operate from.

The random effect GLS regressions considers each unit to be affected by a different underlying effect that are distributed (i.e. the age of CEOs) and hence, theoretically this seems to be reason why it serves as the best fit model in this part of the investigation. In the model, there is an illustration of a statistically significant positive correlation between carbon emitted and lobbying for the older group of CEOs (coefficient=1.208, $p < 0.01$); the greater the amount of carbon emitted i.e. for every 1 tonne of carbon emitted, the greater the tendency a firm has to lobby by \$0.12 million. As for the younger group of CEOs, a statistically significant correlation was not present between carbon emitted and lobbying despite the relationship being positive. This correspondence to previous literature (Davidson *et al.*, 2006; James, 2019) which demonstrate that experience can be advantageous for firms and in this context, the research demonstrates that older and more experienced CEOs know the technicalities and the correct methodology to lobby successfully and hence they may lobby more.

Further analysis for the above regression table also shows that firm size has a significantly positive correlation with lobbying of firms for both older (coefficient=0.166,

³⁵ A firm's total assets will consist of short-term, long-term assets, liquid and non-liquid assets. The most liquid asset is cash which is imperative for a firm in assessing its obligation to meet its short-term liabilities.

$p < 0.001$) and younger (coefficient=2.972, $p < 0.05$) CEOs; the bigger the firm, the more they lobby as larger firms will have access to more disposable funds through generating more sales and having accessibility to financial support i.e. banks (Dennis and Sharpe, 2005). A third significant correlation though negative was found between capital intensity and lobbying for the older group of CEOs (coefficient=-4.244, $p < 0.05$) thus illustrating that if a firm invests more on capital and expanding the corporation, it will have less funds to utilise towards lobbying, hence depicting a negative relationship. Furthermore, the older CEOs can be more mature and aware of the market and may choose to invest into the firm more rather than busy the firm with lobbying; going back to the issue of experience. All the other variables did not display a significant relationship.

3.5 | DISCUSSION AND CONCLUSION

The objective of this study was to analyse and examine the relationship between environmental performance and corporate lobbying by analysing 223 US firms between the period of 2010 to 2020 as panel data. A second hypothesis was also postulated to examine the effect that leadership experience had on the relationship between the two variables to further extend the research. Within the preceding sections of this study, the hypotheses and the theoretical framework they stand upon were explored. With the hypotheses being tested and the results being established, this section will summarize these results obtained within this investigation.

The subsequent sub-sections are organised as follows; the first sub-section will look at the findings identified within this study; the relationship between corporate lobbying and environmental performance and leadership experience as an influencer in the relationship between the two variables. The second sub-section will compare the findings of this study with previous literature within the field. The third sub-section will discuss the implications of this research for directors and policymakers. Thereafter, the final sub-section will address some of the limitations of this study by providing avenues for future research.

The investigation found a statistically significant positive correlation between environmental performance and corporate lobbying expenditure hence displaying that firms (both carbon intensive and carbon non-intensive) that emit more carbon i.e. have a poor level of environmental performance lobby more. Rather than working to lower carbon emissions, firms will choose to lobby in order to avoid being penalised by the Government and have corporate bills passed in their favour. The study also found that leadership experience played a key role in influencing the relationship between a firm's environmental performance and its tendency to lobby as the firms with older CEOs

were found lobbying more than firms with younger CEOs. With age comes experience and experienced leadership will no doubt bring insight, knowledge and wisdom for a firm to successfully lobby. In both instances (environmental performance and leadership experience), firm size displayed statistically significant positive correlations illustrating that larger firms tend to lobby more. Logically, larger firms will generate more sales and have more funds available at their disposal. This now creates an incentive for funds to be allocated for lobbying. With that being the case, the findings from this investigation have supported both hypotheses.

Existing literature within this field have studied various concepts relating to corporate lobbying; lobbying and rational economic behaviour (Deakin, 1989), lobbying and bribing (Harstad and Svensson, 2011), lobbying and fraud detection (Yu and Yu, 2011) and lobbying and investment (Grey, 2018). This study now makes a contribution to the field of accounting and extends the literature by analysing the relationship between environmental performance and corporate lobbying through the lens of the public choice and tollbooth theory. Both these theories are commonly used within political sciences however, this study has applied both theories to underpin its findings.

In comparing the findings of this study to that of previous literature, this study has corroborated previous studies (Yu and Yu, 2011; Harstad and Svensson, 2011) that have discovered the undertakings of underperforming firms. Whilst Yu and Yu (2011) found that firms lobbying were less likely to be penalised for their deficiencies, Harstad and Svensson (2011) discovering firms that they view corporate lobbying as an alternative to bribing, and Grey (2016) concluding heavy lobbying firms indulging in investments to acquire market share to outdo competition, this study has developed results to show that firms falling short in their responsibilities towards the environment look for ways to cover their poor performance through corporate lobbying.

This study has looked at how firms with poor environmental performance view corporate lobbying as a way out. The research presents a number of implications for different stakeholders, namely directors, NGOs (non-governmental organizations) and policymakers. In terms of directors, this research has highlighted the materiality³⁶ of environmental performance. The study has ascertained that poor environmental performers lobby more in order to have corporate bills passed in their favour due to the negative connotations attached to poor environmental performance. Thus, firms are expending money to deal with this type of poor performance. Hence it is imperative for directors to give due care and attention to interaction the firm has with the environment.

This research also poses implications for NGOs; organizations (non-profitable) that are influential in decision-making but independent from governmental supremacy. The objective of NGOs is to look out for the greater welfare of the community by tackling issues and concerns that are prevalent within society. Hence this research has displayed that firms that perform poorly in relation to the environment will lobby more in order to avoid fines and penalties rather than explore ways in becoming more 'greener'. This research will assist NGOs in tackling firms with high emissions in order to present a case to the authorities to take action.

Thirdly, this research presents implications for policymakers as it will act as a blueprint for devising policies relating to the operations of firms. Governments and policymakers need to understand the needs of firms so that when policies are devised, they cater for firms to operate and function within the society. However, with that having been said, there are always two sides to one coin; whilst the needs of firms need to be met, governments and policymakers also need to be aware. Governments and

³⁶ Material in the field of accounting is information that is considered influential in making decisions for the users of accounting information.

policymakers should not just simply accept any form of corporate lobbying for just any cause but rather, they should analyse the request comprehensively and wholistically by weighing the pros and cons and by looking at all parties involved and all parties affected, essentially tightening regulations pertaining to corporate lobbying. With this being the key message of this study, policymakers need to ensure that the corporate lobbying requests received are justifiable to benefit society because if every corporate lobbying proposal is granted, firms will understand that they essentially can achieve whatever they like. Therefore, policymakers need to be more alert.

As with all studies, limitations are present and this study is no different. From the limitations of this study was that scope 1 and scope 2 emissions were aggregated to benchmark environmental performance however, the study did not consider scope 3 emissions³⁷. In contemporary times, there is a growing interest amongst researchers in scope 3 emission as this seems to hold the greatest portion of a firm's carbon footprint (Eunomia, 2021). Thus, the gap can be filled if future researchers work to identify a suitable proxy to measure scope 3 emissions along with investigating the sole impact of firm scope 3 emission on the environment. This can then help policy makers to analyse the operations of firms in order to identify ways to cut down this type of emission wherever possible. No doubt that this type of research will present implications as scope 3 emission for a firm maybe scope 1 or scope 2 emission for another firm and hence reducing scope 3 emission may not be so easy however, conducting research in this growing area is beyond the shadow of a doubt a step in the right direction to improve climate change by firms, policymakers and the Government working together.

³⁷ These are emission incurred from indirect activities of firms from sources that the firm does not control or own i.e. suppliers (Eunomia, 2021).

Another limitation of this study was that a handful of control variables were used; future researchers can include more control variables to enrich the research. This study did not include any data pertaining to research and development and hence, it could be a research motivation to future academics to consider the impact of moderating innovation in the relationship between a firm's environmental performance and its tendency to lobby.

Thirdly, future researchers can conduct a study similar to this by expanding the time frame of research as this study only investigated firms within a 10-year period. Enlarging the timeframe of an investigation enhances reliability, validity and also allows researchers to analyse changes in trends and shifts amongst firms and the market environment they operate within in order to identify new and growing business interests of firms.

CHAPTER 4:

**Can corporate lobbying benefit firms in manifesting environmental
commitment?**

(Empirical Study 2)

4.1 | INTRODUCTION

There is no doubt that the field of business and commerce has been heavily influenced by political science within the modern economy. The way firms are held to account for their business operations and decisions has increased from traditional financial accountability to a greater level of comprehensive scrutiny looking at the impact of firms on the environment, sustainable goals, CSR leadership and so forth (Bolton and Kacperczyk, 2021). Due to the detrimental impacts caused by an increased rise in climate change, the Earth has seen tropical cyclones, water levels rising, flash floods, damages to forestry and large fires. With this being the case, firms are now expected to take responsibility for their actions towards climate change (Kirilenko and Sedjo, 2007; Walsh *et al.*, 2016; Cadez and Czerny, 2016; Riley 2017; Flammer *et al.*, 2019; Kennard, 2020) and illustrate corporate commitment towards the environment. Between 2010 and 2016, 20,920 carbon abatement projects were executed by firms worldwide (Blanco *et al.*, 2020). This prime example depicts the progression towards firms having to take responsibility for their actions in the form of commitment. Additional commitment can bring about a positive perception of a firm and if the entity is genuine in their representation of their operations, it can attract 'greener' investors who are searching for ethical oriented investments. However, it can also be costly for firms and if that representation is construed negatively highlighting the flaws of a firm, it can result in severe repercussions (i.e. loss of shares, drop in market value, negative media sentiment) (Phillippe and Durand, 2011). Whilst depicting climate commitment is not yet mandatory (VinciWorks, 2022), legislation like that of Corporate Sustainable

Reporting Directive (CSRD)³⁸ is moving towards becoming obligatory upon firms. Thus, firms feel pressurized into disclosing more.

If a firm is steered by strong CSR motivated leadership embodying a motto of being environmentally ethical (i.e. having a goal to genuinely benefit the environment), commitment may not be an issue for the firm but on the other hand, if a firm has no concern to be committed to the environment; their impact maybe weak or even detrimental towards climate change thus making firm image drastic (Jeriji and Louhichi, 2020).

It is imperative to distinguish between environmental performance and environmental commitment. The first measures the impact of firms upon the environment whilst the latter measures the level of servitude and dedication a firm has towards bettering itself in having a positive impact on the environment (Birindelli *et al.*, 2022). From a legitimacy perspective, if a firm is subject to being a culprit to performing poorly, its commitment will be questionable to external eyes (Jeriji and Louhichi, 2020). Now already with a tarnished reputation, illegal activity is not going help these firms. Here is where corporate lobbying enters; In order to interact with the authorities on this matter, firms can lobby the Government in their favour. Yu and Yu (2011) argue that the most persuasive mechanism that impacts corporate bill passing by the Government is lobbying with political parties. According to the US Lobbying Disclosure Act of 1995, corporate lobbying has been defined as, “*any non-exempt oral or written communication on behalf of a client to executive and legislative branch officials. A non-exempt communication is defined as lobbying contact if it is about the formulation, modification, or adoption of federal laws, executive orders, Government contracts,*

³⁸ The directive replaces the existing Non-Financial Reporting Directive (NFRD) mandating more transparent reporting pertaining to sustainability (Michalak *et al.*, 2023)

etc.” A more summarised explanation of corporate lobbying entails, “the transfer of information in private meetings and venues between interest groups and politicians, their staffs, and agents” (Figueiredo and Richter, 2014, pg. 164). Firms will be able to hire corporate lobbyists to present a case to ministers and compensate them with donations and gifts.

Whilst the ethics of corporate lobbying can be questioned, it is an alternative option for firms to avoid any illegal activity and thus cannot be penalised for non-conformity. The US leads the world with having the highest corporate lobbying activity within the states; Richter *et al.* (2009) investigated the lobbying expenditure of US firms between the years of 1998 and 2005 by obtaining corporate lobbying data from the Center of Responsive Politics and discovered that corporate lobbying had increased from \$1.44 billion to \$2.47 billion. After walking away from participating in the COP21 Agreement (Paris Climate Agreement) held in Paris back in 2015 (Gillis and Popovich, 2017), the US returned to join another 200 nations in COP26 in 2021 for their quest to mitigate climate change globally and for that reason, the US will be used to contextualize this study.

Corporate lobbying is completely legal (Durkee, 2018) and whilst it may be perceived as a form of bribery, the two are not the same because corporate lobbying does not involve corruption and deception. Furthermore, corporate lobbying legislation mandates disclosure of all corporate lobbying conducted for the purposes of transparency. Section 1609(a) of the ‘US Lobbying Disclosure Act’ mandates, *“that any person making an oral lobbying contact with a covered official shall disclose, on the request of the covered official at the time of the lobbying contact: (a) whether that person is registered under this act; (b) the name of the client represented; (c) whether that client is a foreign entity; and (d) the name of any foreign entity that has a direct*

interest in the outcome of the lobbying activity who contributes more than \$5,000 to the lobbying activities of the client and either holds at least 20 percent equitable ownership of the client or actively participates in the planning, supervision, or control of such lobbying activities”.

Having established that poor environmental performing firms lobby more in the previous segment of this thesis, does this exposure now encourage firms to illustrate commitment towards to the environment in order to protect their image and manage stakeholders' relations? Rather than being part of the problem, can high emitting firms be part of the solution through corporate lobbying? As it was concluded within the previous chapter that poor performing firms lobby the Government more, we argue in this chapter that those firms heavily involved within corporate lobbying (simultaneously performing poorly in relation to the environment) strive to illustrate commitment towards the environment in order to ward of the eyes of the public from their poor performance seeking to preserve their reputation. With very minimal study conducted within this area and not finding research connecting corporate lobbying and its impact on environmental commitment, this chapter will analyse the relationship between top corporate lobbying firms and their level of commitment. Thus, a contribution will be made to the field of environmental accounting through analysing the commitment behaviour of firms that have a high tendency to lobby. The remainder of this chapter is organised as follows; the next section defines the theoretical background and develops the hypothesis; section 4.3 explains the sample used, empirical model, and variables' measurement; section 4.4 presents the results followed by the discussion and conclusion in section 4.5.

4.2 | THEORETICAL BACKGROUND AND HYPOTHESIS DEVELOPMENT

This section will delve into previous literature within the field of environmental accounting. Thereafter, the theoretical framework and the theories acting as the foundation of this research will be introduced followed by the development of the hypothesis.

4.2.1 | The Significance and Role of Corporate Lobbying

The role corporate lobbying plays in covering a firm's poor tracks of environmental impact is imperative to discuss before understanding its commitment to the environment. Despite corporate lobbying being the discussion of controversy of the 20th and 21st century, the first corporate lobbying case dates back to the 1640s (Opensecrets, 2014a). However, the first official case of US corporate lobbying occurred in 1792 when the veterans of Virginia hired Mr William Hull to lobby on their behalf for greater compensation (Opensecrets, 2014). At the time, a congress had newly been formed and the Mr Hull was tasked to lobby for greater pay. It was only later on in 1830 that the term 'lobbying' was recognised as a specific act and thus, included in official political documentation (Opensecrets, 2014).

A thin line has always remained thereafter between 'lobbying' and 'bribing' and in fact, certain lobbyists have been accused of bribing politicians under the guise of lobbying; Sam Ward who was a US lobbyist and also a chef was founded guilty of bribing in 1875 as he fed politicians gourmet cooked meals (Opensecrets, 2014). Since then, US firms have eagerly construed corporate lobbying as a protective shield to ensure that their reputation is preserved whilst ensuring that their corporate lobbying practices do not exceed legal boundaries.

The fastest growing area of trade in the world is the carbon trading industry (Burley and Hoedeman, 2018). Corporate lobbyists have found this area quite lucrative; it is reported that firm spending on carbon trading has amounted to \$300 billion since 2005 (Burley and Hoedeman, 2018). Seeing this soaring figure, unions and pressure groups have raised concerns with international organizations such as the United Nations to eliminate pollution. However large multinational oil corporations like BP, Shell RWE and EON are predicated upon carbon trading and thus realised that if exemptions are placed to limit carbon trading and carbon allowances, it will have detrimental effects to their business operations (Matejek and Gossling, 2014). For that very reason, firms such as BP, Shell RWE and EON are working to corporate lobby the Government to ease carbon trading (Burley and Hoedeman, 2018) citing drawbacks such as financial implications.

That having been said, corporate lobbying is greatly beneficial to firms. Previous literature has depicted how corporate lobbying has helped firms in various ways. Corporate lobbying in the US has proved to strengthen political connections and as a result, those firms who lobby can somewhat be protected from fraud detection as the supervision over their business activities diminish (Cao *et al.*, 2018). Furthermore, corporate lobbying has also helped firms obtain tax credits from the Government to ensure that they pay less tax (Richter *et al.*, 2009). Whilst these are financial implications surrounding corporate lobbying, it is important to note that corporate lobbying within the US has seen a great rise from the 1970s till today Milman (2023) and through the efforts of the media, it has been highlighted that firms within the fossil fuel industry are one of the most prolific participants in corporate lobbying with Milman (2023) reporting over 1500 lobbyists working on behalf US fossil fuel firms. At the same time, it has also been revealed that these lobbyists are at the frontline in

representing environmental groups and liberal-run campaigns who aim to tackle climate change Milman (2023). Hence within this discussion of corporate lobbying, the environment and commitment to it is paramount. To further explore the dynamic relationship between the two, a suitable proxy is required to measure environmental commitment. Berry and Rondinelli (1998) argued that the most committed and successful firms are those with proactive corporate environmental management; compliance leading to better environmental quality. Thus, in order to analyse the level of national commitment within the US from firms, there needs to be an overview of the various environmental commitment mechanisms, agreements and goals (Berry and Rondinelli 1998) the nation has towards the environment and to see the level of commitment firms have towards them. The UNCC (2023) have stated that the biggest agreement i.e. legally binding relating to environmental commitment is the Paris Climate Agreement (COP21). The subsequent sub-section delves upon the 'Paris Climate Agreement (COP21)' and 'carbon pricing' and the implications it has upon firms that strive to be committed to the environment.

4.2.2 | Environmental Commitment via Paris Climate Agreement (COP21) and Carbon Pricing

Whilst the term 'Environmental Commitment' may sound quite broad, the Paris Climate Agreement have provided clear directives in defining what 'Environmental Commitment' constitutes for firms; *"i) reducing greenhouse gas (GHG) emissions and thereby the adverse climate related impacts of their operations on people and the planet; and ii) strengthening the resilience of companies and their supply chains in order to address and adapt to climate change - including impacts on workers, local communities and the natural environment."* (OCED, 2021) Thus, firms need to

demonstrate a sense of responsibility that they have a duty of care for the environment in overseeing their operations.

4.2.2.i | Paris Climate Agreement (COP21)

To provide a contextual overview, the US have now agreed that they will vow to return to fulfil the objectives of the Paris Climate Agreement despite walking away from it back in 2017. In doing so, the US aim to reduce carbon emissions levels by half (in relation to the levels reached in 2005) by 2030 (Patnaik and Kennedy, 2021). Thereafter, the next milestone will be to reach a target of net zero emission by 2050 (Jenkins *et al.*, 2021). Whilst this seems a distant away, the reality holds that time is limited as the US acknowledge that certain measures need to be implemented immediately to control emission levels of firms if these targets are to be met.

As the agreement is legally binding upon the US nation, ultimately US firms will need to take action; firms will need to review their business operations in relation the environment. Firms are the backbone to the nation and make up the whole nation and thus, if US firms are able to show commitment to the environment; the whole nation succeeds in displaying national environmental commitment. But in order for US firms to demonstrate their commitment and ultimately compliance to the Paris Climate Agreement, the US authorities have placed mechanisms within the economy to help achieve commitment and from them which has been a popular topic of discussion within the US political arena is Carbon Pricing' Pricing' (Patnaik and Kennedy, 2021).

4.2.2.ii | Carbon Pricing

The proposed policy of developing carbon pricing to help firms build commitment to the environment is implied within the name; putting a cost or price on carbon to mitigate the adverse externalities that will arise as a result of emitting (Patnaik and Kennedy,

2021). Currently, the World Bank (2022) reports that 70 carbon pricing initiatives have been implemented globally; 47 national jurisdictions are covered by the initiatives selected and 36 subnational jurisdictions are covered by the initiatives selected. This would mean that these initiatives would cover 23.17% (11.86 GtCO₂e) of global GHG emissions. But what exactly constitutes the arrangement of carbon pricing? Namely, there are two approaches; 'carbon tax' and 'emission trading scheme'.

4.2.2.ii.i | Carbon Tax

By administering and imposing a tax, firms would have to pay a fee for every unit of emission. It would be upon the Government to strategically implement a price based upon current emission levels and projected levels. The objective would be to deter firms in emitting or act as a mechanism to take reduction seriously.

Whilst this structure of carbon pricing seems practical in the US, many policymakers have identified areas that require contemplation; the first issue relates to the actual cost; how much should it be and how should it vary overtime? Of course, firms are of different sizes and operate within different sectors and to set a standard rate across all markets would be unreasonable and unfair. In fact, those nations across the globe that implemented this structure of carbon pricing; carbon tax have been rebuked for their inefficiency of implementing correct tax rates to impose impact; many nations have been disparaged for setting low tax rates that have no or very little impact upon improving the environment; Ukraine charge \$0.30 per tonne released whilst some EU nations charged approximately \$75.00 per tonne released (Patnaik and Kennedy, 2021). Economists in the US have argued that in order for carbon tax to successfully benefit the environment i.e. push US firms to be committed to the environment, there must be a gradual increase rather than a sharp rise; Nordhaus (2017) through using

a Dynamic Integrated model of Climate Economy³⁹ proposed that the cost of carbon tax would increase by 3% till the target of net zero is reached by 2050. To illustrate this, the cost of carbon tax (per tonne) in 2015 was \$31.00 with this increasing to \$44.00 by 2025. This would then rise to \$52.00 by 2030. Researchers like him also concluded with similar calculations (Martin *et al.*, 2014; EPA, 2016)

Secondly, who should bear the cost of carbon tax? With focus now given to scope 3 emissions as opposed to scope 1 and scope 2 emissions, it is unclear who the tax liability of carbon should fall upon. Should the consumer be charged this tax or does the burden lie upon the actual extractor or producer? Both sides will claim that the opposing side be responsible and hence, it is difficult to ascertain as to who should pay. Nonetheless, payment of carbon tax depicts commitment from firms.

4.2.2.ii.ii | Emission Trading Scheme (ETS)

The second approach to carbon pricing involves developing an emission trading scheme or what is known as a 'cap-and-trade' arrangement. Under this system, a cap is applied to emission levels for firms within the same industry as well as their industrial plants. As a result, firms are restricted as to how much they can emit. In order to emit, firms must then acquire an allowance from the Government (to emit) or from other firms in the form of trading (Patnaik and Kennedy, 2021). Ultimately both indicate a firms' diligence in being committed to the environment; Indirectly, when a firm is restricted on how much it can emit and it complies, it is a form of commitment. When a firm then strives to trade in order to acquire an allowance to emit, it also demonstrates commitment because the firm is seeking means permitted by the authorities.

³⁹ Model integrating carbon cycle and climate science

The cap-and-trade system originates back to the 1980s when the US wanted to improve the quality of rain within the environment to combat acid rain; emission of sulphur oxide and nitrous oxide into the air was controlled by a cap-and-trade system and it proved to be quite successful (LSE, 2018). Whilst scientific projections show a positive impact of applying cap-and-trade towards climate change, many economists have argued that financially, firms controlled by the cap-and-trade system will lose out to firms outside of the system who will benefit from lower costs (LSE, 2018).

In the context of emissions, the US launched a 'cap-and-trade' system in California back in 2013 (Shen *et al.*, 2014); firms operating within the US state (including power plants, fuel distributors and industrial plants) had emissions capped at 25,000 tons of carbon dioxide yearly (C2ES, 2019). The emission trading scheme was part of the 'California Global Warming Solutions Act of 2006' (Assembly Bill 32) that was passed in the White House in 2006. The system follows similar principles of the cap-and-trade system in Quebec, Canada (Houle *et al.*, 2015). By 2020, the California cap-and-trade system envisaged to lower carbon emission levels in the atmosphere to the amount that was present in 1990. Having successfully achieved that target four years earlier in 2016, this showed the level of dedication amongst US firms in their commitment towards the environment. This now accelerated the confidence amongst the nation as the US now wanted to reduce emission levels by 40% below of the level emitted in 1990 by 2030 and a further reduction of 80% of 1990 emission levels by 2050 (Bang *et al.*, 2017). Whilst this looks promising, the US further want the state of California to 100% of the electricity produced within the state to be carbon-free by 2045 (Bushnell, 2011). The projection of both these targets again demonstrates the commitment of US firms towards the environment within the political arena.

Despite the two structures, the principle is one; a cost is attached to emission and firms need to analyse the financial implications of incorporating this cost within their business operations. Whilst it may seem costly and a hurdle for firms to comply, being committed to the environment can reap benefits for firms.

4.2.3 | Benefits of being Environmentally Committed

Previous literature illustrates firms reaping benefits by demonstrating environmental commitment. When a firm discloses information pertaining to their commitment towards improving the environment, stakeholders tend to interact more with firms and with the objective of bringing about greater public accountability (Abkowitz *et al.*, 1999). This in turn can enhance the image of a firm showing that they are more committed to being socially responsible to stakeholders and the environment as they demonstrate care for all (Abkowitz *et al.*, 1999).

With public accountability enhanced, this opens up the pathway to draw in new potential investors as probable shareholders look for greater transparency. Ben-Amar and Zeghal (2011) studied 181 firms listed on the Toronto Stock Exchange. The results from the study showed a boost in firm image that made shareholders happy. In addition to this, Hassan and Romilly (2018) found that greater transparency of environmental commitment and impact drove investments which raised economic performance. Matsmura *et al.* (2014) found that environmental commitment correlated positively with firm value amongst S&P 500 firms. In another study conducted by Siddique *et al.* (2021), the research found that a similar result; firms showing environmental commitment welcomed more investment entering the firm. As the research sample of this study were global firms and no specific country was contextualized, the results portray a general conclusion of firms all around the world. That having been said, the

three studies discussed all illustrate that the positive impact of happy shareholders and growing investment (with new shareholders) ascertained through enhancing environmental commitment.

As the previous chapter found that high emitters lobby more and hence perform poorly towards the environment, stakeholders may assume that these firms may not be committed to benefitting and helping the environment. However, when analysing previous literature, it can be found that corporate lobbying can actually demonstrate commitment; Che and Gale (1998) and Friedman and Heinle (2016) analysed the concept and psychology of corporate lobbying and concluded that lobbying requires commitment; if a firm or body lobbies, then this shows that they are committed to achieving their objective; had they not been committed, they would have perhaps acted unethical and would not have taken the correct means of reaching their target. A firm that acts unethically can indulge in bribery and fraud if it fails to comply with regulations. On the other hand, corporate lobbying is completely legal (Durkee, 2018) and hence, firms construe it as a tool for building political connections (Yu and Yu, 2011). Lobbyists can be very influential in legislation passing and hence, when a firm allocates money to spend upon lobbying the Government with money that could have been allocated to a different cause i.e. cash reserves, research and development or production, it shows that the firm is committed to its cause.

In the context of the environment and climate change, does corporate lobbying illustrate that a firm is more committed to the environment? Whilst it has already been established in the previous chapter that poor environmental performers lobby more, improving environmental performance for firms is a long-term project, something which cannot be achieved within a short span of time. Hence, through lobbying the Government, can these firms genuinely illustrate commitment towards the

environment? i.e. use commitment as a layer of protection or buy time to improve? Through corporate lobbying, firms can use lobbyists to appeal to the Government to ease legislations in order for the poor environmental performance to be less focused upon and not enhanced in the eyes of stakeholders i.e. consumers and the media. In addition, a firm through corporate lobbying can produce an image of the firm working and engaging with the Government which in turn can bring reassurance to stakeholders. To understand this, the subsequent sub-section discusses the theory postulated that establish the theoretical framework.

4.2.4 | Theoretical Framework

The theory used to underpin the relationship between corporate lobbying and environmental commitment is the legitimacy theory⁴⁰. The forthcoming sub-sections applies the theory to the context of this study in devising the theoretical framework of this chapter.

4.2.4.i | Legitimacy Theory

The theory of legitimacy was founded in 1975 by Dowling and Pfeffer, 1975 who defined this philosophical belief as, *“a condition or status which exists when an entity's value system is congruent with the value system of the larger social system of which the entity is a part. When a disparity, actual or potential, exists between the two value systems, there is a threat to the entity's legitimacy”* (Dowling and Pfeffer, 1975 cited by O'Donovan, 2002). In effect, the principle of this theory focuses upon the behaviour

⁴⁰ The Public Choice and Tollbooth theories were used to principle the theoretical framework in the previous chapter that looked at the relationship between environmental performance and corporate lobbying however in this chapter, the legitimacy theory was the best fit in devising the theoretical framework. As the focus for the first chapter was corporate lobbying, the Public Choice and Tollbooth theories were relevant as they were theories used in political science however as the main area of focus for this chapter is environmental commitment, the legitimacy theory was the most appropriate to use as it has been used widely throughout literature in the field of accounting.

of a firm in its interaction with society as depicted within accounting literature (Bachmann and Ingenhoff, 2016; Nguyen *et al.*, 2021); Reich (1998) cited by O'Donovan (2002) declared firms to be creations of society; society contributes to the creation of firms by creating demand and as a result, firms are formed to serve society. Once a firm is setup, its primary reason for doing business is profitability (Shocker and Sethi, 1973 cited by O'Donovan, 2002). That having been said, the existence of firms is conditional to the desire of society to allow them to continue in operation. As the primary consumer and stakeholder is society, firms need to ensure that they present a positive representation of being 'socially responsible' so that the accounting principle of 'going concern'⁴¹ is achieved. If a firm fails to have positive image i.e. attracts negative publicity from the media that may shun away consumers, profitability is at risk. Therefore, the essence of the legitimacy theory postulates that firms need to legitimise their operations in the eyes of society.

The diagram below maps out the theoretical framework for this study:

⁴¹ The firm will continue to operate for the foreseeable future

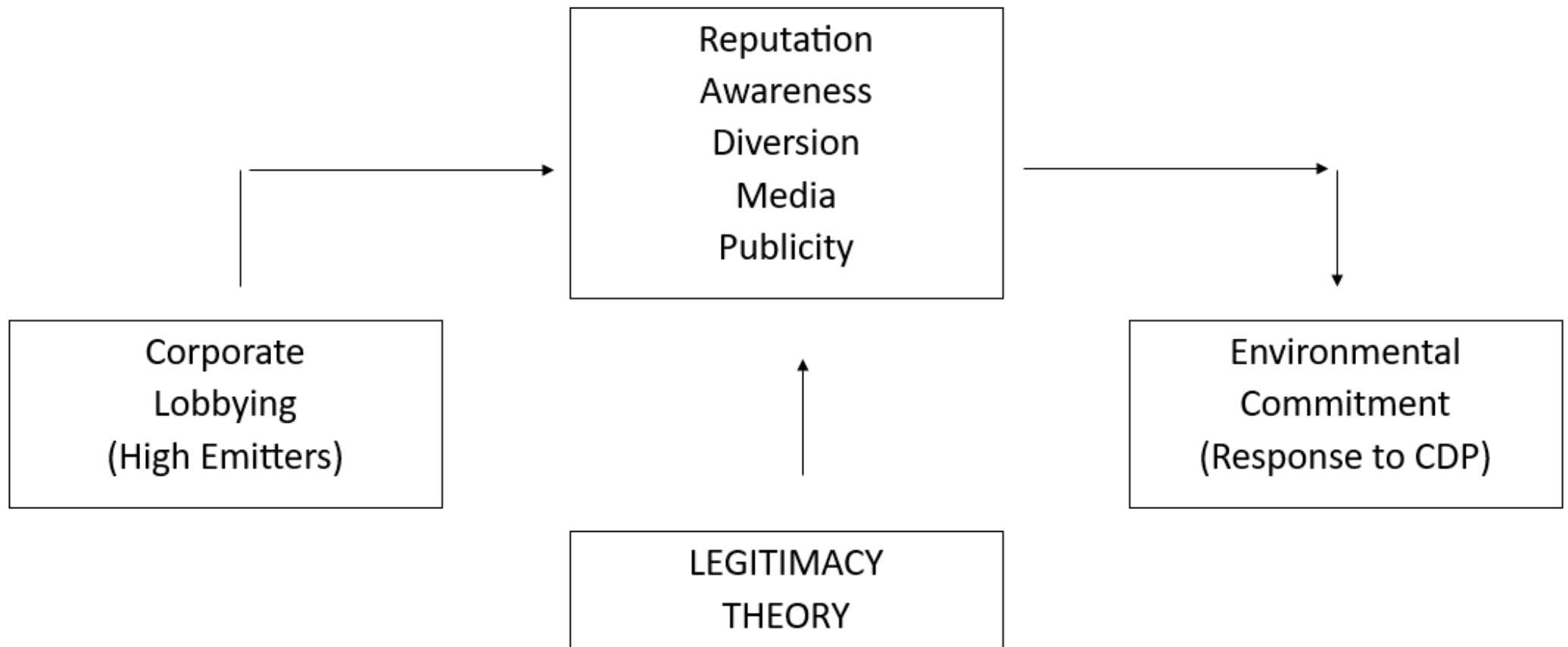


Figure 4.1: Legitimacy Theory (Theoretical Framework)

As the preceding chapter established that firms with poor environmental performance (i.e. high emitters) lobby more i.e. to prevent being penalised with penalties for high emissions, they are now in danger of being chased by pressure groups and NGOs thus attracting negative publicity, consequently putting their reputation in the eyes of stakeholders at risk. Hence to legitimise their efforts and preserve their public image, high lobbying firms strive to show commitment towards the environment in order to divert the negative publicity away from them and present an image of the firm trying to make amends overtime i.e. legitimacy and be committed to the environment. Whilst the legitimacy theory logically explains the interactions between society and firms, researchers have cited weaknesses relating to the theory.

Deegan (2018) noted drawbacks within the legitimacy theory in terms of changing community perception; does legitimisation from firms actually improve the view of society towards a firm? He further argues the ambiguity of impact upon legitimacy i.e. which form of public recognition effectively assists legitimacy for a firm? Thereafter, how can there be determination of which stakeholder is impacted the most? Furthermore, from the perspective of the firm, Deegan (2018) highlights the unquantifiability of legitimacy threats; how are management able to determine the scale of legitimacy threat to the firm? These arguments put forward exposing the deficiency of the legitimacy theory are valid however other researchers in favour of the theory have rebottled to show the practicality and effectiveness of the theory.

Burlea and Popa (2013 p. 1579) extolled the legitimacy theory stating that it has the ability to explain, *“the behavior of organizations in implementing and developing voluntary social and environmental disclosure of information in order to fulfill their social contract that enables the recognition of their objectives and the survival in a jumpy and turbulent environment.”* Elementally, the legitimacy theory gives firms the

opportunity to benefit the society by making voluntary manifestations and with that, the theory has helped researchers link explanations to phenomena that takes place i.e. a firm does not need to display environmental commitment but it does so for legitimisation (Lewelyn, 2003 cited by Deegan, 2018). Furthermore, Shocker and Sethi (1974) cited in Deegan (2018) argue that the theory can be understood very easily as they viewed it as a social contract; a type of 'agreement' laying out the expectations of society they desire to see from firms.

The legitimacy theory not only explains the nature of firms and how they operate but also the management functions; the motivational drive of managers as to how they work in progressing the firm from a CSR perspective; management is generally not motivated by accountability or feeling a sense of responsibility however, when profitability and survival is incorporated, managers will work hard (Deegan, 2018). In essence, if profitability or the survival of the firm is at risk due to a legitimacy void, management will work to close that gap because there is a self-vested interest for themselves i.e. security of their employment, promotion etc.

To contextualize the legitimacy theory, the subsequent section will develop the hypothesis in the application to this study.

4.2.5 | Hypothesis Development

Firms that lobby the Government due to being uncovered as poor performers as a result of their high emissions may attract negative attention from the media for not being 'socially responsible' towards all stakeholders. A firm with both high emissions and high corporate lobbying will no doubt become prey to environmentalists and pressure groups who with their movement and agenda will no doubt stir the light of publicity upon these firms; perceived as having failed to be corporal socially

responsible. Under the public eye, it can be construed that firms are not committed to benefitting the environment due to their poor performance i.e. high emission and wish to cover up any non-compliance with corporate lobbying the Government.

As the damage caused may impact the firm and bring a legitimacy threat to management (Fithriani *et al.*, 2019; Silva, 2021), it essentially now needs to demonstrate legitimacy (i.e. commitment to the environment) to earn the trust of stakeholders; As a result, firms will now need to legitimise their efforts in front of society to demonstrate socially responsibility (Silva, 2021). Within literature, a number of studies have illustrated how the legitimacy theory upholds environmental commitment with various elements of accounting i.e. economic performance, risk, banking etc. In the study conducted by Freedman and Jaggi (1988), a number of US firms were analysed in two groups; those operating within carbon intensive industries and those operating within non-carbon intensive industries. The results depicted a positive correlation between environmental commitment and economic performance for those firms operating within carbon intensive industries in particular, oil production. The rationale here is that those firms that operate within carbon intensive industries are construed as pollutant firms and hence to please stakeholders, there must be an exceptional display of environmental commitment to legitimise their operations. Once depicted, the firm's economic performance grows as stakeholders will view the firm as being ethical. In a similar study, Zhongfu *et al.* (2011) contextualized China. The research focused upon 445 firms listed on the Shanghai Stock Exchange from 9 different industries; 1) 34 – food and drinking industry, 2) 34 – the textile clothing and fur Goods industry, 3) 2 – wood and furniture industry, 4) 16 – papermaking industry, 5) 76 – petroleum chemistry and plastic industry, 6) 27 – electronics industry, 7) 70 – metal and non-metal industry, 8) 130 – mechanical equipment and measuring

appliance industry and 9) 56 – medicine and biological production industry. By conducting a number of multiple regression analysis models, the findings of the study showed that firms that display and promote environmental commitment have better economic performance.

In a cross-sectional study, Hassan and Romilly (2018) sampled 1607 firms from 45 different countries (consisting of firms from developed and developing nations). With 9120 firm observations, the study depicted that firms that depict environmental commitment in the form of lowering greenhouse gas emissions have better economic performance activity.

Along with the above empirical studies contextualizing the US, China and a global situation, a systematic review by Dagestani and Qing (2022) also corroborates the effectiveness of the legitimacy theory in upholding environmental commitment. The article reviewed 13 studies across the past two decades (2000 to 2020) focusing upon the impact of environmental commitment and from the 13 studies, 9 studies presented a positive relationship between environmental commitment and economic performance.

Environmental commitment also within literature correlates with corporate lending. The study conducted by Kleimeier and Viehs (2018) illustrated how a display of voluntary environmental commitment legitimised efforts of firms to allow them to enjoy exclusive lending facilities from banks; the time period of the study ran from 2009 to 2016 and using data from CDP and Thomson Reuter, 17,253 loans were sampled and depicting a positive relationship between strong environmental commitment and achieving benefits from exclusive lending facilities. The legitimacy theory has also established a positive relationship between environmental commitment and debt maturity; the investigation conducted by Freedman *et al.* (2020) on firms listed on the

Johannesburg Securities Exchange (JSE) between 2011 and 2015 illustrated that firms that depict high quality commitment towards the environment tend to pay off debts quicker and thus, environmental commitment is an indirect indication for banks to assess risks when lending. The empirical study by Ding *et al.* (2023) also illustrates a positive correlation between strong environmental commitment and loan term borrowing; contextualizing China, the study sampled a number of Chinese firms from 2008 to 2018 that had applied for loans from the bank and those firms displaying poor environmental commitment or lack thereof had their loan repayment term reduced.

Another area where legitimacy has been greatly present is in the area of innovation and how it has been impacted by the environmental efforts of firms. Studies have shown that firms that strive to be committed to the environment innovate more through expanding research and development; the research conducted by Li *et al.* (2018) sampled a number of firms extracted from CDP between the years of 2008 and 2012 to illustrate a positive correlation between environmental commitment and innovation in particular; green innovation. Whilst research and development is an integral part of every thriving firm, much of being environmentally committed includes innovation and in particular, green innovation by which the firm legitimise their environmental commitment through establishing innovations within the firm that will not only increase productivity and efficiency but also act environmentally friendly.

Environmental commitment has also been linked with investment; in the study conducted by Ganda (2018) over the period of 2010 to 2015, illustrated a positive correlation between firms included in CDP that strive for environmental commitment and return on assets. From the perspective of the investor, this research is pleasing to their eyes as it shows the positive impact of being environmentally committed. However from the other side, the outcome is questionable; does stronger

environmental commitment show a true manifestation of a firm or is this an effort from the firm to legitimise their firm image in the eyes of stakeholders? The research conducted by Rohani *et al.* (2022) investigated this very issue; data was collected from 170 US firms (documenting 559 observations) between the years of 2012 and 2017 to analyse the credibility and certainty of the environmental commitment displayed. After running a pooled OLS regression model and addressing endogeneity using the Generalised method of moment, the results illustrated that firms that executed reasonable assurance correlated positively with environmental commitment.

With that being said, the studies discussed in this section provide a general overview of what the literature holds. With research having focused on environmental commitment and its connection to economic performance, loan receipt ability, borrowing facilities, risks, innovation, assurance and investment, this research aims to close the gap in the literature by analysing environmental commitment through a political lens; corporate lobbying. Being environmentally committed cannot come by itself; it will require assistance; corporate lobbying and in addition to this, time. If a poor performing firm that lobbies the Government illustrates commitment towards the environment, it can justify the lobbying it engages in and rather than contributing to the problem, the firm can actually be a part of the solution. If a firm only lobbies and its corporate lobbying is brought into the public eye, eyebrows will be raised (Beyers and Bruycker, 2015) especially the fact that poor environmental performers tend to lobby more. However, if a firm demonstrates environmental commitment, it will legitimise a firm's operations and remove eyes away from corporate lobbying towards environmental commitment even if the firm has high emissions i.e. it is a poor environmental performer. In a bid to legitimise their operations, poor performing firms can show that even though their environmental performance is poor, under the

legitimacy theory, they are committed to improving the environment by buying time to improve as they can convince stakeholders that change and improvement requires time.

Given the importance of the impact of being corporate lobbying, we join the discussion to contribute to the relationship between firm's environmental issues and lobby within the political sphere of the US economy. That having been said, the following hypothesis have been devised:

H1: Ceteris paribus, firms that lobby more have a higher level of commitment to the environment

4.3 | METHODOLOGY

The Methodology section outlines the process followed to collect data and run econometrics models to test the hypothesis of the investigation. As aforementioned, archival study is the research methodology embedded within this dissertation including this chapter with the research being conducted between the period of 2010 and 2020 for US listed firms from various industries and sectors. As the research paradigm for this investigation having already been discussed, the section will discuss the following; sample selection, measurement of variables, data management and empirical data analysis.

4.3.1 | Sample Selection

The data collection begins with all the US firms reported in the CDP database during 2010 - 2020. US firms have been chosen as the sample of this study as they lead in standing as the second highest polluters of carbon emission in the world (BOFIT, 2022) along having a very active corporate lobbying culture within their political sphere. Hence the data was available and understandable. In order to understand the environmental commitment capability of firms, the data required in this study had to be sourced from a comprehensive database; Carbon Disclosure Project (CDP); a charitable body that works to survey the globe's largest firms on their interaction and impact on the environment ⁴². Previous studies (Boda, *et al.*, 2016; Qian and Shaltegger, 2017; Charumathi and Rahman, 2019; Blanco *et al.*, 2020) have affirmed

⁴² The CDP consists of voluntary responses from firms that have helped build a wide-ranging database of climate change information. CDP data professes the largest number of US firms who have made their interaction with climate change visible to the public. Year by year, the organization grows through more corporate firms joining and cooperating in disclosing their effects towards the environment (CDP, 2022).

that CDP data has produced the largest record of national corporate greenhouse gas emission data and thus, US public-listed firm data was extracted from CDP data.

The CDP organisation works to understand the interdependence of firms with the environment and whether that interaction has a betterment or deteriorative impact upon climate change by assessing carbon emission levels (quantitatively), carbon risks, management styles to deal with environmental changes and strategies of emission trading (CDP, 2021)⁴³. The organisation assesses firms from four directions; leadership (illustrating environmental leadership and communicate practical actions on climate change), management (understanding the specific impact the firm is having upon the environment and showcasing evidence for managing the impact), awareness (evaluation of a firm's impact on ecosystems) and disclosure (answering all questions and providing extensive information) (CDP, 2022). After sending out a questionnaire for firms to complete containing specific questions, the CDP scores completed responses with A, A-, B, B- C, C-, D and D-.

A high score (score A) exhibits a firm as being committed to the environment whilst a low score illustrates that a firm's poor commitment to towards climate change. To ensure validity, impartiality, and to reduce errors, the organization has a rigorous scoring process (CDP, 2022b) in place:

- 1) Firm responses will be reviewed by the CDP 'scoring team'
- 2) Reputational checks are carried to identify if there are any factors that will hinder a firm from being awarded a high score

⁴³ The CDP score provided by CDP towards firms upon receipt of their questionnaire is based upon 10 principles (CDP, 2021): 1) General risks and opportunities of climate change, 2) Effect of existing and future carbon emission regulations, 3) Climate change physical risks, 4) Level of innovation development to deal with climate change, 5) Level of management or responsibility relating to climate change, 6) Quantitative emission levels, 7) Product/services, trade and supply chain emissions produced, 8) Strategy and investment for emission reduction, 9) Planning for emission trading and 10) Energy consumption and costs.

- 3) The 'scoring steering' committee will then internally moderate the score given to the firm

CDP have declared that their process is reviewed each year as a means of continuous improvement and hence researchers wishing to utilise the data will find that scoring processes may differ slightly year by year.

The sample period for this investigation ran from 2010 to 2020. This is because of the lack of CDP data availability; prior to 2010, CDP data was inadequate due to a limited number of firms responding to the survey and thus, comparing between the years would have been difficult to align, limiting the study. 2010 was also chosen as the starting point of this investigation as the onset of the decade saw firms give more importance to understand the environmental impact of management operations and thus, environmental commitment became key (Qian and Shaltegger, 2017). As to choosing 2020 as being the end point for this research, the world's top scientists declared that the completion of the decade i.e. 2020 was the most practical year to co-ordinate and implement climate change to reduce rising climate change levels (WWF, 2023).

The CDP scores were manually extracted from the CDP database and organised to create a sub-sample of the dependent variable. In order to use the data in testing econometric models, the CDP scores were codified to a numerical score of 1 – 8:

Table 4.1: **Categorisation of CDP scores**

CDP Score:	Coded Numerical Value:	Score Interpretation:
A	8	Firm must show environmental leadership, disclosing action on climate change, deforestation or water security. They must demonstrate best practice in strategy and action as recognized by frameworks such as the TCFD, Accountability Framework and others.
A-	7	Similar to 'A' score but less detailed framework and climate change transition plan
B	6	Firm addresses environmental impact through good environmental management
B-	5	Firm illustrates some evidence of good environmental management but does not show what actions it will take to become better.
C	4	Firm illustrates awareness-level engagement with firm impact upon people and ecosystems
C-	3	Firm illustrates some awareness-level engagement with firm impact upon people and ecosystems
D	2	Firm answers all questions in the CDP questionnaire in a comprehensive manner
D-	1	Firm answers all questions in the CDP questionnaire

In emulating previous literature, financial firms were then excluded from the study⁴⁴. The data was thereafter cleaned and organised to omit missing information. After successfully completing the merge, 160 firms remained enveloping 1158 observations.

4.3.2 | Measurement of Variables

A variable is a phenomenon, characteristic or figure (that constitutes a single value or multiple values) that can be measured either numerically (quantitative) or non-numerically (qualitative) against another variable to conceptualize a hypothesis. Variables can be of different types (categorical, nominal, ordinal etc) dependent upon the research being conducted.

It is imperative for a researcher to explain the variables used within their study in order to depict a clear relationship. The main variables used within this research are the independent (also including control variables) and dependent. The independent variable is the determinant whilst the dependent variable is the resultant. Kaur (2013) stated, *“If the independent variable is an active variable, then we manipulate the values of the variable to study its effect on another variable.”* The following subsections define and list the variables used in this study.

4.3.2.i | Dependent Variable

The dependent variable of this study is environmental commitment and whilst there can be various ways to quantify this factor, data was obtained from CDP in emulating previous research studies (Luo *et al.*, 2012 and Blanco *et al.*, 2020). The environmental commitment of firms are embodied in the scores provided for

⁴⁴ Previous literature exclude financial firms from their samples as the reporting practice and procedure for financial firms are different to that of non-financial firms. However, adding or subtracting these firms to the study will not bias the results (Boubaker *et al.*, 2019)

respondent firms in a range of 8 scores with a score of 'D-' depicting the weakest form of environmental commitment and a score of 'A' embodying exemplary environmental disclosure. For those firms that do not respond to the questionnaire, CDP marks them with a 'F' score. In this research, firms scoring 'F' have been dropped as their CDP score is of no value to the econometrics model.

The scores are allocated to firms based upon assessing four areas pertaining to environmental accountability; leadership, management, awareness and disclosure. A list of US firms were obtained from the datasets containing the independent variable and control variables data. The CDP scores were extracted manually for each firm between the years of 2010 to 2020 and organised within a data file. Thereafter, the CDP scores were merged with the other datasets using STATA to create a large and complete dataset.

4.3.2.ii | Independent Variable

Corporate lobbying acts as the independent variable of this study; expenditure data of US firms was derived from the Center of Responsive Politics (Open Secrets) in following the trend of previous studies conducted (Scheuerel, 2008).

As the data extracted was in individual years, the corporate lobbying expenditure data was merged manually to create a large and complete data set of lobbying expenditure for US firms from 2010 to 2020 which was also used in the second chapter of this thesis.

Founded back in 1983 by former US Senators Frank Church and Hugh Scott (Scheuerel, 2008) as mentioned previously in empirical study one, Open Secrets has been used within this study as the organization is non-profitable and non-partisan.

Furthermore, with the database providing the largest US corporate lobbying figures out there, its usage and application contributes to the validity of this study.

4.3.2.iii | Control Variables

The study observed a number of extraneous control variables (financial and governance) which were extracted from Bloomberg:

Table 4.2: Summary of control variables

Variable:	Definition & Measure:	Source:
Total Debt	Short-term Debts + Long-term Debts	Bloomberg
Capital Intensity	Capital Expenditure / Sales	Bloomberg
Book to Market	Market Value per Share / Book Value per Share	Bloomberg
Firm Size	Logarithm of Market Value	Bloomberg
Carbon Intensiveness	Dummy variable = 1 if firm operates within a carbon intensive industry and 0 if firm operates within a non-carbon intensive industry	Carbon Disclosure Project

Total debt is important when analysing a firm as it helps investors to identify high risk firms. Thus, in relation to corporate lobbying, if a firm has high levels of debts, the firm will need to prioritize dealing with leverage first as it is a must whilst corporate lobbying is an option. Secondly, finance no doubt is a key factor for corporate lobbying and hence firm size has also been included as larger firms will tend to have more money available to spend (John and Adebayo, 2013). In addition to this, firm size has also been included as larger firms can have influence on the authorities due to their larger stake in the market (Shevchenko, 2020).

As for capital intensity and book to market, the objective of including these variables is to consider governance as these variables demonstrate the standing of a firm within the market and hence, the position of a firm within the firm can again influence the government. (Shevchenko, 2020). Lastly, carbon intensiveness is a categorical variable within this study that had unquantifiable data. Therefore, in order to involve this variable data within the empirical data analysis, the variable was transformed into a dummy variable; carbon intensiveness takes the value of '1' if the sampled firm belongs to a carbon intensive industry⁴⁵ and '0' if otherwise.

The investigation also controls for year in order to consider time-trends as the data was collected for the respective firms following the same time-trends. The objective of controlling all of these variables were to ensure results are skewed and also help in providing clarity to the relationships held between the intended variables (Brannick and Spector, 2011) by observing a range of both governance and financial variables.

4.3.3 | Econometric Approach

To explore the outcome of a firm's corporate lobbying upon their environmental commitment, the following equation predicated the regression analysis:

$$\text{Environmental Commitment} = \alpha + \beta_1 \text{Corporate Lobbying} + \beta_2 \text{Total Debt} + \beta_3 \text{Capital Intensity} + \beta_4 \text{Book to Market} + \beta_5 \text{Firm Size} + \beta_6 \text{Carbon Intensiveness Dummy} + \varepsilon$$

In the above equation, environmental commitment is the dependent variable whilst corporate lobbying is the independent variable. The proxy used for the independent variable is the amount of money (in dollars) expended by firms upon lobbying the

⁴⁵ According to the Carbon Disclosure Project; carbon intensive industry sectors contain energy, industrial, material and utilities whilst non-intensive industry sectors include financial (dropped), consumer discretionary, consumer staple, health care and IT & telecommunication (Refer to Appendix 1)

Government. As for the dependent variable, it is proxied by the score provided by CDP to firms after completing the questionnaire.

To estimate the above-mentioned equation, a pooled OLS regression has been constructed. To further analysis the data, descriptive statistics and a correlation matrix has been drawn up. These are explained in detail in the sections below.

4.4 | RESULTS

This section will present the results obtained from this study after having tested the hypothesis postulated. The remainder of this section presents the descriptive statistics, correlation matrix comparing the variables in the dataset and the econometric model run to test the hypothesis.

4.4.1 | Descriptive Statistics

Table 4.3: Descriptive Statistics

Variables	Obs.	Mean	Std. Dev.	Min	Max
Environmental Commit	1158	5.098	1.848	2.000	8.000
Lobbying Amount	1158	0.032	0.129	0.000	2.421
Debt	1019	0.298	0.190	0.000	2.439
Capital Intensity	1157	0.050	0.038	0.003	0.285
Book to Market	1138	1.199	1.073	0.087	8.751
Firm Size	1158	10.315	1.144	5.930	14.248
Carbon Intensiveness (D)	1158	0.903	0.296	0.000	1.000

The above table illustrates the descriptive statistics of this chapter within the investigation. Lobbying Amount was used as a proxy to measure corporate lobbying spending. From the table, Lobbying Amount has a mean score of 0.03% with a standard deviation of 0.129. With the standard deviation illustrating the variability of the set of data, this low standard deviation depicts that the data is concentrated around the mean. The dependent variable extensively ranges (CDP scores) illustrating the diversity of firms (carbon intensiveness and industry) utilised within this study as a mixture of carbon intensive and non-intensive were included.

A number of additional control variables were used; debt illustrated the financial stability of firms in terms of their leverage and thus, the small mean of 0.29% conforms with our study as the study does not include financial geared firms which traditionally tend to have more debt and incur greater amounts of interest. Firm size had a small mean score of 10% and a range of 8.318, both illustrating that the firms investigated

within this study were of similar market value (large corporations) in order to establish equality⁴⁶. Firm size produced the highest range amongst the variables (14%) showing variation amongst firms. Despite that, the standard deviation of 1.144 shows that the data is dispersed within the study. From looking at both the range and standard deviation of firm size, it can be concluded that the dichotomy is not too great amongst CEOs but at the same time, it is not too constricted either.

A dummy variable was controlled for within this study; carbon intensiveness. It was pertinent to include this factor as a dummy variable as it contributed to the backdrop of this study surrounding environmental commitment. The mean of this dummy variable was 0.9% whilst the standard deviation ranked 0.296. Again, the low standard deviation of the carbon intensiveness dummy variable like the other two variables of capital intensity (0.038) and Book to Market (1.073) shows the data to be clustering around the mean.

⁴⁶ It would be inappropriate to compare small firms with large corporations to ensure validity and fairness is preserved.

4.4.2 | Correlation Matrix

The correlation matrix illustrates the coefficient relationship between the various variables in a study and in particular, the correlation between two variables (all possible pair of variables) whilst excluding the other variables that maybe present within the investigation.

Table 4.4: Correlation Matrix

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
(1) Environmental Commitment	1.000							
(2) Lobbying Amount	0.140***	1.000						
(3) Debt	0.084***	-0.029	1.000					
(4) Capital Intensity	0.023	0.003	0.003	1.000				
(5) Book to Market	-0.025	0.044	0.145***	0.191***	1.000			
(7) Firm Size	0.243***	0.248***	-0.105***	-0.104***	-0.428***	1.000		
(8) Carbon Intensiveness (D)	0.098***	0.072**	-0.180***	-0.045	0.084**	0.021	0.007	1.000

*** p<0.01, ** p<0.05, * p<0.1

The correlation matrix demonstrates that the dependent variable proxied by CDP score correlates significantly and positively with lobbying amount (0.140), debt (0.840), firm size (0.243) and the dummy variable; carbon intensiveness (0.098). A negative correlation was established with book to market (0.025) albeit it was insignificant respectively.

As for the independent variable; lobbying amount depicted some significant correlations with firm size (0.248) and carbon intensiveness (0.072). A negative correlation was depicted for debt (0.029) although insignificant. As for a firm's leverage proxied by debt, firm size impacted debt negatively (-0.105) and significantly illustrating larger firms have less debts; larger firms have more money available to meet liabilities. A positive and significant correlation was present for book to market (0.145).

Capital intensity displayed a number of significant correlations despite being negative; firm size (-0.104) and carbon intensiveness (-0.045). Book to market was the only variable depicting a positive and significant relationship (0.191). As for firm size, it correlated negatively with a significant relationship with book to market (-0.428) illustrating that larger firms have higher a market value within the market. In addition to this, the dummy variable; carbon intensiveness depicted a number of significant correlations and negative depicting the significance of industry within the study.

Overall, Environmental commitment, capital intensity and carbon intensiveness had the greatest number of significant correlations within the correlation matrix whilst book to market had the least number of significant correlations. The correlation matrix also helped to detect multicollinearity (to prevent being biased); as the table illustrates no two variables displayed a correlation higher than 1.0 and hence, multicollinearity was not an issue in this investigation and hence did not impact the validity of the results.

4.4.3 | Data Analysis

The classification of data within this study is panel data. Stata was utilised to conduct the empirical data analysis of this investigation. Panel data within the field of econometrics is analysed and interpreted by a number of models. In empirical study one, both random and fixed effect estimator models were used along with the Hausman test to determine which model was the most appropriate for the chapter. In this chapter, a number of econometrics models were constructed and after running multiple different models, the pooled OLS regression was the most suited to investigation.

The term 'regression' refers to predicting the relationship between predictors (Bangdiwala, 2018). The pooled OLS regression model (standard ordinary least square) affirmed the hypothesis of this study. The model is a baseline model⁴⁷ providing a representation of the dataset to estimate the unknown parameters within a linear regression model⁴⁸ (Hidayat and Abduh, 2012). The model assumes little or no multicollinearity and heteroskedasticity (Sureiman and Mangera, 2020) but both these issues have been addressed in this section; multicollinearity by constructing a correlation matrix and heteroskedasticity by running tests for heteroskedasticity (including robustness checks)⁴⁹.

Whilst the pooled OLS regression model has been criticized for not considering time-effects or cross-section, it is able to extract consistent and unbiased parameter estimates despite the time period remaining consistent and hence used within previous studies that sample panel data (Yi and Choi, 2005; Vuko and Colar, 2014;

⁴⁷ A reference model for various panel datasets

⁴⁸ Modelling the impact of a relationship between a dependent variable and independent variable.

⁴⁹ The robustness checks are essential for valid inference in the model (Lu and White, 2014).

Choi and Jung; 2021). Furthermore, the pooled OLS regression model provides a standard regression that is clear to understand and that can be used to compare to other complex models. (Jann, 2007; Hidayat and Abduh, 2012; Maulud and Abdulazeez, 2020).

As the study contains more firms than years, a dummy variable has been included to acknowledge the impact of the effect of time; the dummy variable will eliminate the correlation between observation in the same time period providing the time period is fixed (Vuko and Colar, 2014). The following tables display the pooled OLS model regression with robustness checks:

Table 4.5: Pooled OLS Regression

Environmental Commitment	Coef.	Robust St. Err.	P-Value
Lobbying Amount	0.091	0.044	0.177**
Debt	1.364	0.305	1.961***
Capital Intensity	2.504	1.446	5.342*
Book to Market	0.077	0.065	0.205
Firm Size	0.456	0.061	0.575***
Carbon Intensiveness (D)	0.545	0.186	0.909***
Constant	-0.539	0.639	0.714
Mean dependent var	5.143	SD dependent var	1.848
R-squared	0.101	Number of obs	1003
F-test	15.996	Prob > F	0.000
Akaike crit. (AIC)	3986.519	Bayesian crit. (BIC)	4025.805

P-Values in parentheses

*** p<0.01, ** p<0.05, * p<0.1

NOTES: The models are estimated with panel data. *, ** and *** indicate significance at 0.1, 0.05 and 0.01 levels respectively. The sample period is from 2010 to 2020. **CDP Score** is the proxy for environmental commitment (dependent variable) provided after a firm responds to the CDP survey and **Lobbying Amount** is the amount expended by firms (independent variable) measured in US dollars (millions). **Debt** is the total liabilities owed by the firm (*Short-term debts + Long-term debts*). **Capital Intensity** benchmarks a firm's financial efficiency by comparing how well its capital invested is doing in relation to revenue generated (*Capital Expenditure / Revenue*). **Book to Market** compares a firm's book value (*Assets – Liabilities*) to its market value (*TA - Preferred Stock + Deferred Tax -Convertible debt*)/market Value). **Firm Size** is measured by taking the logarithm of market value. **Carbon Intensiveness** is a dummy variable (*1 = carbon intensive and 0 = carbon non-intensive*) used to classify the firms; the firms have been classified by determining which industry sector they operate within in accordance to CDP.

As The pooled OLS regression analysis illustrates a statistically significant positive correlation between corporate lobbying and environmental commitment for the data sample (coefficient=0.091, $p < 0.177$) demonstrating that for every \$1 increase in corporate lobbying i.e. the more a firm spends on corporate lobbying, their environmental commitment increases by 0.091. This follows previous literature (Burley and Hoedeman, 2018) which affirm that high emitting firms lobby the Government to purchase time to evaluate their business operations. A further examination of the above regression analysis portrays a significant and positive relationship between capital intensity and environmental commitment (coefficient=2.504, $p < 5.342$); as capital intensity measures the relationship between capital and investment into a firm's production, reputable firms within the public eye that have valuable assets need to ensure that labour production is driven towards becoming greener as they have a reputation that needs preserving. As a result, more emphasis is given to demonstrating environmental commitment in front of the media and the public for these firms.

A third significant correlation depicted in the above regression analysis was found with carbon intensiveness (coefficient=0.545, $p < 0.909$) indicating that firms operating

within carbon intensive industries tend to be more committed to the environment. This can be the case as carbon intensive firms may feel pressurized by NGOs and stakeholders to take responsibility for their actions and therefore may understand that they need to prove themselves in order to show they are responsible and also to prevent their firm image from being tarnished.

Other important statistical measures ascertained from the pooled OLS regression is the R-squared and F-test measures. The R-squared measures the degree of variance within the dependent variable that can be explained by the explanatory variable or independent variable i.e. how well the dataset fits into the regression model. The R-squared value of this study illustrates that there is a 10% variance that can be observed by the regression model (Taylor, 2023).

4.4.3.i | F-Test

The F-test⁵⁰ illustrates whether the regression model better fits the dataset compared to a model that does not contain any explanatory variables (known as the 'intercept only' model) (Sureiman and Mangera, 2020). In doing so, the F-test has the following outcomes:

1. Null hypothesis = The intercept only model fits the dataset as well as the current regression model
2. Alternative hypothesis = The current model fits better than the intercept only model into the dataset

As the P-value of the F-test ($p < 0.000$) is smaller than 0.05 (Kissel and Posernia, 2017), the conclusion drawn is that the current regression model of this study fits best with the dataset significantly.

⁵⁰ A test developed by Ronald A. Fisher to test the ratio of variances

4.4.3.ii | Testing for Heteroscedasticity

Heteroscedasticity refers to the unequal variance of observed residuals of a regression analysis (Zumbo and Olvera Astivia, 2019). When the observed variances are constant, this is classified as homoscedasticity. To test for heteroscedasticity, researchers use a scatter plot graphs to illustrate linear regression post estimation and formal tests like that of Breusch-Pagan test⁵¹ and Cook-Weisberg test⁵². Both have been constructed within this investigation below:

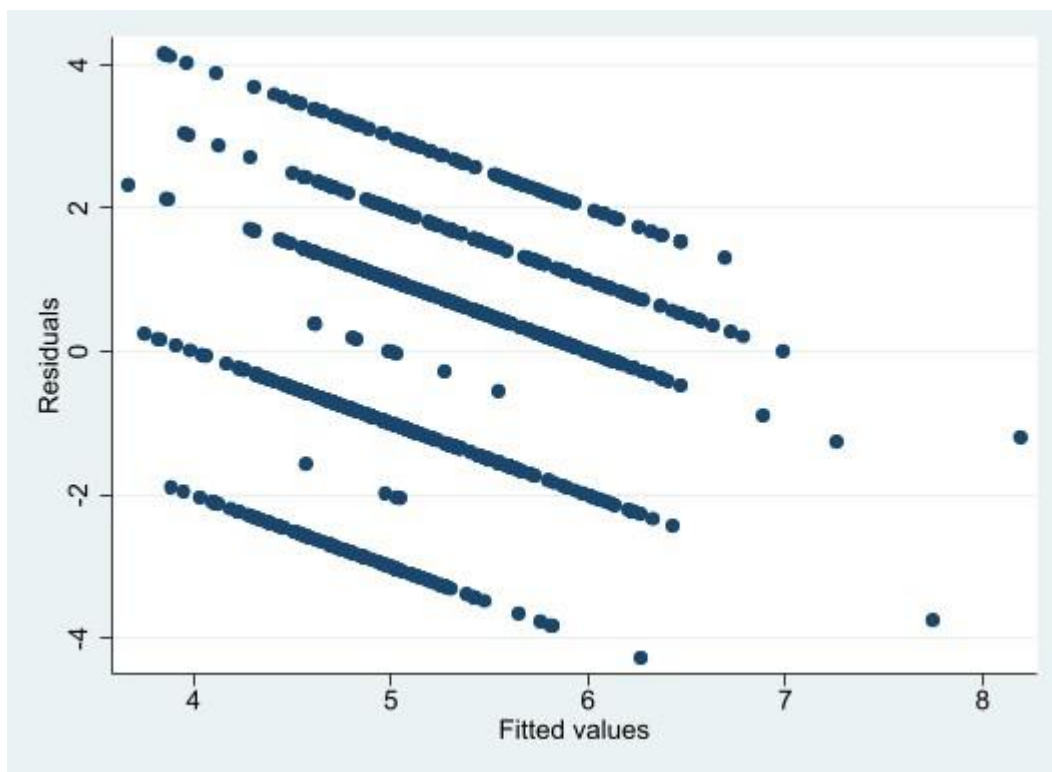


Figure 4.2: Linear regression post estimation scatter plot graph

⁵¹ A test Developed by Trevor Breusch and Adrian Pagan in 1979 to test for heteroscedasticity in a dataset

⁵² A test developed by Dennis Cook and Sanford Weisberg in 1983 to test for heteroscedasticity in a dataset

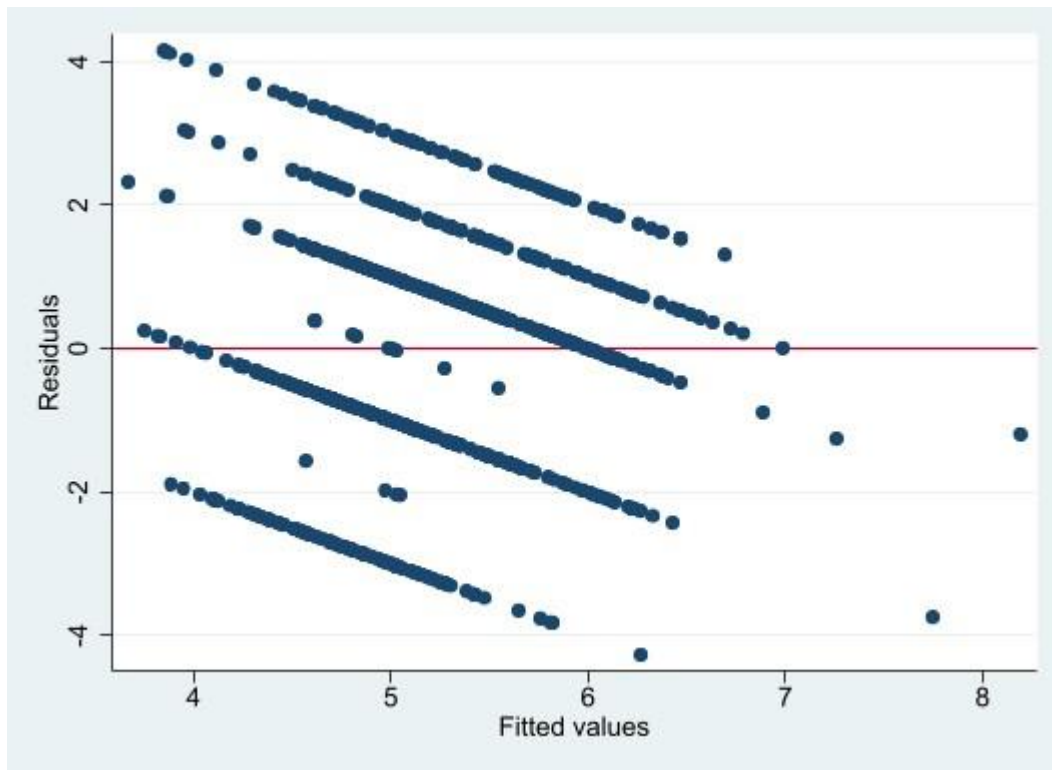


Figure 4.3: Linear regression post estimation scatter plot graph with *Yline(0)*

Figures 4.2 and 4.3 show an illustration of the distribution of residuals from the data of the study. Figures 4.3 presents the scatter plot graph with a line running through the centre to show the disproportion between the residuals (positive and negative). As can be seen, a large portion of the data is quite clustered together albeit some residuals are quite spaced out and hence, this indicates that there is some heteroskedasticity is present.

To run further test for heteroskedasticity, the Breusch-Pagan and Cook-Weisberg tests were conducted and the results are presented below:

Table 4.6: **Breusch-Pagan / Cook-Weisberg test for heteroskedasticity**

Ho: Constant variance Variables: fitted values of CDP chi2(1) = 19.14 Prob > chi2 = 0.000
--

From analysing the previous graphs and tests ($p < 0.000$), it can be concluded that there is some heteroskedasticity present in the panel data albeit, the graphs illustrate that there are a few residuals that are scattered. As a result, heteroskedasticity may reduce precision between the distance of the estimates of the coefficients from the sample but it will not result in the coefficient estimates from being biased analysis (Zumbo and Olvera Astivia, 2019).

4.4.4 | Robustness Checks

The scatter plot graphs, Breusch-Pagan and Cook-Weisberg tests were devised and run at the initial stage of running the pooled OLS regression. As heteroskedasticity was detected, the pooled OLS regression was then run again with robustness checks; these are checks carried out to enhance the validity of the panel data study by ensuring that the coefficients achieved are robust (Lu and White, 2014). Essentially, the researcher is able to see the practicality of the assumptions made by the model with objective of observing the coefficient estimates of the regression when altering the regressors which can either be added or deleted (Leamer, 1983 cited in Lu and White, 2014). As a result, the issue of heteroscedasticity was dealt with and the standard errors of the coefficients were unbiased.

4.5 | DISCUSSION AND CONCLUSION

The objective of this study was to analyse and examine the relationship between environmental commitment and corporate lobbying by analysing 160 US firms between the period of 2010 to 2020 as panel data. Within the preceding sections of this chapter, the hypothesis and theoretical framework that act as the foundation of this study was explored. With the hypothesis being tested and the results being established, this section will summarize these results obtained within this investigation.

The subsequent sub-sections are organised as follows; the first sub-section observes the findings identified within this study; the relationship between environmental commitment and corporate lobbying. The second sub-section compares the findings of this study with previous literature within the field. The third sub-section discusses the implications of this research for directors and policymakers. Thereafter, the final sub-section addresses some of the limitations of this study by providing avenues for future research.

The investigation identified a statistically significant positive correlation between environmental commitment and corporate lobbying demonstrating that firms that lobby the Government more tend to be more committed to the environment i.e have a higher CDP score. Firms that lobbied more (and emitted more carbon established from the previous chapter) illustrated more commitment towards the environment as they needed to assure stakeholders that they are working to better themselves and take responsibility. In the study, a statistically significant positive correlation was also present with book to market value as well-known firms that are key players in the market i.e. have market value tend to be more renowned than others and hence have a reputation that they need to preserve. As a result, more emphasis is given to

demonstrating environmental commitment in front of the media and the public for these firms.

Existing literature within this field have studied various concepts relating to environmental commitment; environmental commitment and stakeholder influence (Abkowitz *et al.*, 1999), environmental commitment and cap-and-trade (Berthelot *et al.*, 2003), environmental commitment and carbon management practices (Doda *et al.*, 2016), environmental commitment and environmental disclosure (Bang *et al.*, 2017) and environmental commitment and carbon abatement (Blanco *et al.*, 2020). This study now makes a contribution to the field of accounting and extends the literature by analysing the relationship between environmental commitment and corporate lobbying through the lens of the legitimacy theory. Whilst this theory is commonly used within accounting, this study has applied the theory to underpin its findings.

In drawing a comparison of the findings of this study to that of previous literature, the research corroborates the study conducted by Grey (2018) who identified that firms indulging in corporate lobbying tend to use investment as a form of protection in order to divert attention away from the lobbying i.e. even if a firm lobbies, it is stimulating the economy through investments and hence creating benefits for society. In this study, attention is focused on environmental commitment so whilst a firm lobbies, there is still goodness present in the firm as it is demonstrating a degree of commitment towards the environment. The study by Bertrand *et al.* (2012) illustrating political connection reaping benefits is also corroborated by this investigation as corporate lobbying can be considered a form of acquaintance and hence, make commitment easier to convince the Government.

This study has looked at how firms that lobby more (and emitted more carbon established from the previous chapter) tend to be more committed to the environment in order to earn respect (legitimacy) in the eyes of stakeholders. The research presents a number of implications for different stakeholders; namely directors, NGOs (non-governmental organizations) and policymakers. In terms of directors, this research has highlighted the value of environmental commitment; firms maybe weak or poor performers in terms of their impact on the environment and hence will lobby. However, directors should construe this lobbying as a form of protection and take the issue of commitment seriously as it will have the ability to restore trust within stakeholders.

This research also poses implications for NGOs; organizations (non-profitable) that are influential in decision-making but independent from governmental supremacy. As stated previously, the objective of NGOs is to look out for the greater welfare of the community by tackling issues and concerns that are prevalent within society. Hence this research has displayed that firms that lobby more will be committed more to the environment and hence, this research will assist NGOs in interacting with the authorities to look at the how genuine or superficial the commitment from lobbying firms are.

Thirdly, this research presents implications for policymakers as it will help strategize devising policies relating to the operations of firms. Aforementioned, Governments and policymakers need to understand the needs of firms so that when policies are devised, they cater for firms to operate and function within the society. With that having been said, there must always be an equilibrium; whilst the needs of firms need to be met, governments and policymakers also need to be aware what serves the best interest of stakeholders. Governments and policymakers should not simply assume that a firm is committed to any cause just from their representation and as a result accept any

form of corporate lobbying but rather, they should analyse the request comprehensively and wholistically by weighing the pros and cons and by looking at all parties involved and all parties affected. In essence, policymakers need to ensure that the greater benefit is achieved in relation to corporate lobbying.

All studies have limitations present and this study is no different. From the limitations of this study was that data pertaining to CDP scores were missing; CDP scores achieved by firms were used to proxy environmental commitment however due to the lack of data, a number of years were dropped for different firms. Whilst data was available for the vast majority of firms, a few CDP scores were missing, in particular from the early years. This was caused to many firms not initially responding to the CDP survey and as a result, a score could not be allocated for the firm during that year. However overtime, no responding firms actually realised benefits (Qian and Shaltegger, 2017; CDP, 2023) to responding and hence began to participate. Another cause for this limitation is the structure of the CDP survey process; whilst the themes remain the same, questions are altered after a year or few years and hence, to categorise, clean and manage the data becomes impractical. CDP is becoming an area of growing interest and whilst responding to the survey is not mandatory, the organization has embarked upon a campaign to encourage response and from statistics published, more and more firms are responding to the survey with nearly 20,000 firms responding to the survey in 2022 (CDP, 2022c). Thus, future researchers can extract a more coherent set of data from CDP. No doubt that there will be implications as certain firms will choose not to respond but at the very least, enhanced CDP data can be utilised by future researchers to point firms and policymakers towards the right direction in positively impacting climate change.

Another limitation of this study was that a cluster of control variables were used; future researchers can include more control variables to enrich the research including a stronger variable to proxy economic performance to consider its impact on the moderating in the relationship between a firm's environmental commitment and corporate lobbying.

Thirdly, time factor is imperative in any research and hence, future researchers can conduct a study similar to this by extending the time period of research as this study only investigated firms within a 10-year period. Broadening the time period of an investigation enhances reliability, validity and also allows researchers to analyse changes in trends and shifts amongst firms and the market environment they operate within in order to identify new and growing business interests of firms.

CHAPTER 5:

**Is environmental commitment an indication of a firm's sincerity to
the environment?**

(Empirical Study 3)

5.1 | INTRODUCTION

The production of harmful and hazardous waste from firms has never been perceived more as a significant problem in the 21st century than now (Hayat *et al.*, 2023). With supply chains and operations central to this issue, firms have been placed under scrutiny to do more in order to tackle this issue to ensure the preservation of the environment (Bolton and Kacperczyk, 2021). As the world races to achieve its target of net zero by 2050 (Ohene *et al.*, 2022), stakeholders are not just calling for more transparency from firms but also demanding accountability to measure the effectiveness of protocols in place from firms to reduce pollution (Pitrakkos and Maroun, 2019). Researchers have now been looking at positive trends and correlations in relation to environmental commitment (Velte, 2020; Lemma *et al.*, 2022). With life being the key driver to the economy (Pimentel *et al.*, 1994), stakeholders are worried that the pollution produced from firms pose a great threat to ecosystems that support human life and mortality (Hendryx and Fedorko, 2011) and the environment around us. Ultimately to simply show commitment towards the environment through greenwashing is not sufficient as stakeholders have now risen from this superficial level (Pitrakkos and Maroun, 2019). Accounting and CSR information must hold weight for the users of this information and depict practical ways firms are commissioning to deal with climate change (Pitrakkos and Maroun, 2019).

Telling a narrative of becoming greener or a lack thereof has both positive and negative drawbacks; firms through putting on a display of greenery can gain positive public media attention, increase market value, draw in shareholders and so forth. On the other hand, a lack of depiction of environmental commitment can draw in pressure from NGOs through bad publicity and ultimately, destroy sales. Many studies have depicted the positive benefits acquired from displaying commitment to the environment

(Yan *et al.*, 2022). Equally, research has also illustrated the negative impacts suffered by firms when poor environmental commitment is displayed (Alsaifi *et al.*, 2020b). Firms that embody an ethos of wanting to help and benefit the environment will make it manifest on their operations in order to show genuinity; the study conducted by Luo and Tang (2020) on FTSE350 firms illustrated that an enhancement in corporate governance proxied by the emissions-reduction strategy index (ERS) leads to better environmental commitment from the firm. In a study conducted by Dong *et al.* (2022), investor confidence increased when firms explain carbon neutrality commitment goals without simply announcing them. This meant that investors were optimistic of the direction the firm was moving towards and ambitious in further investment. In another study conducted by Yan *et al.* (2022) between 2009 and 2017 observing 12,001 observations, research found that firms displaying consistency in publicising information pertaining to the environmental commitment benefitted and enjoyed an increase in corporate economic value.

The research above illustrates that environmental commitment is no doubt impactful. Despite that, it has already been established from the second empirical study of this thesis that poor environmental performers illustrate greater commitment towards the environment. That having been said, the investigation conducted by Guo *et al.* (2020) show the portrayal of environmental commitment from a negative perspective as they argue the manifestation of environmental commitment can be a green-washing technique to contribute to impression management⁵³. Likewise, in a study conducted by Luo *et al.* (2022), a number of firms from seven energy-intensive industries were sampled between 2015 and 2019. The study attested to the same outcome put forward by Guo *et al.* (2020); green-washing being a technique to help impression

⁵³ To influence a perception amongst stakeholders

management supported by the legitimacy theory; the outcome of the investigation portrayed a positive association between environment disclosure and impression management. A further study conducted by Fialho *et al.* (2020) studied firms included within the 'A-list' of CDP⁵⁴; the CDP has different areas where firms can disclose environmental commitment goals when responding to the CDP survey; climate change and deforestation. In 2016, a third area was added by CDP; water security which focused upon the preservation and purification of water resources. The investigation by Fialho *et al.* (2020) found that these firms voluntarily participated in disclosing environmental commitments towards water security (in their 2016 survey to CDP) to impact impression management and thus studies like these encourage contemplation and additional analysis; the issue requires delving further to be able to understand the practicality of environmental commitment.

Having established that high lobbying firms with poor environmental performance tend to show greater commitment towards the environment to protect their image (in empirical chapters one and two), we need to know how genuine is that commitment? How much of that commitment is practically applied to benefit and preserve the environment? The importance of understanding this relationship is in three folds; firstly, the increasing trend of population growth has placed a strain on resources; more people necessitate greater infrastructure which means deforestation (Hayat *et al.*, 2023). Secondly, a growth in population will pressure firms to produce more natural resources i.e. fossil fuels which is the single greatest contributor to climate change (Hayat *et al.*, 2023). This in turn translates to greater emissions from firms and currently, three of the largest national polluters of the globe make up just under 50%

⁵⁴ These are the top firms classified in CDP ranking; the criteria include displaying environmental impact through devising strategies in climate change, deforestation and water preservation.

of all global pollution; China, US and India (wang *et al.*, 2020). Within each of these three areas, firms are at the central point of causing disintegration to ecosystems and so they need to be the first to take action.

With very minimal studies conducted in this area and a lack of research on the practicality of environmental commitment, this chapter will analyse the relationship between firms' environmental commitment and their level of environmentally friendliness. The remainder of this chapter is organised as follows; the next section defines the theoretical background and develops the hypothesis; section 5.3 explains the sample used, empirical model, and variables' measurement; section 5.4 presents the results followed by the discussion and conclusion in section 5.5.

5.2 | THEORETICAL BACKGROUND AND HYPOTHESIS DEVELOPMENT

This section will look at previous literature within the field of environmental accounting. Thereafter, the theoretical framework and the theories acting as the foundation of this research will be introduced followed by the development of the hypothesis.

5.2.1 | The Significance and Role of being Environmentally Committed

Environmental commitment involves firms displaying measures to improve its operations towards the preservation of the environment and ecosystems. Research has portrayed the significance of environmental commitment; namely, its role within corporate governance which has been an area where research has developed; Moussa *et al.* (2020) argue that better environmental commitment leads to better board environmental orientation.⁵⁵ This was supported by their study which ran over a 10-year period observing 2301 US observations. The investigation concluded that developing a carbon strategy i.e. having a commitment goal enhanced the environmental orientation within leadership. Likewise, corporate governance is closely linked with economic performance and this is also an area that environmental commitment has impacted. Economic performance and brand value is one of the key drivers for firms in displaying goals to help the environment. The investigation undergone by Hapsoro and Falih (2020) from 2015 to 2018 following the Kyoto Protocol's second commitment found that environmental commitment was positively associated with brand value amongst carbon intensive firms.

The increase of brand value ultimately enhances a firm's market value. The study conducted by Adu *et al.* (2022) on non-financial FTSE350 firms from 2009 to 2018

⁵⁵ "The extent to which a company integrates ecological issues into its business strategy to reduce the harmful effects of its business-related activities on the natural environment" (Hirunyawipada and Xiong, 2018)

portrayed that firms that self-report carbon reduction initiatives benefit from a number of positive outcomes with a domino effect; firstly, a direct positive correlation was established between self-reported carbon initiatives and direct increase in market value. This in turn impacted sales positively which resulted in higher CEO Salary and Executive Compensation. Velte *et al.* (2020) analysing 73 peer-reviewed quantitative studies concluded a positive correlation between environmental performance and disclosure thus illustrating the importance of environmental commitment. The study also concluded that such environmental commitment improves financial performance for firms.

Performance, both financial and environmental are no doubt indicators of how well a firm is doing. Many studies have proven the impact that environmental commitment has towards performance (Graci and Dodds, 2008; Hapsoro and Falih, 2020; Velte *et al.*, 2022; Adu *et al.*, 2022). When a firm takes the initiative to voluntarily depict commitment towards the environment or 'self-reports', the objective is to create the idea of the firm taking responsibility amongst stakeholders (Adu *et al.*, 2022). However, the question that needs to be asked next is, 'what action follows self-reporting?' As a result, voluntarily declaration must be followed by practical demonstration of effort towards the firm becoming more environmentally friendly in order to show the sincerity of the firm in relation to environmental issues or else, questions arise as how to genuine a firm is. The subsequent section looks to understand the significance of environmental friendliness in the context of firm operations.

5.2.2 | Significance of Environmental Friendliness

Environmental friendliness entails not harming the environment or impacting it negatively but rather, work towards preserving it (Chen *et al.*, 2015). A firm's

environmental friendliness is manifest in their practical goals set to help the environment. Whilst previous research has focused upon emission i.e. carbon and greenhouse gases (Rohani, *et al.*, 2016; Rohani, *et al.*, 2022), firms can be detrimental towards the environment above and in addition to emitting; by releasing toxic waste which has been classified as hazardous to all forms of life within the environment. A review by Schwarzenbach *et al.* (2010) has suggested that groundwater amongst several hundreds of thousands of sites worldwide have been polluted by hazardous toxic waste. The research conducted by Ethlers and Kavanaugh (2013) found that 120,000 sites had groundwater contaminated by hazardous toxic waste which is yet to be cleaned up. As it can be seen, the release of hazardous toxic waste by firms is a major issue to climate change. To combat this and encourage environmental friendliness, the US senate setup the Environmental Protection Agency (EPA) in 1970 (EPA, 2023a).

5.2.2.i | Environmental Protection Agency (EPA) and the Toxic Release Inventory (TRI) program

By monitoring, analysing and conducting research, the US environmental protection agency is able to manage and enforce environmental regulations. The EPA categorise toxic waste release into three main categorises; 1) that which is harmful to human life i.e. cancerous or can cause chronic diseases, 2) that which has intense adverse impact to human health and 3) that which harms the environment. If a firm's release falls into any of these three categories, it has to register for submission to the Toxic Release Inventory (TRI) program. Currently, 770 chemicals across 33 categories have been marked with toxicity by the EPA (EPA, 2023a).

Under the TRI program, US facilities from various industries (NAICS code⁵⁶) are required to submit information regarding toxic waste produced and released into the atmosphere, land or in any disposal unit. Even if the waste is recycled to benefit the environment, its emission must be made manifest (EPA, 2023d). With presence in every US state and neighbouring area; the Virgin Islands, the Northern Mariana Islands, Puerto Rico, Guam and American Samoa, the TRI facilities were setup in 1986 under Section 313 of the Emergency Planning and Community Right-to-Know Act (EPCRA)⁵⁷. Correspondence to the TRI program is mandatory and relevant firms are required to submit toxic waste release data pertaining to their plants annually; every July (EPA, 2023d).

The EPA work rigorously to ensure compliance is present every year. The table below outlines the key regulations (EPA, 2023d) linked to the management and application of the TRI program:

⁵⁶ The TRI program from 1986 till 2006 categorised firms using SIC codes (4 digits); firms with SIC codes 20 – 39 were classified under the TRI program. However after 2006, the North American Industry Classification System (NAICS) came into place (6 digits) (EPA, 2023b).

⁵⁷ Following a serious emission of toxic waste in West Virginia, the Congress passed Section 313 of the Emergency Planning and Community Right-to-Know Act (EPCRA) (EPA, 2023c)

Table 5.1: **Regulations pertaining to the TRI program**

Regulation:	Abbreviation:	Explanation:
Emergency Planning and Community Right-to-Know Act <i>(1986)</i>	EPCRA	The act which founded the TRI program across the US
Pollution Prevention Act <i>(1990)</i>	PPA	The act enhanced the TRI program by requesting relevant firms that not only must they publicise their toxic waste release but in addition to this, they must also devise strategies to subsidise toxic waste release and strategizing is often overlooked or ignored in the presence of regulations as too much emphasis is provided to conformity without genuinely looking for ways to improve.
National Defense Authorization Act for Fiscal Year <i>(2019)</i>	NDAA	Whilst the act was officially passed in 2019, it was implemented for the fiscal year of 2020. The act added a number of chemicals to the list of substances that produce toxic waste release.

The list of chemicals included within the TRI program are reviewed annually, through EPA initiated reviews and via the chemical petition process⁵⁸. Once a firm's release falls into one of the three categories stipulated by the TRI program and meets the employee threshold set out, submission becomes mandatory. The firm will then be required to register on the Central Data Exchange (CDX) (EPA, 2023e) before being required to submit every year⁵⁹. With the data being public, this is one key difference that sets apart the TRI program from other regulatory projects. Through the publicising of data, TRI creates an effective incentive for sustaining a good and healthy

⁵⁸ The Chemical Petition Process allows stakeholders to submit suggestions of removing or adding chemicals to the inventory list based upon evidence (EPA, 2023f)

⁵⁹ A TRI 'Threshold Screening Tool' is available if firms are unsure if submission is incumbent upon them or not.

environment as firms will be required to become more friendly towards the environment.

5.2.2.ii | Impact of TRI program

Research over the decades has illustrated the impact of the TRI program upon various different areas within the US including population distribution⁶⁰, housing and community characteristics (Perlin *et al.*, 1995; Arora and Cason, 1999; Wilson *et al.*, 2012; Mastromonaco, 2015; Charette *et al.*, 2021). In addition to this, researchers have focused upon the effectiveness of the program and its position in making a positive change towards the environment. The program is underpinned by Section 313 of the US Emergency Planning and Community Right-to-Know Act (EPCRA) with the objective of creating awareness of environmental protection amongst the public. Bui and Mayer (2003) mentioned that the effectiveness of the TRI program was manifest between 1988 to 1999 where national toxic waste release dropped by 43%. The study conducted by Fung and O'Rourke (2000) also affirmed this however described the success of the TRI program due to its embodiment of 'Populist Maxi-Min Regulation' mechanism rather than being based upon traditional regulatory; Fung and O'Rourke (2000) explain the Populist Maxi-Min Regulation mechanism to hold three principles; 1) making information manifest for stakeholders to work together in solving environmental issues rather than enforcing, 2) standards of environmental protection are not based upon acceptable risk but rather based upon what citizens deem acceptable, 3) response from firms comes from pressure from local stakeholders rather than governmental penalties.

⁶⁰ The density of inhabitants in a given area

Gerde and Logsdon (2001) described the TRI program as being one of the most comprehensive databases amongst two others in monitoring US pollution levels and cite a number of advantages; the program uniform has consistent method of reporting by the same firms for the same pollutants over a focused period of time. In addition, the database holds data for various different industries and hence, it widens the scope for large scale research. Gerde and Logsdon (2001) further argue that previous studies (Bunge *et al.*, 1996; Klassen and Whybark, 1999) have utilised the TRI program for two main reasons; to measure stakeholder response to TRI data annual announcements and secondly, to see the impact the program has on firms to improve their relationship with the environment.

Upon seeing the successful impact of the TRI program in US, neighbouring country Canada created the National Pollutant Release Inventory (NPRI) in 1994 imitating the procedures and ethos of the TRI program. However, one of the differences between NPRI and TRI is that NPRI takes a quantity-based approach to report pollution into the atmosphere and does not include the relativeness of toxicity releases. This in some ways makes the NPRI deficient as it can mean that harmful chemicals can be ignored (Taylor *et al.*, 2020).

Hence programs like NPRI and TRI have been organised to help firms with poor relationships with the environment improve. As the previous empirical chapter demonstrated that highly committed firms tend to lobby more i.e. to buy more time by taking legal means rather than being penalised for illegal activity, do these highly committed firms actually become more environmentally friendly? Has the tactic of corporate lobbying actually been used by these highly committed firms to genuinely increase in environmental friendliness? To understand this, the subsequent subsection discusses the theory postulated that establish the theoretical framework.

5.2.3 | Theoretical Framework

The theory used to underpin the relationship between environmental commitment and environmental friendliness is the stewardship theory⁶¹. The forthcoming sub-sections applies the theory to the context of this study in devising the theoretical framework of this chapter.

5.2.3.i | Stewardship Theory

The stewardship theory was first founded by Donaldson and Davis in 1991 (Murtaza *et al.*, 2021) to describe the responsibility placed upon the shoulders of those responsible for the operations of a firm entrusted from the firm's owners. The theory has been described as, *"a framework which argues that people are intrinsically motivated to work for others or for organizations to accomplish the tasks and responsibilities with which they have been entrusted. It argues that people are collective minded and pro-organizational rather than individualistic and therefore work toward the attainment of organizational, group, or societal goals because doing so gives them a higher level of satisfaction"* (Menya, 2013 pg. 2322).

Stewardship can be broadly categorised into four main categories (Pirie and McKuddy, 2007); 1) personal stewardship – utilising your skills to benefit society, 2) social stewardship – developing relationships within society to enhance love and care, 3) economic stewardship – utilizing economic resources to benefit society and limiting wastage and 4) environmental stewardship – using natural resources to benefit the society with the aim of limiting pollution.

⁶¹ The Public Choice, Tollbooth and Legitimacy theories were used to principle the theoretical framework in the previous chapters that looked at the relationship between environmental performance and corporate lobbying (empirical study one) and corporate lobbying and environmental commitment (empirical study two) however in this chapter, the stewardship theory was the best fit in devising the theoretical framework. theory was the most appropriate to use as it has been used widely throughout literature in the field of accounting.

The theory directly contrasts the 'agency theory' which believes that people in leadership i.e. CEOs or higher management take maximum benefit for their personal gain from milking their position. The stewardship theory postulates the opposite; a person who is considered to be a 'steward' takes responsibility of the position that they have been placed even though, they may not be the owner. In the context of firms, CEOs and higher management take responsibility to ensure that the firm is moving forward to please all stakeholders. As the owners i.e. shareholders are not involved in the day-to-day running of a firm's operation, CEOs and higher management have been placed in a position of responsibility to discharge their duties to benefit the owners. The diagram below maps out the theoretical framework for this study:

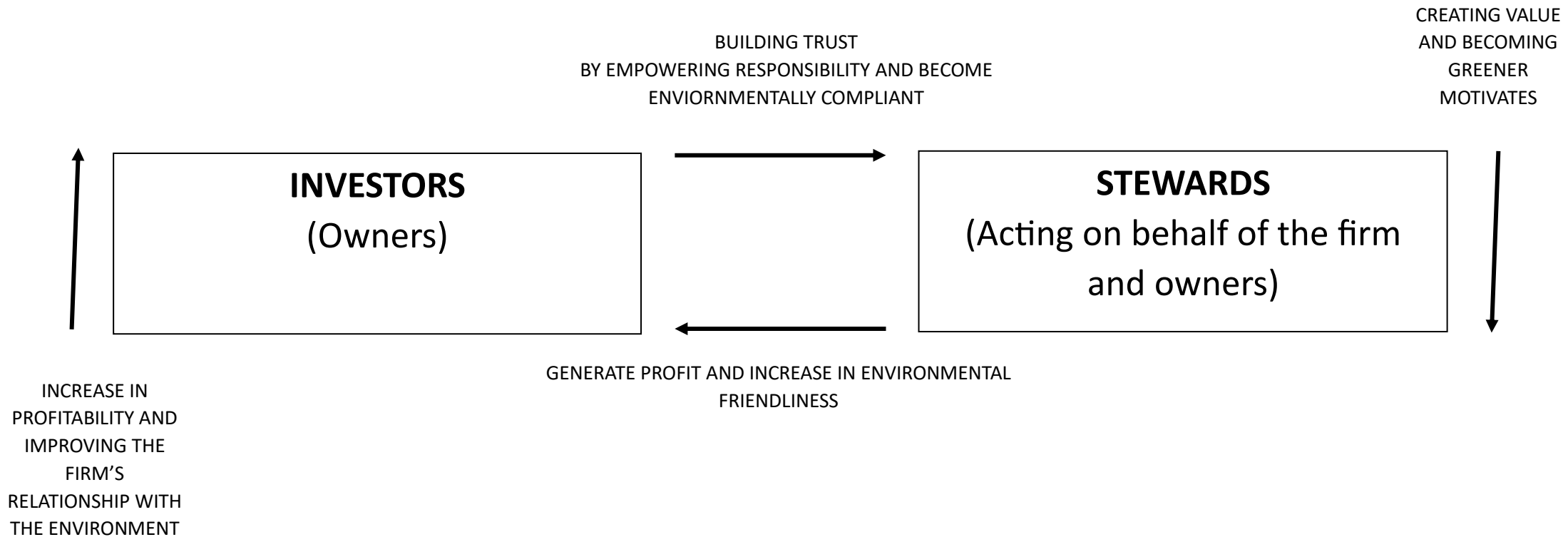


Figure 5.1: **Stewardship Theory (Theoretical Framework)**

The stewardship theory is predicated upon two key tools; the first is responsibility; the theory allows owners to empower CEOs and higher management with responsibility as stewards. Secondly, when these stewards understand the great responsibility they have been entrusted with and respect the position they are in, they will be motivated to create value of the firm both intrinsically and extrinsically. Murtaza *et al.* (2021) argued that managers that embody environmental stewardship not only look to enhance employees and society but also manage resources carefully so as to limit wastage.

Even though the stewardship theory may seem to impact the relationship between owners and managers in a positive manner, it does have limitations. Menya (2013) argued that whilst managers can be placed within a position of reasonability, they may not always fulfil what they have been entrusted with and may even exploit the situation. The utopia relationship between owners and managers was also a point of argument by (Arthurs and Busenitz, 2003) who highlighted this issue; under the stewardship theory, the goals of the principal (owner) and agent (CEO or manager) are aligned to be the same which in many a times has not been the case. Thus, the stewardship theory has been criticized for being far from reality (Keay, 2017). Peachy (2008)

Despite many critiquing the assumptions of the stewardship theory, the theory has been praised for its advantages. Whilst it can be argued that CEO and managers may exploit their position for their own financial gain, stewardship outlines that there does not need to be a dichotomy between the two; financial gain and fulfilling responsibilities entrusted with. CEOs and managers can profit and benefit financially from the firm and at the same time, discharge their duties responsibly by ensuring the firm is geared towards the direction of shareholders. In the study conducted by Pirie and McCuddy (2007) looking at the relationship between decision-making and firm success (proxied

by analysing mission statements) sampling firms from the Fortune's Global Most Admired Companies, the study concluded that financial considerations in decision-making cannot solely impact firm success but when decision-making integrates both financial and stewardship considerations, a firm can be successful. In support of this study, Menya (2013) also argued that stewardship theory can bring about better decision-making for firms; if CEOs and managers are envisaged as stewards of firms, they may bring better expertise to the firm in dealing with issues and challenges facing the firm i.e. innovating ways to benefit the environment or reduce pollution levels because they are onsite compared to owners who can only see the firm from a distance. Likewise, championing the stewardship theory within the ethos of a firm forces CEOs and managers to react responsibly. By doing so, CEOs and managers feel an integral part of the firm and its operations i.e. feeling a sense of belonging and hence it drives motivation to move the firm forward.

In applying the stewardship theory to this study, when a firm has been placed in the spotlight for having a poor relationship with the environment, the stewardship theory presents a sense of responsibility from management; CEOs and managers are not simply worried about their personal reputation or even financial gain, but they have genuine care to bring about improvement to the firm. The previous chapter analysed the relationship between corporate lobbying and environmental commitment and found that highly committed firms lobby the Government more to buy time to improve as improvement cannot be achieved in the short-term. If this is then placed under the lens of stewardship theory, CEOs and managers now build upon this i.e. taking responsibility using the time gained to work and increase the firm's environmental friendliness.

To contextualize the stewardship theory, the subsequent section will develop the hypothesis in the application to this study.

5.2.4 | Hypothesis Development

The first empirical chapter of this thesis found that poor environmental performing firms lobby the Government to avoid being penalised. A penalty would mean that a firm's image or legitimacy would be placed into jeopardy. The subsequent chapter then found that those firms that lobby more tend to be more committed to the environment as corporate lobbying was a tool used to buy time for improvement. This now shows the genuineness of firms wanting to improve and maintain a good relationship with the environment. However, to simply state commitment to the environment or declare commitment is not sufficient but it must be substantiated with action or practical implementation. Hence, under the stewardship theory, firms want to become more environmentally friendly after showing a level of commitment to the environment. By demonstrating stewardship through improving environmental friendliness, a firm shows its level of genuineness by displaying development. As opposed to legitimacy and the firm always looking to impress and put on a pleasing performance that may not be necessarily genuine or by hiding defects, stewardship from the firm illustrates sincerity; initially a firm maybe deficient i.e. poor performer which may tarnish their image. Firms will look to reshine their brand but at the same time, acknowledge the presence of deficiencies. It is through that acknowledgement that firms now look to improve by taking responsibility i.e. enhancing environmental friendliness. Thus, the stewardship theory strikes a balance; image is no doubt important but to act ethically i.e. displaying sincerity is more important and by doing so, stewardship bears the fruit of good publicity and increased market value.

Within literature, a number of studies have demonstrated how stewardship theory upholds environmental friendliness with other areas of accounting. Falkner and Buzan (2017) comment that whilst stewardship theory was created from a few logical ideas in the 19th century, it has today developed to become a primary institution for global international society in the 21st century. Within literature, environmental stewardship stands upon community-based monitoring (CBM) by which local stakeholders of an area observe and focus upon environmental issues within the common community (Conrad and Daoust, 2008). Where interest is present, awareness of the locality is created. Whilst more and more communities embody this form of monitoring, areas like the north of US are prolific with this (Conrad and Daoust, 2008). The objective of community-based monitoring is not to punish or penalise; but rather to nurture, educate and create awareness (Conrad and Daoust, 2008). When all the stakeholders within a locality take initiative to address community environmental issues, this builds a sense of trust and togetherness which allows stakeholders to help firms. Through community-based monitoring, stakeholders will work with firms and identify environmental areas of deficiency. When that relationship is created, a sense of genuine care and trust is built; firms feel the genuine care stakeholders have for them and the environment that they all share and benefit from. Therefore, rather than seeing stakeholders as an enemy, stakeholders are perceived as supporters and helpers to the firm. This collaboration then ultimately builds a sense of responsibility within firms towards the environment. Thus, firms will take their own initiative to help the environment genuinely. To demonstrate this, the investigation conducted by Adu *et al.* (2022) between 2009 to 2018 amongst UK firms listed on the FTSE350 illustrated that when firms self-report carbon reduction initiatives, it has a positive impact on the market value of the firm. To further support the stewardship theory in this study, CEO

pay, and executive compensation (included as variables) had no moderating impact on the relationship showing a level of responsibility. This study enforces the fact that when firms genuinely make an attempt to work harder and improve their relationship with the environment i.e. strive to become more environmentally friendly and not plan to simply greenwash, it has a positive impact on the firm.

In another study, Guimaraes and Liska (1995) investigated the relationship between environmental friendliness and benefits received amongst 133 firms. The benefits received were categorised into 13 groups; 1) Improved employee morale, 2) Fostered a more positive organizational culture, 3) Promoted employee involvement, 4) Resulted in fewer disgruntled employees, 5) Stimulated re-engineering, 6) Stimulated innovation, 7) Created management development opportunities, 8) Created employee training opportunities, 9) Encouraged communication between employer and employee, 10) Strengthened the informal organization, 11) Contributed to problem-solving skills, 12) Lower employee absenteeism and 13) Lower employee turnover. The Pearson correlation analysis illustrated that those firms embodying true environmental friendliness under a stewardship framework, received greater benefits. Thus, the study shows that stewardship benefits the firm externally and internally; externally, the environment is preserved whilst internally, the firm enjoys many benefits. Nickless and Yakovleva (2022) further argued that stewardship is required in order to achieve complete sustainability; simply recycling or minimizing waste is not going to achieve carbon neutrality by 2050 (aimed by US) but rather to fast-track the move to sustainability requires firms to take on a stewardship role. Furthermore, Faison *et al.* (2023) further argues that certain areas of the US environment such as forests would be preserved through stewardship. In spite of the fact that forests have evolved over millions of years in the US (Faison *et al.*, 2023), if firms took on a

stewardship role as a means of environmental friendliness, it would be cost effective in maintaining them because everyone benefits from them and thus to connect environmental friendliness with costing, a firm taking on a stewardship role correlates a positive relationship with cost effectivity as firms will look to save money by being responsible rather than squander wealth (Faison *et al.*, 2023).

If managers, directors and the board of a firm envelop stewardship, a culture of ethical behaviour will run through the firm (Sun *et al.*, 2022). To exemplify this, the study conducted by Moussa *et al* (2019) on 2,301 US firms between 2005 and 2015 illustrated a positive correlation between stewardship and environmental commitment; the study portrayed that firms with environmentally orientated boards of management acting as stewards for the firm look to limit harm to the environment and reduce pollution levels. In another global study led by Haque and Nitim (2020), the investigation analysed 13 industrialized European countries over 4379 firm-year observations between 2002 to 2016 and found that firms that develop a sustainable compensation policy have a better impact on the environment. Thus the study illustrates that once the head of a firm has an ethos of stewardship, the policies devised within a firm align with taking responsibility.

With that being said, the studies discussed in this section provide a general overview of what the literature holds. With research having focused on environmental friendliness and its connection to economic performance, employee production, improved organizational structure, and market value this research aims to close the gap in the literature by analysing environmental friendliness by combining legitimacy and stewardship. A firm may have illustrated commitment to the environment in order to protect its image from bad publicity which may not necessarily be negative. Growth and development for many firms require time and hence, if a firm is initially caught out

for having a poor relationship with the environment, it will need to first get back up on its feet and whilst it now has extra work to do because it has come under the spotlight for the wrong reasons, it will need to show a level of commitment towards improving. Once that has been established and that commitment has become manifest, the firm needs to feel a sense of responsibility in order to practically deliver that commitment. Stakeholders around the firm too will expect to see practical implementation and will not simply accept pleasing depictions to simply impress i.e. impress management and thus, firms will need to deliver a degree of environmental friendliness; taking responsibility for what they produce i.e. pollution, release of hazardous waste. That having been said, the following hypothesis have been devised:

H1: Ceteris paribus, firms that are more committed to the environment have a greater level of environmental friendliness.

5.3 | METHODOLOGY

The Methodology section outlines the process followed to collect data and run econometrics models to test the hypothesis of the investigation. Archival study is once again the research methodology embedded within this study as in the previous two empirical studies with the research being conducted between the period of 2010 and 2020 for US listed firms from various industries and sectors. Whilst data was collected between the years of 2010 to 2020, the data for the dependent variable (toxic waste release) was obtained from 2011 to 2021 to ensure there would be a year's lag to see the firm impact upon the dependent variable. The section will discuss the following; sample selection, measurement of variables, data management and empirical data analysis.

5.3.1 | Sample Selection

US firms have been chosen as the sample of this study as they are the second highest emitters of pollution (BOFIT, 2022) in addition to having a very strong corporate lobbying culture amongst their business entities.

US Firm data was collected from Bloomberg and CDP between the years of 2010 to 2020. Next, toxic waste release data was collected from the toxic release inventory (TRI)⁶² possessed by the US environmental protection agency (EPA)⁶³; a branch of the US government tasked to monitor environmental levels (both in land and sea) and ecosystems to ensure that the risks are minimised and reduced to preserve the environment.

⁶² The data was extracted as a raw file and then formatted into coherent set of data to be used for the study.

⁶³ <https://www.epa.gov/>

Toxic waste release data was collected between the years of 2011 to 2021 to allow a 1-year lag to appear in the research. Firms in the sample that had portrayed multiple releases of toxic waste in a single year had an average calculated to ensure one toxic waste release figure was present for the firm for the year. In emulating previous literature, financial firms were then excluded from the study⁶⁴. The data was thereafter cleaned and organised to omit missing information After successfully completing the merge, 80 firms remained enveloping 582 observations.⁶⁵

5.3.2 | Measurement of Variables

This section discusses the proxies of variables used in this study. As mentioned previously, a variable is a phenomenon, characteristic or figure (that constitutes a single value or multiple values) that can be measured either numerically (quantitative) or non-numerically (qualitative) against another variable to conceptualize a hypothesis. Variables can be of different types (categorical, nominal, ordinal etc) dependent upon the research being conducted.

The portrayal of a clear understanding of variables used in a study is integral for a researcher in order to depict a clear relationship. The main variables used within this research are the independent (also including control variables) and dependent variables. The independent variable is the determines the dependent variable which is the outcome or result. Kaur (2013) stated, “If the independent variable is an active

⁶⁴ Previous literature exclude financial firms from their samples as the reporting practice and procedure for financial firms are different to that of non-financial firms. However, adding or subtracting these firms to the study will not bias the results (Boubaker *et al.*, 2019)

⁶⁵ The release and publication of toxic waste release data is an area that is developing and much of toxic waste release data has not been published due to red tape and regulations, hence the number of firms sampled in this study is small. Nonetheless, whatever toxic waste release data that was available was utilised and merged with the main dataset.

variable, then we manipulate the values of the variable to study its effect on another variable.” The following sub-sections define and list the variables used in this study.

5.3.2.i | Dependent Variable

The dependent variable of this study is environment friendliness proxied by toxic waste release collected from the toxic release inventory controlled by the US environmental protection agency. Unlike the main sample of data that runs from 2010 to 2020, the toxic waste release data was collected from 2011 to 2021 to create a 1-year lag which was then merged to the main dataset (2010 to 2020) i.e. independent and control variables data (main dataset) for 2010 was merged with dependent variable data for 2011.

5.3.2.ii | Independent Variable

The independent variable of this study is environmental commitment proxied by the CDP scores received by firms when completing and submitting the CDP survey as previous research studies (Luo *et al.*, 2012 and Blanco *et al.*, 2020) have illustrated. The environmental commitment of firms are embodied in the scores provided for respondent firms in a range of 8 scores with a score of ‘D-’ depicting the weakest form of environmental commitment and a score of ‘A’ embodying exemplary environmental disclosure. For those firms that do not respond to the questionnaire, CDP marks them with a ‘F’ score. In this research, firms scoring ‘F’ have been dropped as their CDP score is of no value to the econometrics model.

The scores are allocated to firms based upon assessing four areas pertaining to environmental accountability; leadership, management, awareness and disclosure. The CDP scores were manually extracted from the CDP database and organised to

create a sub-sample of the independent variable. In order to use the data in testing econometric models, the CDP scores were codified to a numerical score of 1 – 8⁶⁶.

The dataset of the CDP scores was collected for the research period (2010 to 2020) and then merged with the main dataset manually. As the dataset of the dependent variable contained data from 2011 to 2021 in order to achieve the 1-year lag, the main dataset (containing the CDP scores) was then merged with the dataset of the dependent variable manually on STATA to produce a complete and coherent dataset to run the econometric model to test the hypothesis.

5.3.2.iii | Control Variables

A number of control variables (financial and governance) were included and kept constant throughout the investigation to ensure skewedness of results. Furthermore, the unvarying state of the control variables also help in providing clarity to the relationships held between the various variables (Brannick and Spector, 2011):

Table 5.2: Summary of control variables

Variable:	Definition & Measure:	Source:
Total Debt	Short-term Debts + Long-term Debts	Bloomberg
Capital Intensity	Capital Expenditure / Sales	Bloomberg
Research & Development Intensity	Research & Development Expenditure / Sales	Bloomberg
Book to Market	Market Value per Share / Book Value per Share	Bloomberg
Firm Size	Logarithm of Market Value	Bloomberg
Carbon Intensiveness	Dummy variable = 1 if firm operates within a carbon intensive industry and 0 if firm operates within a non-carbon intensive industry	Carbon Disclosure Project

⁶⁶ The categorisation of CDP scores can be found on Table 4.1

Previously described, total debt is important when analysing a firm as it helps investors to identify high risk firms. Thus, in relation to corporate lobbying, if a firm has high levels of debts, the firm will need to prioritize dealing with leverage first as it is a must whilst corporate lobbying is an option. Secondly, finance no doubt is a key factor for corporate lobbying and hence firm size has also been included as larger firms will tend to have more money available to spend (John and Adebayo, 2013). In addition to this, firm size has also been included as larger firms can have influence on the authorities due to their larger stake in the market (Shevchenko, 2020).

Aforesaid, the aim of including capital intensity and book to market, was to consider governance as these variables demonstrate the standing of a firm within the market and hence, the position of a firm within the firm can again influence the government. (Shevchenko, 2020). Research and development intensity has been newly added to fit the context of this study i.e. environmental commitment and hence the impact of including this variable is to see whether firms are utilising research and development to identify ways to become more committed to the environmental; again, analysing the mentality of governance within a firm. Lastly, carbon Intensiveness is a categorical variable again used within this study with unquantifiable data. Therefore, in order to involve this variable data within the empirical data analysis, the variable was transformed into a dummy variable carbon intensiveness takes the value of '1' if the sampled firm belongs to a carbon intensive industry⁶⁷ and '0' if otherwise.

The investigation also controls for year in order to consider time-trends as the data was collected for the respective firms following the same time-trends. The objective of controlling all of these variables were to ensure results are skewed and also help in

⁶⁷ According to the Carbon Disclosure Project; carbon intensive industry sectors contain energy, industrial, material and utilities whilst non-intensive industry sectors include financial (dropped), consumer discretionary, consumer staple, health care and IT & telecommunication (Refer to Appendix 1)

providing clarity to the relationships held between the intended variables (Brannick and Spector, 2011) by observing a range of both governance and financial variables.

5.3.3 | Econometric Approach

To explore the outcome of a firm's environmental commitment upon their environmental friendliness indicator, the following equation predicated the regression analysis:

$$\text{Environmental Friendliness} = \alpha + \beta_1 \text{Environmental Commitment} + \beta_2 \text{Total Debt} + \beta_3 \text{capital intensity} + \beta_4 \text{Research \& Development Intensity} + \beta_5 \text{Book to Market} + \beta_6 \text{Firm Size} + \beta_7 \text{Carbon Intensiveness Dummy} + \varepsilon$$

In the above equation, environmental friendliness indicator is the dependent variable whilst environmental commitment is the independent variable. The proxy used for the independent variable is the CDP score earned by firms after completing the CDP survey. As for the dependent variable, it is proxied by toxic waste release.

To estimate the above-mentioned equation, a pooled OLS regression has been constructed. To further analysis the data, descriptive statistics and a correlation matrix has been drawn up. These are explained in detail in the sections below.

5.4 | RESULTS

This section will present the results obtained from this study after having tested the hypothesis postulated. The remainder of this section presents the descriptive statistics, correlation matrix comparing the variables in the dataset and the econometric model run to test the hypothesis.

5.4.1 | Descriptive Statistics

Table 5.3: Descriptive Statistics

Variables	Obs.	Mean	Std. Dev.	Min	Max
Environmental Friendliness	582	496787.740	2984832.700	0.000	65379720.000
Environmental Commitment	577	3.225	1.073	1.000	5.000
Debt	515	0.274	0.140	0.000	0.814
capital intensity	581	0.045	0.034	0.006	0.285
Research & Development Intensity	455	0.057	0.065	0.000	0.357
Book to Market	581	1.146	0.965	0.131	8.751
Firm Size	582	10.463	1.016	7.965	12.992
Carbon Intensiveness (D)	582	0.967	0.178	0.000	1.000

The above table illustrates the descriptive statistics of this chapter within the investigation. CDP score proxied environmental commitment amongst firms. From the table, Environmental commitment has a mean score of 3 with a standard deviation of 1.073. With the standard deviation illustrating the variability of the set of data, this high standard deviation depicts that the data is spread out and not tightly congested around the mean. The dependent variable extensively ranges (environmental friendliness) illustrating the diversity of firms utilised within this study as a mixture of firms were included from various different industries; both carbon intensive and non-intensive.

A number of additional control variables were used; debt illustrated the financial stability of firms in terms of their leverage and thus, the small mean of 0.27% conforms with our study as the study does not include financial geared firms which traditionally tend to have more debt and incur greater amounts of interest. Firm size had a small

mean score of 10% and a range of 5.027, both illustrating that the firms investigated within this study were of similar market value (large corporations) in order to establish equality⁶⁸. Both capital and research & development intensities had similar mean scores; 0.05% and 0.06% (illustrating comparable amounts of spending of capital and research and development in relation to sales) to further demonstrate the equality of firms in this study. Firm size produced the highest range amongst the control variables (12%) showing variation amongst firms. Despite that, the standard deviation of 1.016 shows that the data is dispersed within the study. From looking at both the range and standard deviation of firm size, it can be concluded that the difference is not too dispersed amongst firms but at the same time, it is not too constricted either.

A dummy variable was controlled for within this study; carbon intensiveness. It was pertinent to include this factor as a dummy variable as it contributed to the backdrop of this study surrounding environmental commitment. The mean of this dummy variable was 1% whilst the standard deviation ranked 0.178. Again, the low standard deviation of the carbon intensiveness dummy variable like the Book to Market (0.965) shows the data to be clustering around the mean.

⁶⁸ It would be inappropriate to compare small firms with large corporations to ensure validity and fairness is preserved.

5.4.2 | Correlation Matrix

The correlation matrix depicts the coefficient relationship between the various variables in a study and in particular, the correlation between two variables (all possible pair of variables) whilst excluding the other variables that maybe present within the study.

Table 5.4: Correlation Matrix

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
(1) Environmental Friendliness	1.000								
(2) Environmental Commitment	-0.062	1.000							
(3) Debt	-0.055	0.061	1.000						
(4) Capital Intensity	0.038	0.073*	-0.127***	1.000					
(5) Research & Development Intensity	-0.012	-0.017	-0.169***	-0.166***	1.000				
(6) Book to Market	0.058	0.122***	0.118***	0.179***	-0.156***	1.000			
(7) Firm Size	-0.046	0.158***	-0.028	-0.026	0.434***	-0.286***	1.000		
(8) Carbon Intensiveness (D)	0.029	0.148***	0.024	0.006	0.125***	-0.079*	0.073*	0.032	1.000

*** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

The correlation matrix demonstrates that the dependent variable proxied by toxic waste release correlates negatively with environmental commitment (-0.062), debt (-0.055), research & development intensity (-0.012) and firm size (-0.046). A positive correlation was established for capital intensity (0.038), book to market (0.058) and the dummy variable; carbon intensiveness (0.029).

As for the independent variable; environmental commitment depicted some significant positive correlations with capital intensity (0.073), book to market (0.122), firm size (0.158) and carbon intensiveness (0.148). debt (0.061) also produced a positive correlation albeit not being significant. A negative correlation was depicted for research & development intensity (-0.017) although insignificant. As for a firm's debt, firm size impacted debt negatively (-0.028) albeit the relationship being insignificant. A significant and positive relationship was portrayed however between firm size and research & development intensity (0.434) illustrating that larger firms spend more on innovation through research & development.

Book to market displayed a number of significant correlations; with both debt (0.118) and capital intensity (0.179), both correlations were positive. Even though book to market looks at the market value in comparison to the value of shares considering liabilities, firms with higher book to market value i.e. purchasing the firm for more than the shares are worth, these firms possess higher levels of debts. The capital intensity figure depicts that firms with higher book to market value spend more on assets to generate sales.

Overall, Environmental commitment, book to market and carbon intensiveness had the greatest number of significant correlations within the correlation matrix whilst environmental friendliness had the least number of significant correlations. The correlation matrix also helped to detect multicollinearity (to prevent being biased); as

the table illustrates no two variables displayed a correlation higher than 1.0 and hence, multicollinearity was not an issue in this investigation and hence did not impact the validity of the results.

5.4.3 | Data Analysis

The classification of data within this study is panel data; a number of models can be used within the field of econometrics to analyse and interpret panel data. In empirical study one, both random and fixed effect estimator models were used along with the Hausman test to determine which model was the most appropriate for the chapter. In empirical study two, a number of econometrics models were constructed and after running multiple different models, the pooled OLS regression was the most suited to investigation. This procedure was repeated for this final empirical study and again after running different models, pooled OLS regression showed the most coherency to this investigation.

The term 'regression' simply refers to predicting the relationship between predictors (Bangdiwala, 2018). The pooled OLS regression model (standard ordinary least square) affirmed the hypothesis of this study. The model is a baseline model⁶⁹ providing a representation of the dataset to estimate the unknown parameters within a linear regression model⁷⁰ (Hidayat and Abduh, 2012). The model assumes little or no multicollinearity and heteroskedasticity (Sureiman and Mangera, 2020) but both these issues have been addressed in this section; multicollinearity by constructing a correlation matrix and heteroskedasticity by running tests for heteroskedasticity (including robustness checks)⁷¹.

⁶⁹ A reference model for various panel datasets

⁷⁰ Modelling the impact of a relationship between a dependent variable and independent variable.

⁷¹ The robustness checks are essential for valid inference in the model (Lu and White, 2014).

Whilst the pooled OLS regression model has been criticized for not considering time-effects or cross-section, it is able to extract consistent and unbiased parameter estimates despite the time period remaining consistent and hence used within previous studies that sample panel data (Yi and Choi, 2005; Vuko and Colar, 2014; Choi and Jung; 2021). Furthermore, the pooled OLS regression model provides a standard regression that is clear to understand and that can be used to compare to other complex models. (Jann, 2007; Hidayat and Abduh, 2012; Maulud and Abdulazeez, 2020).

Stata was utilised to conduct the empirical data analysis of this investigation. As the study contains more firms than years, 'year' has been utilised as a dummy variable to acknowledge the impact of time; the dummy variable will eliminate the correlation between observation in the same time period providing the time period is fixed (Vuko and Colar, 2014). The following tables display the pooled OLS regression model with robustness checks⁷²:

⁷² Pooled OLS regression model with robustness checks is less sensitive to outliers

Table 5.5: Pooled OLS Regression

Environmental Friendliness		Coef.	Robust St. Err.
Environmental Commitment		-143303.370***	49782.390
Debt		-739321.560**	289848.100
Capital Intensity		-3030104.800*	1473807.000
Research & Development Intensity		-1844749.400**	778311.300
Book to Market		-12531.670	18693.110
Firm Size		141133.520**	59581.430
Carbon Intensiveness (D)		173579.640	75462.860
Constant		-882031.930	413858
Mean dependent var	241612.763	SD dependent var	929169.545
R-squared	0.080	Number of obs	448
F-test	2.084	Prob > F	0.006
Akaike crit. (AIC)	13583.690	Bayesian crit. (BIC)	13661.681

P-Values in parentheses

*** p<0.01, ** p<0.05, * p<0.1

NOTES: The models are estimated with panel data. *, ** and *** indicate significance at 0.1, 0.05 and 0.01 levels respectively. The sample period is from 2010 to 2020. Toxic Waste Release measures the environmental friendliness (Dependent variable) and **CDP Score** is the proxy for environmental commitment

(independent variable) provided after a firm responds to the CDP survey. **Debt** is the total liabilities owed by the firm (*Short-term debts + Long-term debts*). **Capital Intensity** benchmarks a firm's financial efficiency by comparing how well its capital invested is doing in relation to revenue generated (*Capital Expenditure / Total Assets*). Similarly, **Research & Development Intensity** benchmarks a firm's efficiency in innovating by comparing how well the amount of money invested in R&D is doing in relation to sales (*R&D Expenditure/ Revenue*). **Book to Market** compares a firm's book value (*Assets – Liabilities*) to its market value (*TA - Preferred Stock + Deferred Tax -Convertible debt*)/market Value). **Firm size** is measured by taking the logarithm of market value. **Carbon Intensiveness** is a dummy variable (*1 = carbon intensive and 0 = carbon non-intensive*) used to classify the firms; the firms have been classified by determining which industry sector they operate within in accordance to CDP.

As The pooled OLS regression (with robustness checks) analysis illustrates a statistically significant negative correlation between environmental commitment and environmental friendliness for the data sample (coefficient=-143303.370, $p<0.054$) demonstrating that for every 1 CDP score increase in environmental commitment i.e. the more a firm illustrates commitment to the environment, their environmental friendliness (toxic waste release) decreases by 143303.370. This follows previous literature (Vazquez and Rodriguez, 2020) which affirm that highly committed firms are more than willing to demonstrate practical change of improving their relationship with the environment to reduce pollution levels.

A further examination of the above regression analysis portrays a significant and positive relationship between research & development intensity and environmental commitment (coefficient=-1844749.400, $p<0.021$); as research & development intensity measures the relationship between investment into innovation and a firm's production, firms demonstrating environmental commitment will need to innovate ways through different avenues in order to reduce their toxic waste release and illustrate greater environmental friendliness. Another positive correlation observed linked to this relationship is the positive correlation between debt and environmental commitment (coefficient=-739321.560, $p<0.027$); firms may not have necessary funds to finance this type of research in becoming greener and hence, this may lead them to borrow more and acquire more debt.

A fourth significant correlation depicted in the above regression analysis was found with firm size (coefficient=141133.520, $p<0.019$) indicating that larger firms have a greater responsibility towards the environment as their plants produce more toxic waste. Hence their accountability is greater as they do more damage to the environment.

Other important statistical measures ascertained from the pooled OLS regression is the R-squared and F-test measures. The R-squared measures the degree of variance within the dependent variable that can be explained by the explanatory variable or independent variable i.e. how well the dataset fits into the regression model (Taylor, 2023). The R-squared value of this study illustrates that there is a 0.8% variance that can be observed by the regression model.

5.4.3.i | F-Test

Once the regression model is run, the F-test⁷³ is carried out to illustrate whether the regression model better fits the dataset compared to a model that does not contain any explanatory variables i.e. independent variables (known as the 'intercept only' model) (Sureiman and Mangera, 2020). In doing so, the F-test has the following outcomes:

1. Null hypothesis = The intercept only model fits the dataset as well as the current regression model
2. Alternative hypothesis = The current model fits better than the intercept only model into the dataset

As the P-value of the F-test ($p < 0.006$) is smaller than 0.05 (Kissel and Posernia, 2017), the conclusion drawn is that the current regression model of this study fits best with the dataset significantly.

⁷³ A test developed by Ronald A. Fisher to test the ratio of variances. This was also conducted for the previous empirical chapter once the regression model was run.

5.4.3.ii | Testing for Heteroscedasticity

Heteroscedasticity refers to the unequal variance of observed residuals of a regression analysis (Zumbo and Olvera Astivia, 2019). When the observed variances are constant, this is classified as homoscedasticity. To test for heteroscedasticity, researchers use a scatter plot graphs to illustrate linear regression post estimation and formal tests like that of Breusch-Pagan test⁷⁴ and Cook-Weisberg test⁷⁵. Both have been constructed within this investigation below:

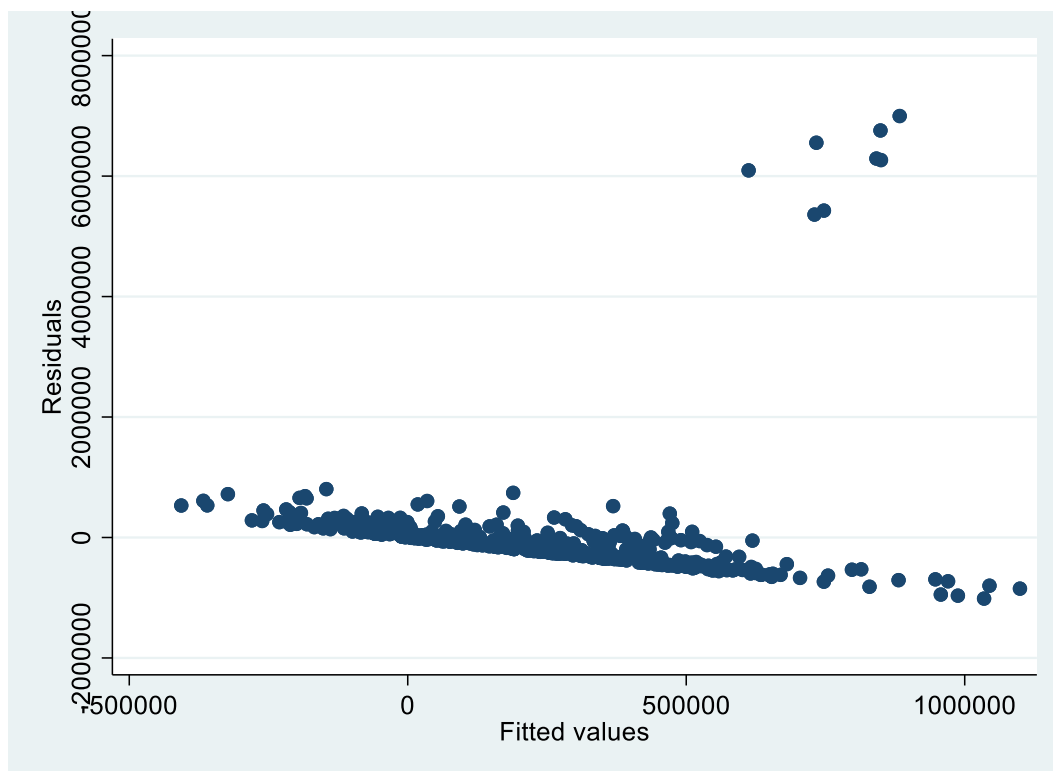


Figure 5.2: Linear regression post estimation scatter plot graph

⁷⁴ A test Developed by Trevor Breusch and Adrian Pagan in 1979 to test for heteroscedasticity in a dataset. This was also conducted for the previous empirical chapter once the regression model was run.

⁷⁵ A test developed by Dennis Cook and Sanford Weisberg in 1983 to test for heteroscedasticity in a dataset. This was also conducted for the previous empirical chapter once the regression model was run.

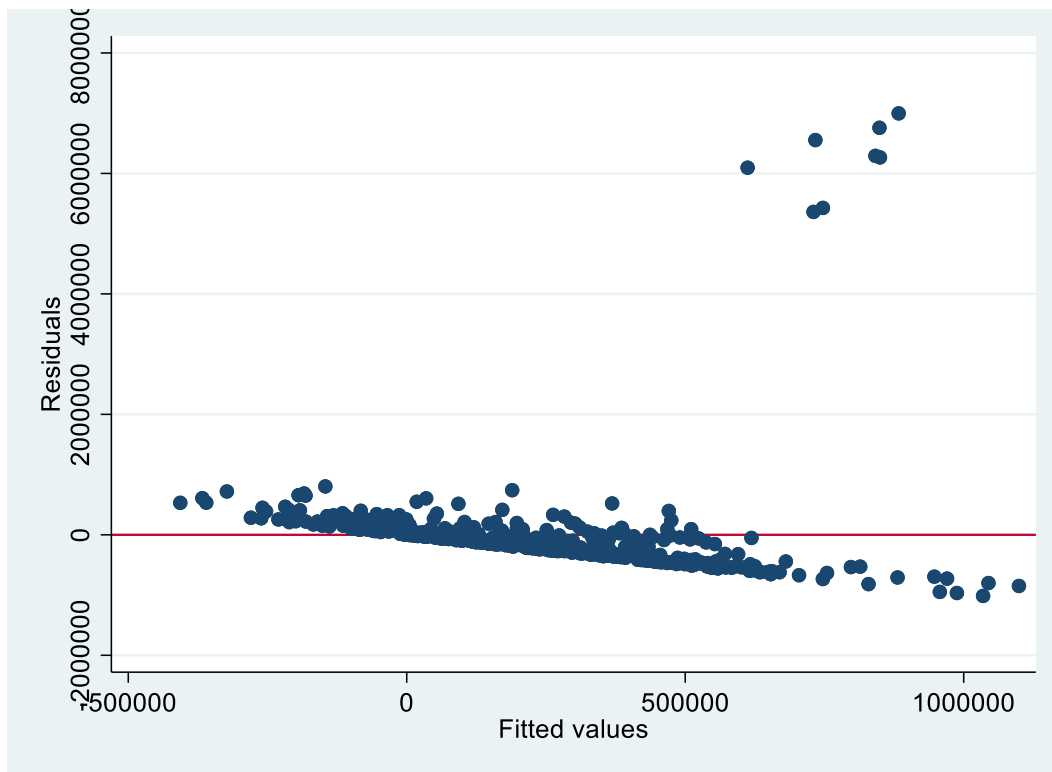


Figure 5.3: Linear regression post estimation scatter plot graph with $Yline(0)$

Figures 2 and 3 present an illustration of the distribution of residuals from the data of the study. Figure 3 presents the scatter plot graph with a line running through the centre to show the disproportion between the residuals (positive and negative). As can be seen, a large portion of the data is quite clustered together albeit some residuals are quite spaced out and further away from the majority. Thus, this indicates that there is some heteroskedasticity present.

To run further test for heteroskedasticity, the Breusch-Pagan and Cook-Weisberg tests were conducted and the results are presented below:

Table 5.6: Breusch-Pagan / Cook-Weisberg test for heteroskedasticity

Ho: Constant variance Variables: fitted values of toxic chi2(1) = 818.72 Prob > chi2 = 0.000

From analysing the graphs and tests ($p < 0.000$), it can be concluded that there is some heteroskedasticity present in the panel data albeit, the graphs illustrate that there are a few residuals that are scattered. As a result, heteroskedasticity may reduce precision between the distance of the estimates of the coefficients from the sample but it will not result in the coefficient estimates from being biased analysis (Zumbo and Olvera Astivia, 2019).

5.4.4 | Robustness Check

The scatter plot graphs, Breusch-Pagan and Cook-Weisberg tests were devised and run after running the pooled OLS regression initially. As heteroskedasticity was detected, the pooled OLS regression was then run again with robustness checks; these are checks carried out to enhance the validity of the panel data study by ensuring that the coefficients achieved are robust (Lu and White, 2014). Essentially, the researcher is able to see the practicality of the assumptions made by the model with objective of observing the coefficient estimates of the regression when altering the regressors which can either be added or deleted (Leamer, 1983 cited in Lu and White, 2014). As a result, the issue of heteroscedasticity was dealt with and the standard errors of the coefficients were unbiased.

5.5 | DISCUSSION AND CONCLUSION

The objective of this study was to analyse and examine the relationship between environmental commitment and environmental friendliness by analysing 80 US firms between the period of 2010 to 2020 as panel data. Within the preceding sections of this chapter, the hypothesis and theoretical framework that act as the foundation of this study was explored. With the hypothesis being tested and the results being established, this section will summarize these results obtained within this investigation.

The subsequent sub-sections are organised as follows; the first sub-section will look at the findings identified within this study; the relationship between environmental commitment and environmental friendliness. The second sub-section will compare the findings of this study with previous literature within the field. The third sub-section will discuss the implications of this research for directors and policymakers. Thereafter, the final sub-section will address some of the limitations of this study by providing avenues for future research.

The investigation identified a statistically significant positive correlation between environmental commitment and environmental friendliness demonstrating that firms that are committed to the environment are more likely to demonstrate greater environmental friendliness i.e. work towards improving their relationship with the environment in a sincere manner. Firms that demonstrated commitment had to substantiate this by illustrating a higher level of environmental friendliness as they needed to assure stakeholders that they are working to genuinely better themselves and take responsibility; not just put on a mere show to create a perceived impression. In the study, a statistically significant positive correlation was also present with research and development intensity as firms looking to improve their impact on the environment need to streamline new protocols to reduce pollution levels.

Existing literature within this field have studied various concepts relating to environmental friendliness; environmental friendliness and market value (Adu *et al.*, 2022), environmental friendliness and employee motivation (Guimaraes and Liska, 1995), environmental friendliness and improved organization structure (Guimaraes and Liska, 1995) and environmental friendliness and cost effectiveness (Faison *et al.*, 2023) This study now makes a contribution to the field of accounting and extends the literature by analysing the relationship between environmental commitment and environmental friendliness through the lens of the stewardship theory; firms with deficiencies are ready to be committed to the environment to improve and this commitment is not just mere impressions management, but rather the commitment displayed is genuine and as firms act as stewards, they benefit the environment by becoming more environmentally friendly through practically lowering hazardous waste output.. Whilst this theory can be applied to individuals, firms and nations, this study has applied the theory to underpin its findings.

In drawing a comparison of the findings of this study to that of previous literature, the research corroborates the study conducted by Vasquez and Rodriguez (2020) which found that firms simply manifesting their environmental goals i.e. displaying commitment to the environment was not sufficient to please stakeholders however, when that commitment was substantiated with practical protocols mapping out how those goals will be achieved, a positive relationship was established between environmental commitment and firm reputation. Likewise, this study illustrates that albeit firms may have been poor performers, through time they can become better by clearly drawing out their goals i.e. goals of environmental commitment and then practically working towards achieving them by increasing in environmental friendliness through embodying stewardship. With research having already emerged showing US

authorities cracking down on firms who overstate their environmental efforts (Bortree, 2009; Kurpierz and Smith, 2020), this study proves that there are firms who are willing to put the work in to improve. Similarly, in the study conducted by *Adu et al.* (2022), it was identified that stakeholders value firms that are ready to work in limiting their emissions; taking practical steps to reduce waste. This study has shown that whilst firms maybe releasing hazardous waste, they are working towards reduction and thus, even though firms make confessions via the TRI, stakeholders will no doubt appreciate the genuine nature of firms striving to increase in environmentally friendliness and this study shows that not only are firms showing commitment to the environment, they are also working to become more environmentally friendly and essentially practising what they are preaching.

This study investigated how firms that depict environmental commitment are more environmentally friendly to genuinely show improvement and a sense of care for the environment. The research presents a number of implications for different stakeholders; namely directors, policymakers and investors. In terms of directors, the implications are two-folds; firstly, this research has highlighted the value of environmental friendliness; directors should not only strive for financial success i.e. economic performance but must also understand the position of responsibility they are in so whilst they make decisions of financial gain, they must equally ensure they act ethically. Secondly, a financial implication related to directors and this research is financial viability; directors need to plan financially in order to ensure that budgeting can encompass a demonstration of environmental friendliness.

Additionally, this research presents implications for policymakers as it will help strategize devising policies relating to the operations of firms. Before devising policies, the Government need to understand the nature of firms and the markets within they

operate as they are the backbone to supply and demand within an economy. When a firm is genuinely looking to improve in becoming more environmentally friendly, policymakers should reach out and help firms by making this easier for them through devising policies that create access to resources that will help them with their task at hand. That level of support will accelerate a level of care and compassion and no doubt establish a firm relationship between firms and the authorities. If policymakers display a lack of care or interest in understanding the needs of firms, this will have a knock-on effect that could result in firms being demotivated in developing their environmental friendliness. Ultimately, a balance needs to be struck between restriction and leeway; regulation needs to be in place to monitor a firm's relationship with the environment but at the same time, too much rigidity could be a means of demotivation and hence, firms should not be restricted to such an extent but rather be motivated to improve.

For investors, the research enhances their confidence in firms as it shows the firms' determination to act ethically and morally. By understanding the moral obligation that firms have to help the environment, investors will feel a sense of strong culture to the firm in upholding values and goals which are not just financially driven. In addition, this confidence in a firm acting ethically in terms of non-financial display and commitment will extend to financial representation i.e. investors having greater confidence in the firm not indulging in fraudulent activities when presenting financial accounts.

As with all studies, limitations are present and this study is no different. From the limitations of this study was the data proxying environmental friendliness being deficient. The data provided by the TRI was limited which ultimately resulted in the number of firms being sampled in this investigation to be reduced. The TRI database can be expanded to allow future research to be developed with greater a sample size. Furthermore, imminent research can use similar databases present within other

nations to see if a similar trend can be extrapolated within those nations i.e. NPRI in Canada and thus, shifts in trends can be analysed to see new implications facing firms and their relationship with the environment.

CHAPTER 6:

CONCLUSION

6.1 | INTRODUCTION

This chapter provides an extensive conclusion and discussion after completion of the three empirical studies. The subsequent section of 6.2 provides the overall findings of all three empirical studies. Section 6.3 highlights the implications the research poses followed by section 6.4 which identifies limitations of this thesis. The final section draws avenues for future researchers who can develop the findings of this thesis.

6.2 | FINDINGS

This section provides the overall findings of all three empirical studies in three sub-sections; 6.2.1 presents the findings of empirical study one, 6.2.2 presents the findings of empirical study two and 6.2.3 presents the findings of empirical study three.

6.2.1 | Empirical Study 1

In empirical study one, the relationship between environmental performance and corporate lobbying was analysed through the lens of the public choice theory and tollbooth theory. The investigation concluded that firms that are poor performers tend to lobby the Government to look for an escape route to avoid being penalised rather than actually taking initiative to improve. The theoretical framework underpinned the findings of this study as the public choice theory postulates that the Government will give in to corporate lobbying proposals should they see a financial benefit regardless of the repercussions that may arise from the acceptance of that particular corporate lobbying proposal. Corporate lobbying over the years has brought millions of dollars of income for authorities (Broadwater, 2021). and hence, it is very lucrative. The tollbooth theory provided an extension of support to understand deregulation within the economy via corporate lobbying; the public choice theory entails authorities to accept corporate lobbying due to financial gain and then when legislations become too rigid for the economy to withstand, it cracks as firms find compliance very difficult. The Government is then faced with an opportunity cost; acceptance of corporate lobbying or penalties. Hence, firms choose to lobby and the Government accepts their lobbying as it is still income (just like penalties) but with less administrative duties i.e. bureaucracy.

Contemporary literature within this field has already established various concepts relating to corporate lobbying; lobbying and rational economic behaviour (Deakin, 1989), lobbying and bribing (Harstad and Svensson, 2011), lobbying and fraud detection (Yu and Yu, 2011) and lobbying and investment (Grey, 2018).

The study conducted by Harstad and Svensson (2011) demonstrated that firms that lobby are more likely to bribe. Furthermore, the findings of the study consisting of 4000 firms conducted by Giovannoni and Campos (2007) were similar; corporate lobbying and corruption are substitutes with larger firms (size and ownership) having a greater grip of corporate lobbying. This validates the finding of this study which found that larger firms tend to lobby more as they have more disposable income. The study conducted by Yu and Yu (2011) found that firms involved in fraudulent activities and corporate lobbying were 38% less likely to be discovered for their fraudulent activities. Likewise, the study by Salehi and Norouzi (2022) demonstrated a direct correlation between corporate lobbying and money laundering through analysing 173 firms between 2013 and 2020 on the Tehran Stock Exchange; firms that are involved in fraudulent activities that have board members in parliament or possessing political connections are more likely to lobby.

These highlighted studies demonstrate how corporate lobbying is an effective tool to influence politics. The findings of this first empirical study support existing literature which have demonstrated negative perspectives of corporate lobbying; poor environmental performing firms lobby the Government more. In spite of the fact that existing literature focuses upon financial implications and its connection to corporate lobbying, this empirical study makes a contribution to literature by extending the subject and looking at the relationship of non-financial issues i.e. environmental performance and corporate lobbying.

The empirical study was extended with a sub-hypothesis which was developed from the primary hypothesis; the role of leadership experience in corporate lobbying. The random effect model illustrated that older CEOs lobbied more interpreting that older CEOs are more experienced and have wisdom in knowing when to lobby and how to lobby. Previous literature has analysed the relationship between different management characteristics and corporate lobbying by proxying political ideology and CEO tenure (Davidson *et al.*, 2006; Unsal *et al.* (2016); Rudy and Johnson, 2016; James, 2019); the investigation by Unsal *et al.* (2016) found that that CEOs in favour of republican politics are more likely to lobby because of their political knowledge and awareness. Furthermore, the research conducted by Rudy and Johnson (2016) found a positive relationship between CEO tenure and corporate lobbying after analysing 27 years of US firm data. The findings of the sub-hypothesis of this empirical study conform to existing literature demonstrating that management with political knowledge and awareness are more likely to lead to corporate lobbying. The findings also make a contribution which broaden literature by showing the impact of leadership experience within management upon the likeliness of lobbying more. That having been said, both hypotheses of the study were affirmed.

On the other hand, corporate lobbying has shown to bring positive results for firms i.e. firms that lobby the Government are more like to investment more and grow their portfolio (Grey, 2018) as well as literature demonstrating a positive correlation between corporate lobbying and financial performance (Deakin, 1989). This finding now makes a contribution to the field of accounting and extends the literature by demonstrating that a relationship can be established between environmental performance and corporate lobbying.

6.2.2 | Empirical Study 2

The second empirical study is an extension of empirical study one and further looks to see what actions those poor environmental performing firms take to combat any negative repercussions that may come their way as a result of stakeholders being aware of their shortcomings. To now pick themselves up, poor performing firms need to demonstrate commitment to improving so as to legitimise their operations and brand image. However, that improvement cannot come in the short space of time and hence, firms need to plan long-term. With the legitimacy theory underpinning the theoretical framework of this empirical study, poor performing firms need to legitimise their operations and hence demonstrate commitment towards improving their relationship to the environment in order to prevent facing backlash and please stakeholders. Unlike the previous study which highlighted corporate lobbying from a negative perspective, by depicting poor environmental performing firms having the tendency to lobby more, this study has shown that corporate lobbying can act as a tool of protection to buy time for improvement rather being an obstacle raised by the question of ethics and thus, the key findings of this empirical study illustrated how corporate lobbying allows firms through extending time to implement positive change in being more committed to the environment and ward away any substantial penalties.

The outcome of this empirical study illustrates that those firms depicting commitment to the environment tend to lobby more as a tool to buy time. Thus, this relationship establishes the benefits that firms can ascertain if they are closely connected with the authorities. The outcome of this study conforms with previous literature like that of Bertrand *et al.* (2012) and Blau *et al.* (2013); the investigations found that firms keeping a close connection with the authorities and regularly enter upon them are more likely to receive benefits that other firms who are not so closely connected to the authorities

may not receive. By establishing that relationship with authorities, corporate lobbying can serve as protection against penalties to extend time in improving and demonstrating commitment to the environment. Then in the study conducted by Grey (2018), firms that lobby more are more likely to invest further and grow their portfolio which include green investments. Hence, to summarise the relationship between all three factors, firms with political connections are more likely to lobby more; this in turn equates to more greener investments by the firm as a means of moving away from being poor performers and demonstrating commitment to the environment. This empirical study contributes to the existing literature by demonstrating further environmental commitment in the form of CDP scores; whilst CDP response is voluntary, poor performers will participate to illustrate commitment to the environment and lobby more in a bid to ensure legitimacy.

6.2.3 | Empirical Study 3

The final empirical study of this thesis aimed to establish the genuineness of the claims of firms illustrating commitment to the environment from the preceding empirical study. To simply state commitment to the environment in an effort to legitimise a firm's brand image is not sufficient according to many stakeholders (Pitrakkos and Maroun, 2019). For that reason, the study looked at the relationship between environmental commitment and environmental friendliness to ascertain whether those firms claiming commitment actually deliver. By doing a 1-year lag, the investigation found that firms depicting commitment to the environment do actually live up to their word and demonstrate greater environmental friendliness by reducing their release of toxic hazardous waste through enveloping stewardship to the environment. Under the stewardship theory, the results of this study has extended the current literature; despite firms initially being poor performers to the environment (empirical study one),

once they acknowledge their errors, they are ready to show commitment to change (empirical study two). However, that commitment cannot be mere 'lip service' and must be substantiated with practical action (empirical study three) as stewards who want to have a positive impact upon the environment. By understanding each stage of progression, this study conforms with existing studies like that of Sun *et al.* (2022) which depicted a positive correlation between environmental commitment and developing stewardship within the economy through encouraging green purchasing behaviour.

Empirical study three also further supports studies within existing literature on the topic of environmental friendliness; the impact of environmental friendliness and its benefits to employee motivation as well as environmental friendliness and organizational structure and its impact on environmental friendliness (Guimaraes and Liska, 1995; Adu *et al.* 2022). Similarly, the study conducted by Graci and Dodds (2008) falls within the same area; the study found that firms depicting environmental commitment were sincere in their commitment as they wanted to take responsibility for their impact on their environment. This would then translate to happy customers as an additional benefit.

Empirical study three substantiates the fact that firms who demonstrate commitment do actually strive to live up to their commitment. The study is the culmination of this research as it shows that by giving time and space, the worst offenders to the environment can change and bring about benefit as stewards who take responsibility for their impact on the environment. Having established these findings, it is imperative to understand the implications this research has.

6.3 | IMPLICATIONS OF RESEARCH

This section provides a summarized outline of the implications the research conducted has⁷⁶. A number of entities are impacted by this research including NGOs, Government and policymakers.

6.3.1 | Non-Governmental Organisations (NGOs)

Firstly, this research provides implications for NGOs; non-governmental organisations independent from the Government; their independence from the Government helps to avoid bias. The objective of NGOs is to seek out the wider benefit for all. NGOs like pressure groups can use this research (empirical study one) to demonstrate the importance of environmental performance to the authorities; poor environmental performing firms are harming the environment whilst being permitted to lobby and hence, repercussions need to be assessed. In addition to this, NGOs can also use this research to raise a point of danger should authorities turn a blind eye towards accepting corporate lobbying at the expense of the environment from firms. Therefore, empirical study one acts as a banner of support for NGOs in working for their aims of preserving the environment.

At the same time, empirical studies two and three work against pressure groups looking to damage the reputation of firms because both empirical studies illustrate commitment from firms; even though empirical study one demonstrates that poor performing firms lobby more to avoid landing hefty fines, the subsequent empirical studies show that poor performing firms are willing to be committed to change (empirical study two) and improve their relationship with the environment and

⁷⁶ The implications of research for each empirical study have been discussed within the conclusion sections of each empirical study; chapter 3, chapter 4 and chapter 5. This section provides a summary of all implications of research.

corporate lobbying is a mere tool to buy time as improvement cannot be completed within the space of a short time. Thereafter in empirical study three, environmental commitment from poor performing firms is validated as those very same firms illustrate environmental friendliness with a 1-year lag lowering their release of toxic hazardous waste. Therefore, pressure groups should understand that some firms are perhaps trying to genuinely improve in their stewarding of the environment but require time to become better. Hence, NGOs should not isolate the findings of empirical study one by taking it out of context but rather, should understand how empirical studies two and three complement empirical study one in order to establish a broader image of what implications this research has to them.

6.3.2 | Government and Policymakers

This research also contains implications for the Government as it will highlight the importance of being aware of the impact firms have upon the environment. Governments should be balanced in their approach; they should not simply authorise or approve all forms of corporate lobbying just by simply envisaging sole benefits for themselves but rather, they are required to carefully analyse the different corporate lobbying proposal that come through. The Government are perceived to be the biggest stewards to the environment and hence before any corporate lobbying proposal is accepted, they need to weigh the pros and cons by understanding what the overarching benefit is for the society.

In addition to this, the process of corporate lobbying requires regular review; by examining current legislations relating to corporate lobbying, this will allow reformation and modification to ensure that the process entails fairness, ethics and is free from corruption. Again, the process of corporate lobbying requires moderation; the process cannot be too stringent and bureaucratic for firms that turn them to corruption but at

the same time, protocols need to be in place to ensure that firms do not take advantage.

Thirdly, this research poses implications for policymakers. Empirical studies 2 and 3 illustrate that policymakers need to drive a balance when devising policies. Rather than being rigid restricting movement for firms, policymakers must understand the needs of firms. By doing this, they will be able to acknowledge that firms can actually work to improve and hence when devising policies related to the environment and sustainability, not only are they devising for the betterment of the society and Government, those same policies need to accommodate the needs of firms to ensure that there is a fair and smooth exchange of dealing and interaction. When policymakers see firms improving and being stewards to the environment, there should a visual display of encouragement in devising of policies.

Internally, the implication for policymakers should shift from detailed administrative tasks i.e. producing reports to creating support for management and employees in their awareness of environmental accountability. This in turn will lead skills being developed that will benefit firms in their environmental management. Forthcoming policies should drive motivation in enhancing environmental accounting and its application in order to establish operative methods that will achieve emission reduction goals.

6.3.3 | Institutional Investors

Institutional investors are agents who invest on behalf of others. Literature has exhibited how institutional investors such as hedge fund managers, mutual fund managers and endowment managers are tracking greenhouse gas emissions of listed firms (Bolton and Kacperczyk, 2021) and hence, this research has implications for

them. Through this observation, the aim is to form coalitions that will help initiate interaction with firms with the hopes of reducing greenhouse gas emissions as an increased amount of asset owners are looking to align their objectives with firms that are compliant to the Paris Agreement (Bolton and Kacperczyk, 2021).

In addition to this, institutional investors have begun treating firms with high level of carbon emissions as 'sin stock' (Hong and Kacperczyk, 2009) questioning carbon premium; the additional return investors request for investing in high emitting firms. That having been said, this research provides implications for institutional investors as it will provide a blueprint of support when considering whether to invest or not for their client; a firm may depict poor environmental performance however, should investing in that firm be written-off completely even though it is working to demonstrate commitment to the environment through being environmentally friendly?

6.4 | LIMITATIONS OF RESEARCH

As with all research projects, limitations are present and the three empirical studies contained within this thesis have limitations⁷⁷. Theofanidis and Fountouki (2019) described limitations within research as scientists being restricted within their research scope due to various issues. In empirical study one, an aggregate of scope 1 and scope 2 carbon emissions acted as the proxy for environmental performance. However with research now developing, scientists are focusing upon scope 3 emissions which has not been included in this study. Scope 3 is a developing area in accounting and no doubt it plays an integral part in understanding climate change however, as researchers have stated, it is difficult to measure due to it being considered somewhat of a 'third-party' emission (Eunomia, 2021). Furthermore, with voluntary disclosure being applied to scope 3 (Ducoulombier, 2021), it was difficult to obtain data in this area as not all firms declared their emission for scope 3 and hence it was not included in this research.

Another limitation relates to the availability of data; empirical studies 2 and 3 utilised CDP data as proxies for variables however the data available was limited. The CDP scores proxying environmental commitment was limited as many firms did not respond to the CDP questionnaire and hence, could not be scored. As a result, this reduced the number of firms that could be included within empirical studies 2 and 3. A firm could be very committed to the environment however if they lack responding to the CDP questionnaire, they will remain unscored and hence their efforts cannot be depicted within CDP data for researchers to use.

⁷⁷ The limitations of research for each empirical study have been discussed within the conclusion sections of each empirical study; chapter 3, chapter 4 and chapter 5. This section provides a summary of all limitations of research.

Time range is a third limitation present within this thesis stemming from the limitation of lack of data availability. Despite all three empirical studies covering analysis of firm data between 2010 and 2020, deficiency in data availability restricted the time range from being extended as CDP data could not be obtained for the years succeeding 2020 and as for the years prior to 2010, much data was missing as only a few firms participated in responding to CDP questionnaires and in addition to this, the CDP method of reporting was different compared to that of the years from 2010 to 2020 and as a result, CDP data for years prior to 2010 could not be utilised. Limited data resulting in restricting the time frame of the research reduces the number of observations that can be included which subsequently is another challenge for the investigator.

Whilst limitations can be construed as deficiencies within studies, researchers have argued that limitations can be positive. By explaining limitations, researchers are able to position their research findings into context (Ioannidis, 2007). Highlighting limitations are not simply stating systematic errors which may have arisen but rather, the discussion around limitations extend to comprehending the validity of methodical work. Limitations therefore provide context to the environment the research has been conducted in along with mention of any influences that have driven the creation of errors arising and also validate any research problems (Ioannidis, 2007). Theofanidis and Fountouki (2019) further argue that explaining limitations clearly allows the researcher to acknowledge and understand that there is further scope for development which is the key to research; without open-mindedness in research, hypotheses are prevented from being extended and thus, it allows the researcher to pave a way to create avenues for further investigation that can support the existing research at hand. With that being said, the next section highlights avenues for future research.

6.5 | AVENUES FOR FUTURE RESEARCH

Avenues for future research creates opportunities for future scientists who can use exiting studies to shape and refine their hypotheses or research questions. This thesis creates different avenues for future research. Firstly, with empirical study one establishing the impact of scope 1 and scope 2 carbon emissions, future researchers can conduct research in this area by studying carbon emission scope 3; these are emissions emitted from indirect activities of firms from sources that the firm does not control or own i.e. suppliers (Eunomia, 2021). Despite it being an area which has received much attention, researchers have stated that it is extremely difficult to quantify for accountability as they occur within the supply chain and hence, the emissions can only be traced accurately to the primary supplier (Schmidt and Sholz, 2022). Researchers have however devised models that can estimate emission levels that provide an approximate overview of scope 3 emissions emitted such as economic input-output analysis supplier (Schmidt and Sholz, 2022). Another challenge in relation to scope 3 emissions is transparency; disclosure of scope 3 emissions remains voluntary (Ducoulombier, 2021) and hence not all firms are willing to put that information in the public eye especially if it attracts scrutiny and thus creates a problem of sparsity for academics. Nonetheless, the usage of materials and goods by firms emit scope 3 emissions which in turn makes a huge contribution towards climate change and therefore its accountability is required. Future researchers can measure scope 3 emissions and compare the results with that of scopes 1 and 2 in order to see which emission is having the most impact on the environment as well as which scope can be reduced in the most effective way.

Empirical study three extended the study by 1 year using a 1-year lag to illustrate whether firms are genuine in their commitment to the environment. Future researchers

can also extend this research by increasing the time range; by extending the research by more years or even a decade, the investigation will provide a higher degree of validity in understanding the relationship between firms and the environment as more observations will be included. An extension in time range will also help to highlight any trends or patterns that maybe present amongst firms i.e. financial performance, governance etc which may provide plausible explanations to the results ascertained from the study later on.

Moreover, all three empirical studies within this thesis focused upon the US; future researchers can utilise the same theoretical framework but analyse firms in other high polluting nations such as India which has reported to spending \$6.7 to \$8.7 billion a year on health costs resulting from water pollution (Ridzuan, 2021). The political situation connected to corporate lobbying should be studied and its impact on environmental costs in India. Furthermore, future researchers can analyse multinational firms to ascertain global results. Corporate lobbying and environmental regulations will differ from nation to nation and so through a global perspective, researchers can draw a comparison and dichotomy between countries to see any links that can be contributing to climate change. In addition to this, CDP responses are growing and on a yearly basis, more and more firms are signing up to participate in responding to their questionnaires. With a greater number of responses received, this will allow researchers to have a large pool of global data available to choose from and hence, future researchers can extend this research by including more studies with a greater sample size.

In expanding upon this research, future investigators can extract firm environmental data from a different source to CDP increasing the robustness of this research. At the same time, other different environmental emittance related proxies can be used when

investigating environmental relationships. This thesis used carbon emission as a proxy in empirical study one but with importance and direction now given by nations towards achieving 2030 and 2050 net zero carbon goals, future researchers can utilise new carbon projects as proxies i.e. carbon abatements; the cost of reducing 1 tonne of carbon from the environment, carbon capture plants; the number of facilities that directly capture carbon once it is produced and transport it to be preserved underground and carbon sinks; anything that takes in more carbon than it emits.

With that having been said, these new carbon initiatives i.e. carbon abatement, carbon capture plants and carbon sinks illustrate the great attention that has been given towards environment accounting and therefore, this thesis acts as a source of motivation and enthusiasm for further research in this field as the deadline to achieve net zero carbon goals nears.

6.6 | FINAL CONCLUSION

The empirical studies within this thesis have collectively made a strong contribution to the field of environmental accounting. In addition to this, the contribution extends to political sciences as the nature of politics and its relationship to accounting is analysed within this research. As a result, this research responds to the call of previous literature that implored for further research to be established from external factors on the impact on social and environmental accounting (Owen, 2009) rather than just focusing on internal factors within the realms of accounting. Likewise, the research also responded to the call of previous literature that called for research to embed more tools to be established in order to track and reduce carbon footprints of firms and institutions (Meida *et al.*, 2013) within environmental accounting; this research utilised toxic waste hazardous release as a proxy to measure a firm's level of friendliness to the environment when depicting environmental commitment.

In summation, both empirical studies one and two have drawn upon existing corporate lobbying literature; much of empirical study one is focused upon corporate lobbying from a negative perspective whilst empirical study two sheds positive light to corporate lobbying. This dichotomy shows the balance within existing literature. It also shows the comprehensiveness of this thesis as it has taken corporate lobbying from both sides of the spectrum as the second empirical study compliments the first.

In line following a balanced approach, this research portrays a notion of balance; in order to effectively protect the environment, there is a two-stage process; both the authorities and firms need to work together. It is easy to put the blame on someone and point fingers however if responsibilities are taken by all stakeholders within the

environment, this will no doubt have an impactful effect on bringing about positive change to reaching net zero targets which is the first stage of the process. Thereafter, the second stage involves reducing climate change; this research has demonstrated that blame and guilt cannot always be placed solely on firms but rather, if they are looking to improve, they should be given a chance and not just that, but facilitation should be created for firms to become stewards to the environment rather than continuously taunt them for their mistakes. If everyone is united in their vision of preserving the environment and acting ethically, the goal will be achieved.

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APPENDICES

Appendix I: Firms sampled within dataset (Empirical study 1)

NO OF FIRMS	SECTOR
1	Construction
5	Wholesale Trade
16	Mining
17	Retail Trade
53	Transportation, Communications, Utilities and Sanitary Services
131	Manufacturing

Appendix II: News article of top oil firms lobbying resulting in climate change



The screenshot shows the Guardian website's header with navigation links like 'Print subscriptions', 'Sign in', 'Search jobs', 'Search', and 'UK edition'. Below the header is a 'Support the Guardian' banner. The main navigation bar includes 'News', 'Opinion', 'Sport', 'Culture', 'Lifestyle', and 'More'. A secondary navigation bar lists various topics including 'UK', 'World', 'Climate crisis', 'Newsletters', 'Football', 'Coronavirus', 'Business', 'Environment', 'UK politics', 'Education', 'Society', 'Science', 'Tech', 'Global development', and 'Obituaries'. The article title is 'Top oil firms spending millions lobbying to block climate change policies, says report'. A sub-headline reads: 'Ad campaigns hide investment in a huge expansion of oil and gas extraction, says InfluenceMap'. A yellow banner indicates 'This article is more than 4 years old'.

Appendix III: Firms sampled within dataset (Empirical study 2)

NO OF FIRMS	SECTOR
1	Construction
94	Manufacturing
10	Mining
13	Retail Trade
40	Transportation, Communications, Utilities and Sanitary Services
2	Wholesale Trade

Appendix IV: **Firms sampled within dataset (Empirical study 3)**

NO. FIRMS	SECTOR
1	Wholesale Trade
2	Retail Trade
5	Mining
14	Transportation, Communications, Utilities and Sanitary Services
58	Manufacturing

Appendix V: Sample of NAICS codes included in the TRI program

NAICS Code	Description
111998	All Other Miscellaneous Crop Farming (limited to facilities previously classified under SIC 2099, Food Preparations, Not Elsewhere Classified)
113310	Logging
211130	Natural Gas Extraction (limited to facilities classified under SIC 1321, Natural Gas Liquids and facilities that recover sulfur from natural gas previously classified under SIC 2819, Industrial Inorganic Chemicals, Not Elsewhere Classified)
212114	Surface Coal Mining
212115	Underground Coal Mining
212220	Gold Ore and Silver Ore Mining
212230	Copper, Nickel, Lead, and Zinc Mining
212290	Other Metal Ore Mining (limited to facilities previously classified under SIC 1061, Ferroalloy Ores, Except Vanadium (nickel); and facilities previously classified under SIC 1099, Miscellaneous Metal Ores, Not Elsewhere Classified)
212323	Kaolin, Clay, and Ceramic and Refractory Minerals Mining (limited to facilities operating without a mine or quarry and previously classified under SIC 3295, Minerals and Earths, Ground or Otherwise Treated)
212390	Other Nonmetallic Mineral Mining and Quarrying (limited to facilities previously classified under SIC 3295, Minerals and Earths, Ground or Otherwise Treated)
221111	Hydroelectric Power Generation (limited to facilities that combust coal and/or oil for the purpose of generating power for distribution in commerce)
221112	Fossil Fuel Electric Power Generation (limited to facilities that combust coal and/or oil for the purpose of generating power for distribution in commerce)
221113	Nuclear Electric Power Generation (limited to facilities that combust coal and/or oil for the purpose of generating power for distribution in commerce)
221114	Solar Electric Power Generation (limited to facilities that combust coal and/or oil for the purpose of generating power for distribution in commerce)
221115	Wind Electric Power Generation (limited to facilities that combust coal and/or oil for the purpose of generating power for distribution in commerce)
221116	Geothermal Electric Power Generation (limited to facilities that combust coal and/or oil for the purpose of generating power for distribution in commerce)
221117	Biomass Electric Power Generation (limited to facilities that combust coal and/or oil for the purpose of generating power for distribution in commerce)
221118	Other Electric Power Generation (limited to facilities that combust coal and/or oil for the purpose of generating power for distribution in commerce)
221121	Electric Bulk Power Transmission and Control (limited to facilities that combust coal and/or oil for the purpose of generating power for distribution in commerce)

A full list of all NAICS codes included within the TRI Can be found here: <https://www.epa.gov/toxics-release-inventory-tri-program/tri-listed-chemicals>

Appendix VI: Registering a CDX account to make a submission to the TRI

 **EPA** United States Environmental Protection Agency

[Home](#) [About](#) [Recent Announcements](#) [Terms and Conditions](#) [FAQ](#) [Help](#) [Virtual Assistant](#)

 **Core CDX Registration** [Contact Us](#)

1. Program Service

2. Role Access

3. User and Organization

4. Confirmation

Begin typing a program service name or related keywords to filter the list of available services (e.g., air quality system, AQS, or Clean Air Act).

Active Program Services List

ACARS: Air Compliance and Applicability Request System

ARCS: Aircraft Reporting and Compliance System

BaSR: Burial at Sea

CAER: Combined Air Emissions Reporting

CDRS: Consent Decree Reporting System

CEDRI: Compliance and Emissions Data Reporting Interface

CEDRI1: Compliance and Emissions Data Reporting Interface

CROMERRSubmitNow: CROMERR Submit Now

Appendix VII: **A summary of the aggregate release of toxic waste (2011 to 2021) recorded by the TRI**



Appendix VIII: A summary of the aggregate release of toxic waste (2011 to 2021) on an industrial level recorded by the TRI

