



SCHOOL OF
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The Effect of Workplace Autonomy on Environmental Performance

A study on the individual workers' autonomy in an organization and how it
affects a company's environmental performance

by

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Abstract

This thesis examines the relationship between workplace autonomy and environmental performance. The relationship is measured through Scope 1 CO₂ equivalent (CO₂e) emissions and through a quantitative study. Previous research found that autonomy is not a widely researched field for environmental performance purposes. A major psychological theory about autonomy is the self-determination theory, which states that autonomy is one of the basic needs for intrinsic motivation to be able to grow. However, previous studies found that innovation and corporate social responsibility are connected with autonomy in the workplace, mediating the relationship. To further develop this research stream, we developed a research question, which asks “*Does the level of autonomy within a company affect the environmental sustainability performance of a company?*”, and this led to the development of our hypothesis, stating “*The level of workplace autonomy within an organization does have an effect on the firm’s CO₂e emissions*”. This was tested through a deductive approach with the self-determination theory, and Larney’s definition of autonomy as the basis. Data was collected through surveys to find out about the level of autonomy that exists within multinational enterprises, and the CO₂e-emissions were found through the companies’ sustainability reports. This data was converted into two variables, one averaging each company’s responses for autonomy, and one CO₂e-emissions per employee. These were put into a regression analysis, which did not give a statistically significant model, and a correlation analysis was implemented to draw conclusions from our results. What the results showed was that there is a weak correlation between a firm’s level of autonomy and their environmental performance, where companies with higher autonomy had lower CO₂e-emissions. However, our sample was small, with only 31 observations, and diverse in terms of industry. It was also homogenous in culture, where most companies were founded and based in Western countries. This led to our results not being statistically significant.

Keywords: environmental performance, environmental sustainability, autonomy, workplace autonomy, self-determination theory.

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1. Introduction

Firms of today are being increasingly faced with pressure from stakeholders and shareholders to implement policies which will boost the company's environmental performance (Molina-Azorín, Claver-Cortés, Pereira-Moliner & Tari, 2009). This pressure comes from many different sources, such as the stakeholders' and shareholders' desire to invest in a company that is financially productive but growing in a healthy and sustainable way or asset owners insisting on sustainable investing strategies from their asset managers (Eccles & Klimenko, 2019; EY Global, 2020). Many corporate managers believe that sustainable investing leads to lower returns, but evidence from other studies have concluded that there is a positive correlation between having a sustainable investing focus and producing high financial returns; this will also lead to more engagement between firms and their shareholders (Eccles & Klimenko, 2019). Therefore, it is important to understand companies' abilities to act in a sustainable manner. In other words, what factors influence their environmental performance?

Previously established research shows that the environmental performance of a firm is affected by its manufacturing process and the amount of energy, be it electrical or chemical, it has consumed (Wang, Cardon, Liu & Madni, 2020). It can be inferred that the higher the environmental performance, the more environmentally suitable the goods and services produced will be. It can also be interpreted that this type of performance comes down to what type of measures the firm implements. The more sustainably effective these measures are, the more sustainable the firm acts. The internal work structure and bureaucracy of an organization affects how well an organization functions and how its employees can act within their roles (Pugh, Hickson, Hinings, & Turner, 1968). This changes the perception of individual workers of how autonomous they are allowed to act in regard to implementing company initiatives.

Within organizations, there exists a certain level of autonomy, the extent to which workers can decide how and when to carry out their tasks (Langfred & Moye, 2004; Morgeson & Humphrey, 2006; Spector, 1986). Autonomy is based on three basic psychological needs necessary for the intrinsic motivation of employees to grow, and furthermore it is responsible for leading to greater and better performance of the firm; these are the beliefs which make up the theory of self-determination (Deci et al., 2015). Many authors agree that autonomy is also a very important organizational variable (Breugh, 1985). When analyzing an organization's level of autonomy, researchers relate the variable to the company's environment, any outside factors which could or may influence any aspect of the organization, such as its goals, operations, procedures, etc. (Aharoni, Maimon & Segev, 1978). Research indicates that there is a connection between Corporate Social Responsibility, which involves environmental sustainability measures, and innovation within a company; this relationship is mediated by autonomy (Li, Fan, Álvarez-Otero, Sial, Comite, Cherian, & Vasa, 2021). Therefore, this paper will expand on this research and attempt to further develop how autonomy has an effect on a company's environmental performance, specifically on its carbon emissions output, using the self-determination theory.

1.1. Terminology

In order to grasp the main focus and concepts of this paper, it would be valuable to understand the following terms and abbreviations provided in the following table. These terms will be mentioned multiple times throughout the paper, and understanding these will make reading the paper more efficient and easier to read.

Table 1: Important Terminology

Workplace Autonomy (WA)	Although it varies from organization to organization, workplace autonomy refers to the amount of freedom each employee has, specifically relating to how, when and where they can decide to complete their work (Lartey, 2021). In this text <i>workplace autonomy</i> and <i>autonomy</i> are used interchangeably.
Environmental Performance (EP)	Environmental Performance refers to how well a company is performing from an environmental sustainability perspective, given a number of environmental performance indicators (Ruf, Muralidhar & Paul, 1998; Carroll, 2000).
Corporate Social Responsibility (CSR)	Corporate Social Responsibility is defined as a set of self-regulating business actions that hold the firm’s actions accountable in regard to their impact on society and the environment (Nickerson, Lowe, Pattabhiramaiah, & Sorescu, 2022; Knudsen & Moon, 2022; Li et al., 2021a).
Organizational Structure (OS)	Organizational Structure is described as how certain activities are coordinated within an organization or company in order to achieve their objectives (Pugh et al., 1968; Mintzberg, 1981).
Ton of Carbon Dioxide Equivalent Emissions (tCO ₂ e emissions)	CO ₂ equivalent emissions describe the various greenhouse gasses (GHGs) as one quantifiable value and easily compare them to their global warming impact (Brander, 2012). Throughout this paper, the CO ₂ e emissions will be calculated in metric tons, as they are standardized and the analyzed companies throughout this study all reported their emissions in this manner.

1.2. Background and Problematization

The background introduces and gives an overview of important topics which will relate to the main focus of the paper. The subject of sustainability is presented, and then it is further developed and narrowed down to its environmental aspect. Afterwards, background information is presented on workplace autonomy, which leads into an introduction of organizational structures and an important theory relating to autonomy.

1.2.1. Environmental Sustainability

The concept of *sustainability* has grown in importance over the past years, and companies and their managers have therefore implemented Corporate Social Responsibility (CSR) initiatives in order to make the society they currently live in, “sustainable” for the future and contribute

positively to the environment (Samaibekova, Choyubekova, Isabaeva & Samaibekova, 2021). World leaders are being called out by activists like Greta Thunberg to take proper action to address the climate crisis (The Telegraph, 2019), and international organizations are adjusting their guidelines of how they operate in order to promote more ecologically friendly growth (IMF, 2022; OECD, n.d.; UN, n.d.a). For the purpose of this paper, sustainability will follow the definition created by the United Nations Brundtland Commission in 1987: “meeting the needs of the present without compromising the ability of future generations to meet their own needs” (UN, n.d.c, n.p.).

As previously mentioned, the term *sustainability* was first described in the Brundtland report of 1987, and the three pillars or dimensions of sustainability were formed: economic, social and environmental (UN, 1987). The pillars are often seen in the form of a three-way Venn Diagram, with the dimensions intersecting the term sustainability; the graphic is used frequently in academic literature to describe the intersection as what companies and their business goals need to focus on to be completely sustainable (Farrington & Kuhlman, 2010; Purvis, Mao & Robinson, 2019). Furthermore, the Sustainable Development Goals (SDGs), set forth by the United Nations as guidelines for both developed and developing countries to become more sustainable by 2030, explicitly encompass these three pillars (UN, n.d.a).

Growing concerns for the environmental aspect of sustainability relating to climate change have risen in recent years (Giovannoni & Fabietti, 2013), and economists discuss that one should not care for the environment due to its innate value, but in order to preserve resources for future generations (Farrington & Kuhlman, 2010). Contributing greatly to climate change in a negative way are industrial gas emissions caused by human and economic activities (Sovacool, Griffiths, Kim & Bazilian, 2021). Examples of such gasses include carbon dioxide (CO₂), methane (CH₄), nitrous oxide (N₂O), and examples of economic activities that lead to these gas emissions are heat and electricity, agriculture and industry production (EPA, 2022). Additionally, the EPA (2022) mentions that global carbon emissions from fossil fuels have increased dramatically since 1900, having escalated by about 90% and fossil fuel combustion and industry emissions responsible for a 78% increase of total greenhouse gas emissions from 1970 to 2011. Contributing to more than half of the top emitters in 2014 are China, the United States, countries in the European Union, Japan, India, and Russia (EPA, 2022). Fossil fuel emissions were found by the Intergovernmental Panel on Climate Change (IPCC) to be responsible for 75% of global man-made emissions in the 21st century (IPCC, 2001c cited in IPCC, 2005).

When referring to sustainability in this paper, the concept is related to its environmental aspect, not economic nor social sustainability. The *environment* refers to the interaction of all the factors which affect human survival and economic activity, such as the living species, climate and weather, and natural resources (Johnson, Ambrose, Bassett, Bowen, Crummey, Isaacson, Johnson, Lamb, Saul & Winter-Nelson, 1997). Environmental sustainability:

seeks to improve human welfare and SS [Social Sustainability] by protecting the sources of raw materials used for human needs and ensuring that the sinks of human wastes are not exceeded, in order to prevent harm to humans (Goodland & Daly, 1996, p.1003).

Similar to the definition of economic sustainability, environmental sustainability refers to maintaining natural capital (Goodland & Daly, 1996). How can an organization achieve environmental sustainability? It is an act that is easier said than done and requires a strong commitment and engagement from firms across all industries (Balasubramanian, Shukla, Mangla & Chanchaichujit, 2021). Some potential ways companies can reduce their impact on the environment include implementing renewable energy sources or recycling (Lewis & Cassells, 2010; Raar, 2011). However, previous research shows little about what specifically impacts an organization's ability to reduce its environmental impact.

There are many characteristics of firms which specifically impact their environmental strategy, practices, and performance (Balasubramanian et al., 2021). For example, Haladu and Salim (2016) examined how a firm's age and its environmental reporting practices are related, and Faith, Fagbenle, Amusan and Adedeji (2018) studied the relationship between a firm's ownership and its environmental commitment. Furthermore, another important characteristic studied by authors like Vijayvargy, Thakkar and Agarwal (2017) is a firm's size and its implications on environmental performance. All of these general characteristics affect the firm's ability to potentially act in a desired way or form. A larger-sized firm may have a greater amount of capital in order to invest in pollution prevention systems and greener infrastructure and equipment (Younis & Sundarakani, 2019), however, a smaller-sized firm may lack the necessary resources which may prevent environmental practice implementation (Vijayvargy, Thakkar & Agarwal, 2017). Older firms in comparison are found to use more outdated equipment and technology, reluctant to invest or upgrade to new equipment, and this in turn decreases their opportunity to be more environmentally active than newer firms (Darnall, Henriques & Sadorsky, 2010). In regard to a firm's ownership, foreign firms were concluded to have the essential technical and managerial skills, especially in relation to the environment, due to their international exposure and experiences (Albornoz, Cole, Elliott & Ercolani, 2009; Zhu, Cordeiro & Sarkis, 2012). All these company characteristics are possible factors to explain why some firms are more environmentally active or engaged than others.

Previous studies have focused on various aspects which can influence the environmental performance of a firm. Wang et al. (2020) describe in their work what social and economic factors are responsible for environmental performance, and Kassinis and Vafeas (2006) express the pressure coming from stakeholders and how this pressure creates a positive correlation with environmental performance. Other papers discuss what and how environmental performance can influence within society or within the firm itself. de Burgos Jiménez and Céspedes Lorente (2001) write about environmental performance in relation to operations management and how it influences the general strategy and operations performance of the firm. What these articles and

more lack is what more specific internal factors exist that can influence how an organization performs environmentally. This is the key focus of the research throughout this paper, specifically with a focus on employees.

Performing in an environmentally sustainable way is essential for companies, as it is everyone's individual responsibility to do what they can in order to combat climate change. How their goals are achieved relates to different social factors, among them, those at an employee level. Furthermore, the individuals tasked with carrying out the majority of instructions given by their senior management will inevitably be employees. The employees are responsible for carrying out the majority of day-to-day operations. How these instructions are carried out introduces the concept of autonomy.

1.2.2. Workplace Autonomy

Lately, there has been an emergence of greater demand for autonomy from employees within organizations. Following the fallout of the COVID-19 pandemic, there has been a shift toward demand for more remote or hybrid work (Reisinger & Fetterer, 2021). With these changes, workers may therefore choose employers that can accommodate these wishes.

An autonomous workplace has been shown to stimulate innovation and motivation, and employees have been welcomed to be part of this change and share their own ideas (Li et al. 2021a). Motivation and innovation in the workplace, mentioned by Li et al. (2021a) further affect a company's CSR which in turn can lead to a competitive advantage. CSR is not only responsible for making employees innovative, but this relationship is also mediated by autonomy (Li et al., 2021a). For corporate decision makers, it has therefore become imperative to understand the effect autonomy has on performance.

Thus, one must ask, what is autonomy? The concept of autonomy in the workplace and employee autonomy specifically is defined by Franklin M. Lartey as "the ability for the employee to decide on the place, the time, and the way to complete their tasks, thus having a say on the when, where, and how" (2021, p.140). This means that although the task itself is defined by circumstances outside of the employee's control, it can still be an autonomous environment if the approach towards the problem is decided by the individual employee.

One aspect that impacts the level of autonomy for workers in an organization and needs to be discussed is the organizational structure (Pugh et al., 1968; Wollnik & Kubicek, 1981). Gareth Jones defines organizational structure as "the formal system of task and authority relationships that control how people coordinate their actions and use resources to achieve organizational goals" (2013, p.30). It can be inferred that it is to an extent the nature of these authority relationships that dictate the level of autonomy within an organization.

There are many different types of organizational structures, each having its own implications for autonomy. Jacob Morgan (2014) outlines three important types of structures in his work. These

are traditional hierarchies, flat organizations and flatarchies. In hierarchical organizations, information flows downwards from the top of the organization to the employees which reduces innovation, engagement and collaboration (Morgan, 2014). This type of structure can also be said to have a negative impact on the autonomy of employees, as decisions tend to be taken by senior managers without the consideration of the employees (Morgan, 2014). In flat organizations however, there is no top-to-bottom structure because every employee is formally seen as an equal (Morgan, 2014). In these types of organizations, it is largely up to the employees themselves to choose what to work on and in a sense, manage themselves. This type of organization can be said to bolster the autonomy of the employees, in contrast to the classic hierarchical structure (Morgan, 2014). These are two extremes of different organizations and many organizations are located somewhere between the two. The third main type of organizational structure mentioned by Morgan (2014) is the flatarchy which is a mix between the hierarchy and the flat organization. These organizations often employ makeshift teams for specific purposes in order to undertake tasks, though the formal organization can be either flat or hierarchical with varying degrees of structure within the actual ad-hoc team (Morgan, 2014). As such, these types of organizations do not encourage autonomy as much as their flat counterparts, but they do not counteract it as much as their hierarchical counterparts.

Edward Deci and Richard Ryan (1985) originally developed the self-determination theory in their paper *Intrinsic Motivation and Self-Determination in Human Behavior*. In this paper, they discuss that self-determination theory is a motivational theory that argues that when three basic psychological needs (autonomy, relatedness and competence) are met, the probability of good performance increases. They argue that the theory emphasizes two types of motivation: autonomous motivation and controlled motivation. Autonomous motivation refers to motivation from within, where tasks are undertaken because they are found interesting or align with their personal beliefs leading to intrinsic motivation, and controlled motivation comes from the outside such as through compulsion or obligation leading to extrinsic motivation (Deci, Ryan, Schultz & Niemiec, 2015). Self-determination theory argues that it is autonomous motivation that leads to greater performance and proposes that meeting the three basic psychological needs provides the necessary nutrients for this type of motivation to grow (Deci et al., 2015).

1.3. Aim and Objectives

The aim of the thesis is to provide the reader with an assessment about the relationship between the concepts of workplace autonomy and environmental performance. Specifically, the aim of the paper is to evaluate how the environmental performance of multinational enterprises may be affected by the level of autonomy occurring within the company. This is done through several objectives. The first objective is to assess what theories relate to autonomy and what previous research has been conducted about the main factors which relate workplace autonomy and environmental performance. Environmental performance is based on environmental indicators, and the indicator which is throughout this analysis is CO₂ equivalent emissions. The second objective is to identify the importance of this indicator, in order to provide an explanation about

why this indicator is used later on in the analysis. Furthermore, in order to properly assess the relationship between the main concepts, subjective data is collected, about employees' opinions about their workplace autonomy, and objective data is gathered about the corresponding firms' environmental performance, specifically relating to their emissions data. The third objective is to formulate two variables based on the data collections. The final objective, after finalizing the data and establishing the independent and dependent variables, is to forecast what significance the independent variable (level of autonomy) has on the dependent variable (environmental performance).

1.4. Research Purpose

The purpose of this thesis is to deepen the knowledge related to the environmental performance of firms based on how autonomous they act within their organization. By researching related theoretical concepts and performing an extensive literature review, the study expands on current knowledge and establishes how relevant the relationship between workplace autonomy and environmental firm performance has been in the past. The provided analysis and discussion can then help scholars determine further connections, generalizations, and predictions about environmental initiatives undertaken by international firms. This research led to the development of the following research question:

Research Question: *Does the level of autonomy within a company affect the environmental sustainability performance of a company?*

Through the use of Lartey's definition of autonomy (Lartey, 2021) and the previous research conducted about environmental sustainability and performance, multiple hypotheses are developed. These are then used throughout the analysis, with the intention of proving one and contradicting the other. The hypothesis can be seen below:

H₀ = *The level of workplace autonomy within an organization does not have an effect on the firm's CO₂e emissions.*

H₁ = *The level of workplace autonomy within an organization does have an effect on the firm's CO₂e emissions.*

1.5. Delimitations

Throughout this study, it is necessary to clearly define and narrow the scope of the paper. This thesis was written within a short time frame, and therefore gathering the necessary data to analyze was proven difficult. As a result, the scope of the companies which are analyzed are only limited to multinational enterprises; these are companies with an international perspective from which it is reasonably simple to access their emissions data. Secondly, as the term *emissions* can include various forms, the emissions data gathered only includes Scope 1 CO₂e data. This allows for one complete "basket" of emissions to be analyzed, instead of describing each individual form of emission produced by the company. Thirdly, for feasibility reasons, only one part of the

self-determination theory is tested: the autonomy aspect. Instead of investigating multiple aspects of the theory and establishing multiple variables after the data collection is complete, only one independent variable was formulated, which allows for a direct establishment of what part of the theory would affect a firm's environmental performance. Using multiple parts of the theory as independent variables would broaden the analysis and make it difficult to determine which specific aspect of the self-determination theory has an effect on the firm's environmental performance.

1.6. Outline of the Thesis

The thesis is divided into five chapters. Chapter one provides background and problematization information explaining the basis of research and furthermore presents the details about the aim & objectives and purpose of the paper. Chapter two provides research about a relevant theory which will be referenced throughout the discussion. Furthermore, the chapter conducts a comprehensive literature review about environmental performance and workplace autonomy, as well as providing the gap in knowledge to be examined within the analysis. Chapter three describes the methodology of the paper, specifically how the hypotheses will be tested, how data will be gathered, and how the collected data will be analyzed. Chapter four provides an extensive analysis of the finalized data, implementing specific statistical calculations and models, and chapter five, will discuss what the findings discovered in the analysis mean and what they imply for further research. Lastly, chapter six will conclude the paper with the conclusion to the essay.

2. Literature/Theoretical Review

This chapter presents expanded research literature and theoretical concepts. The first section in the chapter is about an important motivational theory entitled Self-Determination Theory. The chapter continues with a presentation of research that has been conducted about organizations and their respective levels of autonomy. Next, previously examined research done on multiple topics relating to business and environmental performance is presented. Finally, a chapter summary is provided, reviewing all the essential details necessary to understand before the analysis begins.

2.1. Self-Determination Theory

Self-determination theory is a metatheory about motivation, first developed by Richard Ryan and Edward Deci in 1985, and consists of several different sub-theories (Deci & Ryan, 1985). This theory focuses on causes for motivation and what it can be influenced by, particularly in a positive setting where there are no external motivators (Deci et al., 2015). As previously mentioned in the last chapter, intrinsic motivation refers to motivation from within, where a task is undertaken due to, for example, the individual finding a task interesting and/or finding that the purpose of the task aligns with their personal beliefs such as a challenging puzzle or volunteer work for a charity (Deci et al., 2015). This theory also argues that it is intrinsic motivation which leads to the best performance when compared with extrinsic motivation (Deci et al., 2015).

The theory further argues for the three basic needs that are required to be met for intrinsic motivation to be present: autonomy, competence, and relatedness (Deci et al., 2015). This is known as the basic psychological needs theory, a sub-theory that is part of the building blocks of different sub-theories that create the self-determination theory (Ryan, 1995). This mini-theory argues that the three needs previously presented are necessary for personal growth, and the lack of satisfaction for these needs can instead stifle motivation because it can lead to passivity and defensiveness (Vansteenkiste & Ryan, 2013). The reason why only these three necessities qualify for this distinction is because they are the only three that have passed the different criteria for classification (Vansteenkiste, Ryan, & Soenens, 2020). In order to qualify, a need must be psychological, essential, inherent, distinct, universal, pervasive, content-specific, directional, and explanatory (Vansteenkiste, Ryan, & Soenens, 2020). The three needs themselves are defined individually within the theory as well (Deci & Vansteenkiste, 2004). Autonomy is defined as experiencing psychological freedom and liberty of one's own will (Deci & Vansteenkiste, 2004). Competence refers to the individual's ability to utilize expertise, expand on their already existing ones, and concerns the beliefs regarding effectiveness and mastery (Deci & Vansteenkiste, 2004). Relatedness is defined as the feeling of connectedness and belonging to others (Deci & Vansteenkiste, 2004). Although motivation can be found in other places, it is when these needs are met that the necessary conditions are available for intrinsic motivation to grow (Deci & Vansteenkiste, 2004).

Another sub-theory of self-determination theory is the organismic integration theory which explains extrinsic motivation (Deci & Ryan, 1985). This theory showcases different types of extrinsic motivation with differing levels of autonomy related to them which are classified as externally regulated behavior, introjected regulation of behavior, regulation through identification, and integrated regulation (Deci & Ryan, 1985). External regulation of behavior concerns actions performed due to either direct external pressure or the direct possibility of reward and is thereby negatively related to autonomy (Deci & Ryan 1985). Introjected regulation of behavior describes behavior when it is regulated by oneself but not truly accepting these regulations as one's own (Deci & Ryan, 1985). These behaviors are often found related to the occasion when motivation comes from maintaining one's self-worth and is more autonomous than external regulation. (Deci & Ryan, 1985). Regulation through identification is even more autonomous and relates to identifying with a goal or other type of outside pressure in a way that makes it important to the individual themselves (Deci & Ryan, 1985). Integrated regulation relates to a type of extrinsic motivation that is as autonomous as extrinsic motivation, specifically where extrinsic pressures are integrated with personal beliefs to the point where they are a part of the individuals' assessment of themselves and of their belief of their absolute needs (Deci & Ryan, 1985). This makes it similar to intrinsic motivation but differs since the objective is pursued due to external causes rather than internal beliefs or enjoyment of the task at hand (Deci & Ryan, 1985). These behaviors can be integrated to become intrinsically motivated, especially in conditions where the need for relatedness and competence is met which can increase motivation and performance relating to these behaviors (Deci & Ryan, 1985).

The last four sub-theories are the relationship motivation theory, referring to the need for relatedness, the goal contents theory, comparing intrinsic and extrinsic goals' impact on motivation, the cognitive evaluation theory which focuses on the factors explaining intrinsic motivation, and the causality orientation theory, which explores differences in motivation between individuals (Deci & Ryan, 1985). These together with the aforementioned cognitive evaluation theory, organismic integration theory, and the basic needs theory are the sub-theories that create the meta-theory called self-determination theory. While these last four sub-theories are also important building blocks of the theory, for the purposes of this study, their impact is limited and they are therefore not discussed more in depth.

2.2. Independence in the Workplace

The purpose of this chapter is to portray what previous research has been done regarding the individual structure within an organization and how the subject of autonomy is therein pertained. Furthermore, a cross-examination between organizational structure and workplace autonomy is provided. Finally, the importance of corporate social responsibility will be explained, and how this concept is implemented within organizations.

2.2.1. Organizational Structure

Organizational Structure is a highly researched stream with different aspects and perspectives that in this part will be elaborated on and further explained how they connect to workplace autonomy. The structural dimensions of an organization can be conceptualized and described by five different stages; specialization, standardization, formalization, centralization and, configuration (Pugh, Hickson, Hinings, & Turner, 1968; Wollnik & Kubicek, 1981; Sandhu & Kulik, 2019). Specialization is about how official duties are spread over different positions within the company, making a position specialized in a certain area (Pugh et al., 1968; Wollnik & Kubicek, 1981). Standardization is about how policies, rules and procedures are created to make the tasks standardized and quicker, this goes hand in hand with the workplace autonomy and a more standardized organizational structure allows for less autonomy (Pugh et al., 1968; Wollnik & Kubicek, 1981). Formalization is almost a part of standardization, but instead of how the rules and procedures are formed, it is about how or if they have been formalized, which means put down on paper to have a clear role within the organization (Pugh et al., 1968; Wollnik & Kubicek, 1981). Furthermore, the fourth stage centralization covers how power is distributed, a more centralized organization has more power at the top executives, as a less centralized organization gives more power to each role (Pugh et al., 1968; Wollnik & Kubicek, 1981). Lastly, the final stage configuration is about how the organization is set up. It is about the vertical distance, the horizontal distance, and workers per manager (Pugh et al., 1968; Wollnik & Kubicek, 1981). As organizational structure often only is referred to as the tree with the linkages between each role, it is actually much bigger than that in academic terms, and further in this paper the organizational structure will cover each of these aspects when referred to as a whole.

Another perspective on organizational structure is given by Henry Mintzberg (1981). He describes five different types of organizational structure, their design, specific attributes and, when they are used (Mintzberg, 1981). Mintzberg (1981) continues by stating that the form of which an organization has is not fixed, and it depends on the age of the organization as well as its size, which in his paper is stated as almost making the same difference. This is seen in the quote “as they age and grow” (Mintzberg, 1981, p.116). The stages given in the paper are: the simple structure, the machine bureaucracy, the professional bureaucracy, the divisionalized firm, and the adhocracy (Mintzberg, 1981). Simple structure is the stage in which most companies start and its features are as its name states, simple. The design of this particular organizational structure is centralized and not very formalized, it is operating in the easiest way possible which means that there are fewer managers and more workers and these are often grouped in a functional structure (Mintzberg, 1981). The simple structure is mostly seen in younger and/or smaller firms which do not need as much formalization and chain of command as the typical larger firm, and often the manager is also the proprietor of the business (Mintzberg, 1981). The machine bureaucracy is a second typical type of organizational structure. This structure is not as common in the smaller businesses as it needs a certain size to be operational, and is therefore more common in older and larger firms, some examples of this type of structure were given as national postal services, steel and other manufacturers (Mintzberg, 1981). Each role in this type of organization is highly

specialized and standardized, there is a high degree of formalization, regulations, and centralization (although not as centralized as the simple structure) (Mintzberg, 1981). The professional bureaucracy is less formalized than the machine bureaucracy and instead of standardizing work, they are standardizing skills (Mintzberg, 1981). This creates an organization in higher need of training for their employees, but it is also less strict and gives room for a more dynamic role for each employee in the organization (Mintzberg, 1981). A divisionalized form is a mixture of professional and machine bureaucracy with a set of machine bureaucracy parts in a bigger professional bureaucracy, when looking at the structure (Mintzberg, 1981). This type of organization needs, by its definition, a much larger organization and is therefore almost only seen in the larger companies (Mintzberg, 1981). Lastly, Mintzberg (1981) also mentions adhocracy. This type of organizational structure is much less formalized than the others, and gives room for more flexibility and adaptation to the operations of a company (Mintzberg, 1981). As shown, the organizational structure is highly connected to autonomy for employees and one type of organization can dramatically impact the perceived and factual workplace autonomy.

2.2.2. Workplace Autonomy

From organizational structure, there is a sub-stream of research that gives more insight into the workplace from another perspective, autonomy. Autonomy is one of the main needs for individuals and is often defined as the power to decide over yourself (Overbeck & Park, 2001; Lammers, Stoker, Rink, & Galinsky, 2016; Li et al., 2021a). This means that the less control another person has over your actions the more control you have. However, there are more layers to autonomy. Autonomy can also be lessened by having less knowledge or skills and therefore create a dependence on other people and as an extension to that, by not being provided feedback for one's actions (Lammers et al., 2016). It has been shown that people can be grouped into two main groups, those with low perceived power and those with high perceived power, and these experience autonomy differently (Overbeck & Park, 2001; Lammers et al., 2016). The ones with higher perceived power have a higher sense of autonomy and the same can be said for those with less perceived power, which in turn makes the ones with lower perceived power then seek situations where they have more power as it is an innate need of a person (Overbeck & Park, 2001; Lammers et al., 2016). For example, when people were put into situations where they could get in a situation with either few or many alternatives, the ones with lower perceived power were more keen to choose the more alternative situation as this gave a higher sense of power and autonomy (Lammers et al., 2016). Putting this into a workplace perspective, autonomy is not about exerting power over others (Li et al., 2021a) and therefore a manager does not necessarily feel more workplace autonomy. Workplace autonomy is not working without supervision or in isolation either, but having a workplace where respect, integrity, and interdependence are key factors and where it is motivated to control the work of one's own instead of having to control the work of others (Li et al., 2021a). It has also been shown that autonomy in the workplace has a positive correlation and linkage to innovation within the company as this type of workplace encourages employees to think and be creative in their work (Li et al., 2021a).

2.2.3. Cross-Examination Between Organizational Structure and Workplace Autonomy

As seen, the organizational structure and autonomy are related, as one type of organizational structure creates an environment where autonomy is preferred or even needed. An example of this is Mintzberg's (1981) definition of adhocracy, where adaptation is key, and there are not too many formalities around how an employee is doing their work. It is also possible to see how the formalization and standardization that is mentioned by Pugh (1968) will change the workplace autonomy as the more formalization a company has, the less power over the tasks each employee has and this will lessen the autonomy that is perceived by the definition made by Li et al. (2021a). The centralization of power also affects an employee's autonomy, as seen by Overbeck and Park (2001) there can be low perceived and high perceived power, and a more centralized organization will take the power away from individuals in the lower parts of the organization and they will have a lower perceived power. This also goes together with Li et al. (2021a) as a more centralized organization with power at the top will give less ability for the employee to control its own work.

2.2.4. Corporate Social Responsibility

Corporate Social Responsibility (CSR) is defined as the set of actions made by a company where the first priority is the good of society and not for the shareholders directly (Nickerson, Lowe, Pattabhiramaiah, & Sorescu, 2022; Knudsen & Moon, 2022; Li et al., 2021a). CSR is becoming more and more relevant for companies and most companies are acknowledging that they need some sort of CSR-plan (Nickerson et al., 2022; Li et al., 2021a). However, Nickerson et al. (2022) state that consumer purchase decisions and willingness to buy is not changed by a company's CSR work. Instead, Li et al. (2021a) find a link to having motivated workers and a company's CSR work, where it is seen as an enabler to get more innovative employees and get a competitive advantage through that. Knudsen & Moon (2022) discusses CSR from another perspective, seeing how it is related to both societal policies and to laws. They found that, even though CSR often is connected to voluntarism, it is more often that CSR actions are because of laws and policies, but that it is framed as a CSR action for the sake of publicity. Nickerson et al. (2022) also looked at a study made by Coca-Cola in 2019 and it was concluded that the most successful type of CSR actions are related to lessening the company's environmental or societal harm. This is because accountability for actions is widely seen as something positive in society, and a company addressing their negative externalities shows accountability and is therefore more accepted (Nickerson et al., 2022).

2.2.4.1. *Corporate Social Responsibility & Organizational Structure*

Li et al. (2021a) looks into CSR and workplace autonomy as enablers of innovative performance in SMEs. In the study they find that CSR is highly linked as an enabler for innovative behavior because this shows that the company is caring, transparent and trustworthy. This in continuation makes the employees more motivated to go beyond their normal working boundary and be more innovative (Li et al., 2021a). Not only is it stated that CSR makes employees more innovative,

but also that autonomy is the mediator of the relationship between them (Li et al., 2021a). That means that autonomy is shown to have a strong connection to CSR, making it directly connected to it and being a mediator between CSR and innovation. As mentioned by Nickerson et al. (2022), environmental and societal harm are the main drivers for negative publicity, and lessening harm is the most successful CSR action. This makes the impact of workplace autonomy on environmental performance a knowledge that could be changing the way companies look upon the bureaucracy within their organization.

2.3. Business and the Environment

This chapter will describe previous research done about environmental aspects and companies' involvement with them. The literature describes the concept of environmental sustainability, followed by how it is viewed from an international perspective. Next the idea is described at an organizational level, which leads into the significance of environmental performance and sustainability within organizations. This chapter concludes with research about how environmental performance can be evaluated, specifically with what indicators can be used and what indicators will be used throughout the analysis of the study.

2.3.1. Environmental Sustainability

The concept of sustainability, as previously mentioned in the introduction, is based on three factors or components (environmental, social, & economic), and the combination of the three concepts is coined as the triple bottom line (TBL) (Crane & Matten, 2007). This term was advocated by John Elkington, and he believed that a business' goal is not only about adding economic value but should also include environmental and social value (Elkington, 1998). Overall, the concept of sustainability is often related to the environmental perspective (Hediger, 1999), but Crane and Matten (2007) find that it is a mistaken conception that sustainability is purely an environmental concept. That being said, this does not imply that the environmental side of sustainability is any less important than the other two perspectives. Generally, most individuals who have not studied the idea of sustainability associate the term with the environment.

2.3.2. Environmental Regulations from an International Perspective

International economic organizations (IEOs) are responsible for sustainable regulations on a more global scale for environmental regulations and performances because a country's long-term macroeconomic performance can be affected by harsh environmental degradations (Gandhi, 1998). This is important as macroeconomic stability is necessary in order to properly protect the environment and certain policies may, under certain conditions, have a negative impact on environmental conditions (Fischer, 1996). These organizations are responsible for improving sustainable conditions at an international level, helping various nations develop through the usage of the SDGs and other programs in order to achieve the goals of the Paris Agreement and the 2030 and 2050 emissions targets (Abbott & Bernstein, 2015; Cormier, 2016; Tosun & Peters, 2018). According to the Paris Agreement, an international treaty on climate change, emissions

exerted in total by countries should not be as extreme as to increase the Earth's global temperature above 1.5°C (UNFCCC, 2022a). Furthermore, IEOs have set a goal to reduce and stabilize the Earth's temperature by attempting to reduce emissions by 45% by 2030 and by attempting to reach net-zero emissions by 2050 (UN, n.d.b).

Almost 10 years ago, the United Nation member states adopted the 2030 Agenda for Sustainable Development, a proposal for the people and the planet in order to live peacefully and prosper economically, now as well as in the future (Schramade, 2017). Emerging from the 2015 meeting were the 17 Sustainable Development Goals (SDGs), uniting both developed and developing countries with the desire, amongst others, to reduce poverty and inequality, improve education and health, and expand economic growth, but by doing so in a healthy and environmentally sustainable way (UN, n.d.a). The IMF uses the 17 SDGs as guidelines for helping its member countries achieve financial sustainability and the expansion of their economy (IMF, 2022). Similar to the IMF, the World Bank follows the SDGs, but it has also developed a program, the Global Program on Sustainability, to incorporate environmental concerns into private and public decisions, by providing policy makers the tools they need in order to include environmental risks when contemplating an economic decision (The World Bank, 2022a; The World Bank, 2022b). As concluded by Schramade (2017), acting sustainable and fulfilling the SDGs, especially those related to the environment or planet, are essential for survival both for the society and companies and the economy. Companies have therefore been changing their internal structures in order to accommodate for new sustainable regulations (Bocken, Morgan & Evans, 2013).

2.3.3. Environmental Sustainability within Organizations

The environmental sustainability challenge is one faced by many organizations in today's era. Specifically, an increased amount of attention has been given to the natural environment due to problems created by the increase of the human population and industrial production as well as an increased consumption of non-renewable resources (Albino, Balice & Dangelico, 2009). As the growing troubles have continued, firms have started to aim at implementing the concerns into their business operations, and through talks with their stakeholders, they have begun to merge environmental sustainability with their business strategies (Dyllick & Hockerts, 2002). Although there may exist diverse approaches of how companies "go green", Bansal and Roth (2000) identify three categories that motivate firms to act sustainable: legitimacy, competitiveness, and social responsibility.

Legitimacy refers to companies following specific legislations and declarations set out by their surrounding communities (Albino, Balice & Dangelico, 2009). These legislations are also structured at an international level, such as through the Kyoto Protocol, a treaty which established that the signing parties are committed to reducing greenhouse gas emissions, especially the human-made emissions which are the main driver (UNFCCC, 2022b). Competitiveness describes how companies can act in a win-win scenario, how they can benefit

themselves while also acting responsible towards the environment (Porter & van der Linde, 1995). Albino, Balice and Dangelico (2009) describe that such benefits can include an increased efficient use of resources, enhanced corporate image, and a superior competitive advantage. The final category of social responsibility originates from firms' social obligations and values they bring to their community (Welford, 1997; Dyllick & Hockerts, 2002). Sustainability-driven companies is the name given to firms that respect and implement such initiatives within their business strategies (Albino, Balice & Dangelico, 2009).

2.3.4. Environmental Performance

Environmental performance is described as the degree to which companies act in an environmentally responsible manner to meet the expectations of their stakeholders (Ruf, Muralidhar & Paul, 1998; Carroll, 2000). Measuring and analyzing the environmental performance of companies within different industries has become the focus of many researchers in recent years (Li, Xu, Rafique, Naqvi & Nadeem, 2021b). A study conducted by the European Union found that the environmental performance within an organization is affected significantly by its production process and usage of energy, and through the adoption of environmental technologies would the output performance be improved (Beltrán-Estevé & Picazo-Tadeo, 2017). The better the environmental performance of a country, the more environmental public goods will be produced, and the level of greenhouse gas emissions will be reduced in order to protect the global natural environment (Tseng, Chang, Lin, Nguyen & Lim, 2020; Romeis, Collatz, Glandorf & Bonsall, 2020; Gupta & Gupta, 2020; Peng & Liu, 2016). It can be concluded that the more effective companies are when implementing sustainability measures, the better the environmental performance of a country will be.

The effectiveness of the implemented measures comes down to how effective the organization is and works when focusing on the environmental impact. Lober (1996) suggests that there are four categories of environmental effectiveness that firms consider: how well the firm meets its goals, how resources are used in order to obtain a competitive advantage, how well information flows and how effective workers communicate with one another, and the level to which stakeholder requirements are met. The main category to consider however, is how well a firm meets its environmental goals, in other words, how well the firm performs environmentally.

How well a firm performs can come down to its internal systems measures. Ilinitich, Soderstrom and Thomas (1998) describe internal systems measures as organizational processes that are designed to, amongst others, enhance environmental performance, using environmental compensation incentives to managers and workers, as well as appointing employees to environmental activities. Furthermore, Wells, Hochman, Hochman and O'Connell (1994 cited in Ilinitich, Soderstrom & Thomas, 1998) find that environmental results are driven by efficient managerial systems. Therefore, it can be inferred that many of the environmental responsibilities and final output decisions are put in effect by the individual workers at the firms they work for.

In other words, one can also describe the environmental performance of a firm as how effective its measures are when implemented due to the final decisions of the employees.

2.3.5. Environmental Performance Evaluation

When planning and evaluating company performance, be it in an economic or environmental context, firms use specific indicators which help measure output; from an environmental perspective there are specific indicator systems companies use to determine its environmental performance, level of exertion, and any costs involved (Jasch, 2000). By benchmarking the different indicators, companies can compare and contrast their past performances with current performances and evaluate their progress to become more environmentally stable (Jasch, 2000). The concept of Environmental Performance Evaluation (EPE) can be defined, based on the International Organization for Standardization (ISO), as:

‘an internal process and management tool designed to provide management with reliable and verifiable information on an ongoing basis to determine whether an organization's environmental performance is meeting the criteria set by the management of the organization’ (Jasch, 2000, p.79).

The Environmental Performance Indicators (EPIs) are used by companies because stakeholders wish to be able to assess that environmental improvements have been put in place, and they then desire to see proof of these developments on a continuous basis (Thoresen, 1999; Azzone, Noci, Manzini, Welford & Young, 1996). Thoresen (1999) suggests that both external and internal stakeholders may use EPIs when evaluating companies. External stakeholders use the EPIs on a macro-level to regulate, control, influence, and minimize risk when valuing company performance, and internal stakeholders use EPIs on a micro-level allowing for uses such as company goal-setting, control and surveillance of product performance, and/or benchmarking and comparing one's performance with that of a competitor (Økstad, 1997 cited in Thoresen, 1999; Thoresen, 1997 cited in Thoresen, 1999).

The metrics which exist to measure the environmental impacts of products and processes are both diverse and similar to one another. Two prominent metrics found in research are the carbon footprint (CFP) and the Life Cycle Assessment (LCA) (Laurent, Olsen & Hauschild, 2010). Finkbeiner (2009) defines the CFP as an indicator which analyzes the impact greenhouse gas emissions have on climate change throughout a product's life cycle, the stages a product goes through from being introduced until it is bought by the consumer. The LCA is similar to the CFP as it also examines all the processes a product or services faces throughout production (Laurent, Olsen & Hauschild, 2010). However, it differs from the CFP, as it evaluates all the environmental implications which occur throughout the cycle, not just those related to climate change (Hauschild, 2005). LCA can therefore be interpreted as the more efficient indicator to analyze environmental impacts companies face throughout operations.

For the purpose of this paper, the CFP is a more prominent metric, but it is what the CFP consists of that is important for this study. The CFP encompasses the six greenhouse gasses found in the Kyoto Protocol, one of which is CO₂ (Laurent, Olsen & Hauschild, 2010). How much carbon a company emits depends on several factors: its industry, its position in the value chain, and company-specific factors, such as its product portfolio (Hoffmann & Busch, 2008). When examining specific metrics to reduce greenhouse gas (GHG) emissions, it is necessary to distinguish the direct and indirect emissions (Hertwich & Wood, 2018), which are further separated into different scopes. The table below demonstrates the distinction characterized by Hertwich and Wood (2018):

Table 2: Scope Emissions

Scope	Scope Explained
Scope 1	Emissions produced directly by the organization, specifically those related to a certain activity or process Example: the combustion created by fossil fuels in furnaces
Scope 2	Indirect emissions created through the generation of activities such as electricity, steam or fuel
Scope 3	Other indirect emissions generated throughout a company's value chain Example: emissions caused through the commuting of employees or the usage of products that have been sold

Another important term relating to carbon emissions and greenhouse gasses are CO₂ equivalent indicators (CO₂e). Carbon dioxide emissions are often used to replace the term greenhouse gas emissions, but this is not true, as greenhouse gasses include more than just CO₂ (Brander, 2012). As previously mentioned, the Kyoto Protocol recognized six greenhouse gasses, one of which is CO₂, and as the Protocol defines a “basket” of gasses, it was further established that countries would be able to reduce their total amount of emissions by combining emissions for the range of gasses, bringing out a so-called “CO₂ equivalent” (CO₂e) (Wigley, 1998). Prairie, Alm, Beaulieu, Barros, Battin, Cole, del Giorgio, DelSontro, Guérin, Harby, Harrison, Mercier-Blais, Serça, Sobek and Vachon (2018) and Grasset, Sobek, Scharnweber, Moras, Villwock, Andersson, Hiller, Nydahl, Chaguaceda, Colom and Tranvik (2020) establish that the CO₂ equivalent can be used to quantify how many total greenhouse gas concentrations are emitted into the atmosphere. The CO₂ equivalent is therefore useful as it groups the different greenhouse gasses into one

common quantifiable unit, and it allows for an easy comparison among the different GHGs in terms of their total global warming impact (Brander, 2012). The CO₂ equivalent level indicator is what will be analyzed throughout this study, specifically how the level of autonomy with a firm affects the firm's level of CO₂ equivalent emissions produced.

2.4. Development of Hypothesis

The hypothesis of this paper was constructed from the findings in the literature review about environmental performance, corporate social responsibility and its connection to autonomy. By reviewing Deci and Ryan (1985) self-determination theory together with Li et al. (2021a) findings, a hypothesis was made that environmental performance and level of autonomy are related, specifically indicating that the level of autonomy in a firm affects the environmental performance of that firm. The hypothesis is stated below:

H₀ = *The level of workplace autonomy within an organization does not have an effect on the firm's CO₂e emissions.*

H₁ = *The level of workplace autonomy within an organization does have an effect on the firm's CO₂e emissions.*

2.5. Chapter Summary

The literature review of this study is designed to establish what previous research has been conducted relating to the relationship between workplace autonomy and a firm's environmental performance. The theory of self-determination is a theory which can be used to explain the motivation of workers, specifically the intrinsic motivation. Previously established research showed that intrinsic motivation leads to a firm performing well, and one of the three requirements necessary for intrinsic motivation to exist in the workplace is the concept of autonomy. Autonomy was defined as the power for an individual to decide for oneself what, where and how to complete their work assignments or projects. The level of autonomy within a firm relates back to the organizational structure of the firm, and this structure is what leads to individuals acting creatively and more innovatively. Furthermore, autonomy is the concept which acts as a mediator between corporate social responsibility and innovation. Acting socially responsible can be further interpreted as how environmentally sustainable a firm acts. This is a challenge faced by many organizations in today's era. Measures and metrics are taken and used by the firm in order to establish how the firm performs in regard to the environment, i.e. how much impact (good/bad) it has. These measures are also known as Environmental Performance Indicators, and they can be used to indicate the amount of emissions, which can vary in scopes, a firm produces. One very important indicator is called the carbon dioxide equivalent indicator, which will be used for this study, as it groups the total amount of greenhouse gasses into one quantitative number. These metrics are also used by stakeholders to monitor how the firm is performing. The final performance was researched to be affected by the organizations' internal system measures, i.e. what measures are put in place for the firm to follow or how autonomous can the workers act within the organization.

3. Methodology

This chapter introduces the method used for answering the research question and hypothesis. It describes the reasoning and arguments as to why this method was chosen and how it was applied. First, the research approach and research design are presented to give an overview of the general method, leading into more details. The details include the method on how data is collected for the analysis, how the sampling is conducted, and how variables are constructed to make them comprehensible and comparable. The chapter continues to move towards showing what impacts the results in the validity and reliability, and finally the limitations of the thesis are presented with its weaknesses and how they are accounted for.

3.1. Research Approach

It was important to select a specific and precise research approach while conducting the research and preparing the analysis. There were two choices which had to be made: choosing between an inductive or deductive approach as well as a quantitative or qualitative analysis. The following two sections provide argumentation for why a deductive theory approach and a quantitative analysis research approach were selected.

3.1.1. Deductive Theory Approach

Bryman and Bell (2011) describe two methods to follow or use when conducting academic research in a business context: a deductive or inductive approach. A deductive approach discusses the relationship between theory and research, by conducting research in a manner that the research relates back to the original hypothesis/hypotheses proposed based on a specific theory (Bryman & Bell, 2011). This is the research approach which was followed throughout this study in order to test the hypotheses.

There are two main areas of research, autonomy and environmental performance, that were investigated in this paper which filled the original gap in knowledge in order to create a new theoretical understanding. Additionally, before conducting the actual study and collecting data, multiple theories and frameworks were investigated to obtain a background of knowledge that relates to the study. Based on the self-determination theory and its description of autonomy as one of three basic needs which can provide an increase in performance, it was believed that this relationship would extend beyond that of the singular worker and extend into environmental performance as well. Therefore, there was reason to believe that the level of autonomy had an impact on the environmental performance of a firm. The main research and data collection was based on current developments within the business environment, and furthermore, based on the background research conducted, two hypotheses were developed.

3.1.2. Quantitative Analysis Research

When collecting data, there are two strategies to do so: quantitative and qualitative research methods (Bryman & Bell, 2011). A quantitative research strategy often implies the collection and analysis of numerical data (Bryman & Bell, 2011). Furthermore, a quantitative study also

involves a deductive approach to investigate the relationship between a theory and research (in other words, this type of study will test a theory or multiple theories) (Bryman & Bell, 2011). This study conducted a quantitative data analysis in order to properly investigate the complexity of the research topic and the research question.

When deciding how to best go about establishing the relationship between an organization's level of autonomy and its effect on its environmental performance, specifically based on the company's emissions, it was concluded that conducting a quantitative study would result in the best findings. Furthermore the data which was collected came from a wide range of companies, and quantitative research is more generalizable, allowing for an investigation into casual relationships. After following a quantitative study, the numerical data collected was used to discover patterns and test general relationships between the variables. A quantitative study is also best when used in either a regression or correlation research, as was the focus of this study, discovering the effect the level of a firm's autonomy has on the firm's environmental performance. Following a correlation analysis would determine the linear significance between the two variables of the level of autonomy of a firm and the level of environmental performance produced by a firm. It would help measure how strongly correlated the variables are and if their relationship were positive or negative. As autonomy relates to the level of independence an employee has when working in an organization, the best method to find the autonomous perception of employees would be to ask them through a survey. It would be important to be aware if the employee(s) has/have a managerial position because then the insights might skew the results. However, for this study, the target group is managers as the perspective from them is more of the overview and not of the individual. Even though having several employees from each company being surveyed would give a more accurate result, the scope of this thesis did not allow for that. Further details of how the survey was conducted and carried out, as well as what questions were asked can be found in the upcoming chapters.

3.2. Research Design

In the Aim and Objectives Chapter, it is stated that data was collected and studied based on two variables: the level of autonomy of the company and their corresponding Scope 1 CO₂ equivalent emissions (CO₂e). For this type of research, a cross-sectional research design was the most appropriate one as, according to Bryman and Bell (2011), this type of research design "entails the collection of data on more than one case ... at a single point in time in order to collect a body of quantitative or quantifiable data" (p.53). As the hypothesis and objective show, the study was not conducted over a period of time, and there are two quantitative variables that were analyzed, with multiple observations each. The observations were companies, and each company is connected to an individual data point within both variables. This type of research design was the most suitable one for survey-based data collection according to Bryman and Bell (2011). This type of design is used for patterns of association (Bryman & Bell, 2011), which means that through the application of this design it was possible to establish if there was an association (connection) between the level of autonomy and the Scope 1 CO₂e-emissions.

There are some difficulties with this design that would have an effect on the conclusion. The main setback is that even though there is a shown correlation between the variables, this type of design would not be able to show a causal relationship between the variables (Bryman & Bell, 2011). This means that the design showed some correlation between the two, but there is no possible way to say if the relationship was due to the autonomy being higher than emissions are or if it is because of other factors not within the scope of this study.

3.3. Data Collection Method

After finalizing which research approaches and what research design would be selected, it was crucial to determine how to properly collect the data necessary to conduct the analysis. The data collection is important as this is what will be used in order to properly test the hypothesis. The first subchapters describe how the variables, which are the center of the analysis, were constructed and what sampling techniques were used. The following subchapters describe how the actual data was collected, specifically how and why a survey method was used to gather data for the independent variable and why company reports were gathered to find the emissions data.

3.3.1. Sampling Techniques

According to Bryman and Bell (2011), the most common form of sampling used throughout the field of business and management is convenience sampling. They define that convenience sampling is “one that is simply available to the researcher by virtue of its accessibility” (p.191). In order to collect data for the independent variable, a survey was sent out to accessible managers at different companies across various industries, and therefore the convenience sampling technique was the most efficient form. Furthermore, the manner of collecting the emissions data, for the dependent variable, would be based on accessibility as well, as not all company reports are disclosed to the public. The following sections will describe how the actual data for the variables will be collected.

The survey was created through Google Forms, due to its straight-forward and easy to use nature for both the creator of the survey and for the respondents as well. Users can access the questionnaire by clicking a virtual link. All questions were designed to be mandatory to answer, so as to avoid the submissions of any incomplete surveys. After finalization, the survey was sent out to Swedish managers and executives at multinational enterprises. These respondents were found through various means such as LinkedIn, company web pages, and direct contact with the companies themselves. The respondents were then contacted by email, either one provided by the company themselves or one found by the common `firstname.lastname@company.com` email formula. Moreover, the survey was also published on LinkedIn through the account of one of the researchers and thereby open to the general public. Once the survey was completed, there were a total of 62 respondents, some from the same company, and some from non-multinational enterprises which made it necessary to omit those before collecting the emissions data. In total, 33 respondents from 31 companies were used for the final analysis.

3.3.2. Survey Structure

The survey consists of nine questions in total, and there is a combination of free response, multiple choice, and Likert scale questions. The first three questions were designed in order to obtain background information of the respondent: what company they work for, where the company was originally founded, and if the respondent has a managerial position. The remaining six questions, with the majority relating to the respondent's perception of autonomy within the company as well as one question asking about the company's environmental initiatives, were structured in the Likert scale format and the final question designed in a multiple choice, "Yes or No", format. The Likert scale provided the respondent with 4 options as responses (1 = To a very low extent & 4 = To a very high extent). The Likert scale was selected because it is one of the most common questionnaire forms in order to measure attitude (Bryman & Bell, 2011). Seeing as the majority of questions were intended to question how autonomous the organizational structure is within a company, the questions themselves were justified by relating them back to the definition of autonomy, with many directly relating to Lartey's definition of how, when, and where to work (Lartey, 2021). Questions four through six specifically related to the definition as seen below:

Q4: *"To what extent can employees at your company choose from where to do their work? (i.e. can choose to work remotely)"*

Q5: *"To what extent can employees at your company choose how to do their work?"*

Q6: *"To what extent can employees at your company choose when to do their work? (i.e. employees can plan their own work day)"*.

Furthermore, questions seven and eight asked about the state of autonomy within the company, drawing inspiration from the self-determination theory and its definition of autonomy as experiencing psychological freedom and liberty of one's own will (Deci & Vansteenkiste, 2004). This definition is partially addressed to an extent by the questions related to Lartey's definition of autonomy. To further address the definition, the questions asked if employees have the freedom to choose and govern what to work with and provide a clarifying aspect of self-governance respectively, thus, to further relate to psychological freedom and liberty of one's own will. The questions are seen below:

Q7: *"To what extent can employees at your company choose what to work with?"*

Q8: *"To what extent do managers at your company trust their employees to undertake their tasks without constant guidance?"*

The final question was designed to ask if the employee knows of any initiatives that are currently being undertaken by the company in order to reduce their emissions output. This question would infer that the level measured in the analysis may have a long-term decrease which may improve their standing over time. The full survey can be found in Appendix A.

3.3.3. Primary Data (Level of Autonomy)

In order to research the level of autonomy amongst companies and how it varies between them, a survey was conducted to start gathering data. Utilizing a survey-based method was seen as the most time-efficient and cost-effective process to collect large amounts of responses in a relatively short period of time (Burns & Burns, 2008). This is because the survey-based method of data collection requires less time per response than alternative methods, such as interviews. The target demographic for the survey are managers that work at multinational enterprises (MNEs) such as Ernst & Young or Mercedes-Benz. These were chosen because MNEs often are bigger than their domestic counterparts with greater production volumes, segmented production leading to increased transportation emissions and often are market-leaders. Thereby, the greater impact of any strategy to tackle emissions should be found in MNEs. Furthermore, this to an extent, eliminates part of the variance between firms and, in theory, should lessen cultural differences as they are MNEs. Thereby they need a global mindset to a greater extent than domestic competitors. However, it must still be taken into account that an influence from outside factors such as culture and industry is never totally eliminated. The survey then defines how the level of autonomy varies from firm to firm and provides a control variable in order to further define how the level of autonomy of the companies affects their environmental performance.

3.3.4. Secondary Data (Environmental Performance)

The survey was sent out in order to collect data about the level of autonomy within multinational enterprises. In order to collect data relating to the second portion of the research question, the environmental sustainability reports and other sources of self-reported emissions of CO₂ equivalent data were examined. CO₂ equivalents were chosen because, as mentioned in the literature review, they group multiple greenhouse gasses into one quantifiable unit and allow for a straightforward comparison of the impact the different GHGs have on the environment. Self-reported data was chosen for feasibility reasons. Furthermore, as there are three different scopes of emissions, it was decided to only collect data from Scope 1 CO₂ equivalent emissions. Scope 1 emissions are those which come directly from the company or organization and do not relate to any indirect emissions that are produced throughout the product or service process, such as electricity. Furthermore, data relating to the number of employees working at the firm and whether the firms have their own manufacturing complexes was collected. Defining if the firm has manufacturing facilities was necessary in order to conclude in the analysis if the emissions that were produced could be due to their corresponding manufacturing plants and thereby be a product of the fundamental characteristics of the product rather than the operating procedure of the company. Additionally, as the investigation into the different sustainability reports was carried out, it was established that some firms either did not have an accessible sustainability report, nor was there another available way to gather the emissions data. Moreover, as the general goal is to lower emissions within a company, a lower value means better environmental performance.

3.3.5. Construction of Variables

When conducting a quantitative study, there are many considerations which have to be made. Among these considerations is deciding what variables to use throughout the analysis and how to classify these variables, as the type of variables will lead to what type of analysis will be conducted (Bryman & Bell, 2011). For the purpose of this study, one primary variable and one secondary variable will be used. The two variables are also classified as being the independent or dependent variable. Seeing as the hypotheses are testing if the level of autonomy within a firm has an effect on the firm's Scope 1 CO₂e emissions, the level of autonomy is classified as the independent variable and the latter is determined as the dependent variable. The level of autonomy variable is labeled as independent because this variable will be used to investigate if it has an effect on another variable, for this paper, the Scope 1 CO₂e emissions variable, which was divided by the total number of employees in the firm. This was chosen as a "size equalizer" in order for the result to not simply state that larger companies emit more CO₂e. This means that a lower value of the variable shows better environmental performance. Although, because of the "size equalizer" there is the aspect of the number of employees having an effect as well. While other possibilities were considered such as revenue and profit, they were deemed to be even more industry dependent than the number of employees and thereby not chosen. This also ties back to looking at the autonomy of individual employees. The emissions variable is classified as dependent, as it will be used to see if it is *dependent* on another variable. The level of autonomy was more specifically designed based on Questions 4-8 of the survey:

Q4: *"To what extent can employees at your company choose from where to do their work? (i.e. can choose to work remotely)"*

Q5: *"To what extent can employees at your company choose how to do their work?"*

Q6: *"To what extent can employees at your company choose when to do their work? (i.e. employees can plan their own work day)"*.

Q7: *"To what extent can employees at your company choose what to work with?"*

Q8: *"To what extent do managers at your company trust their employees to undertake their tasks without constant guidance?"*

Questions 4-6 refer back to Lartey's definition of autonomy, relating to the ability of employees to choose where to work, when to work, and how to go about their work (Lartey, 2021). They also tie in with the self-determination theory's view of autonomy as a psychological freedom and the liberty of one's own free will (Deci & Vansteenkiste, 2004). The definition of the self-determination theory is further expanded upon in Questions 7 and 8 in order to capture its view to an even greater extent. In the construction of the variable, these questions are all seen as equally important, and the variable is constructed by taking the average response value (1-4) of the respondent on each of the individual Questions 4-8.

For the additional secondary variable, the last question of the survey, Question 9, asked if the managers were aware of any ongoing initiatives taken by the company to lower its emissions. The question gave the alternatives “Yes”, “No”, and “Don’t know”. This was then used to create a variable to further deepen the knowledge about how information-sharing, concerning environmental activities within the organization, may impact emissions.

Workplace Autonomy

$$WA = avg(Q4 - Q8) = \frac{Q4+Q5+Q6+Q7+Q8}{5}$$

Environmental Performance

$$EP = \frac{tCO_2e-emissions (Scope 1)}{numbers\ of\ employees}$$

Furthermore, the two variables can be categorized as an interval and a ratio variable. The independent variable is allocated as an interval variable. Because the data for this variable was collected through a survey, specifically with the use of Likert scale questions as will be explained later, and it is assumed that the distance between the categories is equal, the variable is therefore classified as an interval (Bryman & Bell, 2011). The dependent variable, on the other hand, is considered a ratio variable, an interval variable with a fixed-zero point (Bryman & Bell, 2011) because currently it is not possible for firms to have negative emissions data. Classifying the two variables as independent or dependent and as interval or ratio, is crucial in order to properly collect the data, which is necessary before conducting the analysis.

3.4. Data Analysis

After the data collection was complete, all the responses from the survey were graphed in an Excel chart. When the sample size is greater than 30, statisticians confirm that this size will prove that the mean of the sampling distribution is approximately normal (Berenson, Szabat, Stephan & Levine, 2020). Therefore, this sample size will be enough to facilitate a result that is likely to mirror or to closely follow the result for the population as a whole given its sample size of >30, which is showcased by the total 31 respondents as being enough. In order to establish the internal consistency of the main data questions (Q4 through Q8), a Cronbach Alpha Test was conducted. After establishing that the questions were internally consistent with one another, indicating that they test the same aspect, the average value of the responses was taken in order to construct the independent variable level of autonomy.

In the Excel document, after gathering all the company and emissions data, a formula was inserted in order to establish the amount of CO₂ equivalent emissions which were generated per employee of the company. This calculation was found by dividing the ton of CO₂e emissions by the total number of employees of the firm, both generally provided by the company's sustainability report. After establishing the number for every respondent company, the data was developed into the dependent variable.

The calculations of the data analysis were done using the SPSS statistical tools. The Excel document containing all the constructed variables was imported and correctly categorized as the type of variable. After the Cronbach's Alpha test yielded internal consistency, the autonomy variable was selected as the independent one and the tCO₂e emissions per employee was put as the dependent variable in an analysis of variance (ANOVA) test. This means that the calculation tested if the level of autonomy could predict a company's emissions. The ANOVA test yielded a p-value of 1.839 which indicates that the results were not statistically significant as it surpassed the value of 0.05. Thereby the results proved that a regression analysis would not be feasible, meaning that a model could not be created to predict emissions through autonomy, and therefore a correlation analysis was carried out together with descriptive statistics instead. The correlation analysis involved two major parts: scatterplots made in Excel and a Pearson Correlation Analysis made in SPSS. The scatterplots used the same variables as the ANOVA-test, and here, a trendline was inserted together with a formula for the trendline and an R² value. The trendline was put in the graph to better visualize the relationship between the observations, and the R² was provided to give information about how strong the relationship is. The Pearson Correlation, which was made in SPSS, shows if there is a positive or negative correlation between the variables, as well as the significance of the relationship.

All calculations for descriptive statistics were made in SPSS. The analysis was divided into two sections to better understand the sample. The first section included the full sample and showed the minimum-, maximum-, and average value, as well as the standard deviation for the variables. The second section shows the same values, but the sample was divided into manufacturing or non-manufacturing companies before calculations. The categorization was based on whether the company had manufacturing in its value chain or if it purely had a service-based offer. This categorization was done to better understand the dataset, as manufacturing in many cases involves a higher output of emissions for a company and this may skew the results.

3.5. Validity & Reliability

The validity and reliability of the survey relates to who the respondents were, why the questions were structured in their specific way, and why and how the data results were finalized. In order to assure that all the responses gathered from the survey are reliable, the survey was either sent by email to managers of the company directly, or it was shared on LinkedIn, a professional network. This guaranteed that the responses came from our target group and not from respondents which would invalidate the survey. Furthermore, the questions were structured in a specific way in order to remain in accordance with what is asked in the research question. The majority of the questions which were asked, relate back to the definition of autonomy, constructed by Lartey (2021). Lartey is a senior researcher, having published multiple peer-reviewed journal articles, such as his work in the *Journal of Human Resource and Sustainability Studies*. From his definition, as well as from the structure of the questions, the independent variable found can be considered valid. In order to ensure that the emissions data

results were accurate, after the invalid responses were deleted, the CO₂e emissions data and employee count was collected only from the companies' sustainability reports, taken directly from the company websites. This guarantees that the results have not been tampered with, as they are from a reliable company report, and can therefore, be interpreted into one dependent variable.

In order to determine if the actual survey responses, from the different company managers, can be legitimized as trustworthy forms of data, the Cronbach Alpha test was run through SPSS. The alpha variable was a value established greater than 0.7, which proves that the main survey questions asked are a reliable form to gather data. From this outcome, it was unnecessary to remove any outlying questions which would provide unreliable results. As this study can be recognized as both reliable and valid, there are some limitations, as with any study, which will need to be discussed.

Given this finding of a significant Cronbach Alpha and the sample size of >30, it is likely that these results mirror that of the overall population. Any further study would replicate the results found here. What can also be said is that, should another study focus on a specific subset of the population such as multinational energy companies or multinational consultancy firms, then the result may differ as the context has then changed.

3.6. Limitations

As with every study, there are limitations to this one as well. One group of limitations is regarding the collection of emissions data. This survey focuses on the emissions CO₂ equivalents in Scope 1. This focus on CO₂ equivalents potentially ignores other types of environmental performance such as oceanic pollution, toxic wastewater, and poisoning of subsoil water. Thus, this paper can be said to measure the emissions performance of the firms but not the entire environmental performance as other factors remain unexplored. However, CO₂ equivalents still capture a large portion of the performance and the information is more readily available to the general public.

Furthermore, all the data utilized regarding emissions was self-reported by these companies themselves which could impact how reliable these numbers are. These companies have an interest to portray themselves as lesser emitters than they truly are for better publicity but also some may face taxation regarding emissions which could financially incentivize them to under-report their emissions. However, no reasonably priced sources were found available that could portray that data in an accurate way. If future researchers have access to such data, they would do well to test the validity of the self-reported data.

Furthermore, only Scope 1 greenhouse gas emissions were measured, which potentially excludes large portions of a firm's true contribution towards global emissions. Consider a company that outsources its manufacturing of a highly carbon intensive good, the emissions from this

production will not materialize in Scope 1 which can thus appear to reduce their carbon footprint as measured by this paper. This however was done as both Scope 2 and Scope 3 leave greater room for interpretation which can cause lesser validity of the result.

The sample size and the sample size per company also potentially causes the reliability of the results to be impacted negatively. The 31 companies that have responded to the survey do create a sample size that falls in an acceptable category for statistical analysis but the margin is slim and some problems with likelihood of the sample mirroring the population at large still remain. Another problem is that the majority of companies only had one respondent answer for them. This can cause significant problems as the individual person's bias, knowledge of the organization, or situation may differ from the company at large which in turn can create a result that does not mirror the reality of autonomy at the company, creating an unreliable data point. However, it is not feasible to find more than 30 respondents per company and still find more than 30 companies with the time and resources available at this time. Thereby, compromises needed to be made, and it was decided to focus on expanding the number of companies rather than the number of respondents. Future researchers with access to either more time or greater resources may be able to create a more reliable result by surveying a greater number of respondents at each company.

As for the chosen variable of autonomy in relation to self-determination theory and why not all three basic needs are tested, measurement of all three psychological needs would create a question that is impossible for a single paper to answer and a single variable is thus isolated. Potential future studies with greater resources and time may be able to conduct such an analysis but for a paper with this limitation of time and scope, such a test would be unfeasible.

Another risk related to this is related to the respondents and it is that some representatives might actively try to make their own company look better than it is in regards to autonomy and thereby willingly distort the result. Those surveyed were managers and/or executives at their firm and may thereby have an inherent interest to portray the company in a good light to the outside world.

Additionally, there are inherent limitations involved in a deductive, quantitative research approach such as the one in this essay. One such limitation is that there is a lack of depth of reasoning in the responses. Respondents only answer the questions asked by the researchers to the ability made possible by the researchers. In this study for instance, some respondents might have had more to say regarding autonomy at their workplace but were unable to share their insights given that they were only allowed to answer with a number. Thus, nuances, such as situational differences when autonomy differs relating to tasks and the particular employee, are lost. Furthermore, the “why” of the answer is lost completely. From the responses it is possible to see what the respondents answered but not why they chose their answer which is an important component to better understand the subject matter. Such depth of knowledge however could be reached through further research, in particular through case studies of individual firms. The

deductive approach also presents weaknesses, most clearly in the way that it reduces the possibility of an open road towards the findings of the essay. Using a deductive approach, this essay will seek to answer whether a hypothesis is true or not which limits the scope of possible findings to either find that the hypothesis and the assumptions of the essay hold true, or that they do not. Future research focused on an inductive approach however could explore this further and thus provide further insight.

3.7. Chapter Summary

In this chapter, the method in which the objectives of this essay would be met were introduced. The research approach, utilizing a deductive and quantitative approach, was described and justified. It was found that a cross-sectional design would be the most beneficial to find whether a relationship between the variables existed or not. As for the method in which the data would be collected, it is explained how the variables were constructed, with why our dependent variable of environmental data was CO₂e emissions and how the definitions of autonomy were utilized to construct the independent variable of workplace autonomy. It also explained how usage of sustainability reports was due to feasibility concerns and why only Scope 1 emissions were chosen. The sampling method, utilizing a mix of both direct messaging of managers at multinational enterprises, as well as posting a link to the survey on LinkedIn, was also showcased. Closely related to the survey structure were the definitions of autonomy, given to us by Lartey, and the self-determination theory, which influenced how the survey questions were structured. How the analysis was carried out was explained, and due to the low value of the F-stat, the idea of a regression analysis had to be abandoned and a correlational study was conducted instead. Lastly, the validity, reliability, and limitations of this study were discussed and the result found that while many aspects were credible and strong, there were several limiting factors which reduced the reliability of this study.

4. Results

This chapter presents the data that was collected, shows calculations, and tables and graphs to visualize the data for the purpose of analyzing it. The structure of the chapter is ordered in the same chronology as the data is analyzed, starting with reliability statistics of the level of autonomy, moving on to regression and then correlation plots and additional graphs and tables with findings.

4.1. Reliability

For the reliability of the questions about workplace analysis a Cronbach's Alpha test was done to measure the internal consistency, giving the results in *Table 3*.

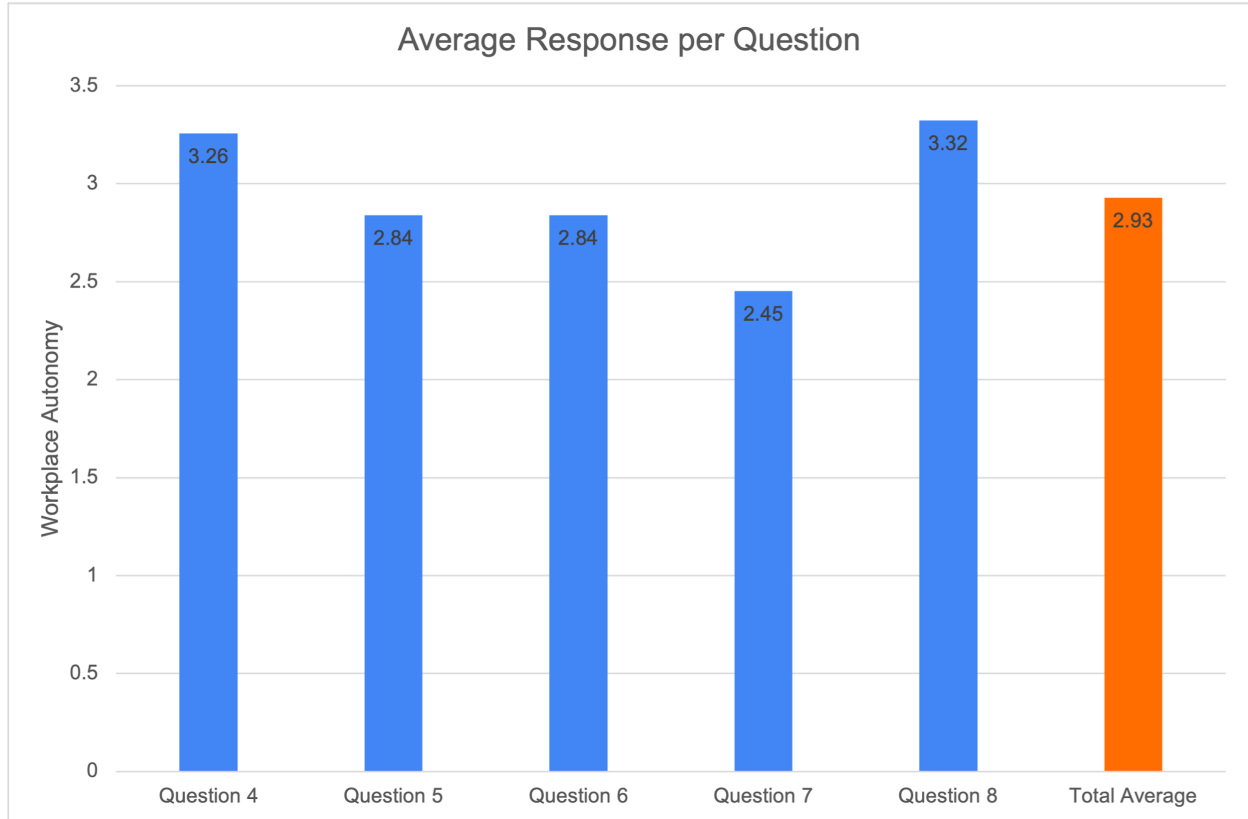
Table 3: Internal Consistency

Internal Consistency	
Cronbach's Alpha	N of Items
0.742	5

The questions analyzed were Question 4 to Question 8 in the survey, all designed to touch upon workplace autonomy through different perspectives. Cronbach's Alpha for the data set came out as 0.742 which is greater than 0.7, and therefore the questions are all asking about the workplace autonomy and no question needs to be taken out of the analysis.

Graph 1 shown below gives the averages per question for the entire sample. Question 8 is the one with the highest average, the question was stated "To what extent do managers at your company trust their employees to undertake their tasks without constant guidance?", and the lowest is question 7, which follows "To what extent can employees at your company choose what to work with?". Question 7 is the only one of all questions on the lower half of the scale, all other averages are above 2.5 which is the midpoint between 1 and 4. This could be due to the specialization of the workforce as described by Pugh et al. (1968). This relationship is expanded further in the next chapter.

Graph 1: Response Mean per Question



4.2. Regression

After having measured the internal consistency of the variable for autonomy, the two variables were put into a linear regression to see if it was possible to create a statistically significant model for how the two variables are related. The ANOVA test shows a F-stat (p-value) of 1.839 as seen in *Table 4*. For a model to be significant, this number has to be below 0.05, which means that it is not possible to create a linear regression model from the gathered data nor reject or accept our null hypothesis. Instead, alternative methods will be used to show how these two variables might have a relation. It could be possible that this is due to the composition of our sample which is neither isolated as national culture nor industry. These variances could greatly influence the result and produce a situation where the controlled environment of an analysis is no longer controlled.

Table 4: Analysis of Variance

ANOVA						
Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	31.167	1	31.167	<u>1.839</u>	.186b
	Residual	491.477	29	16.947		
	Total	522.645	30			

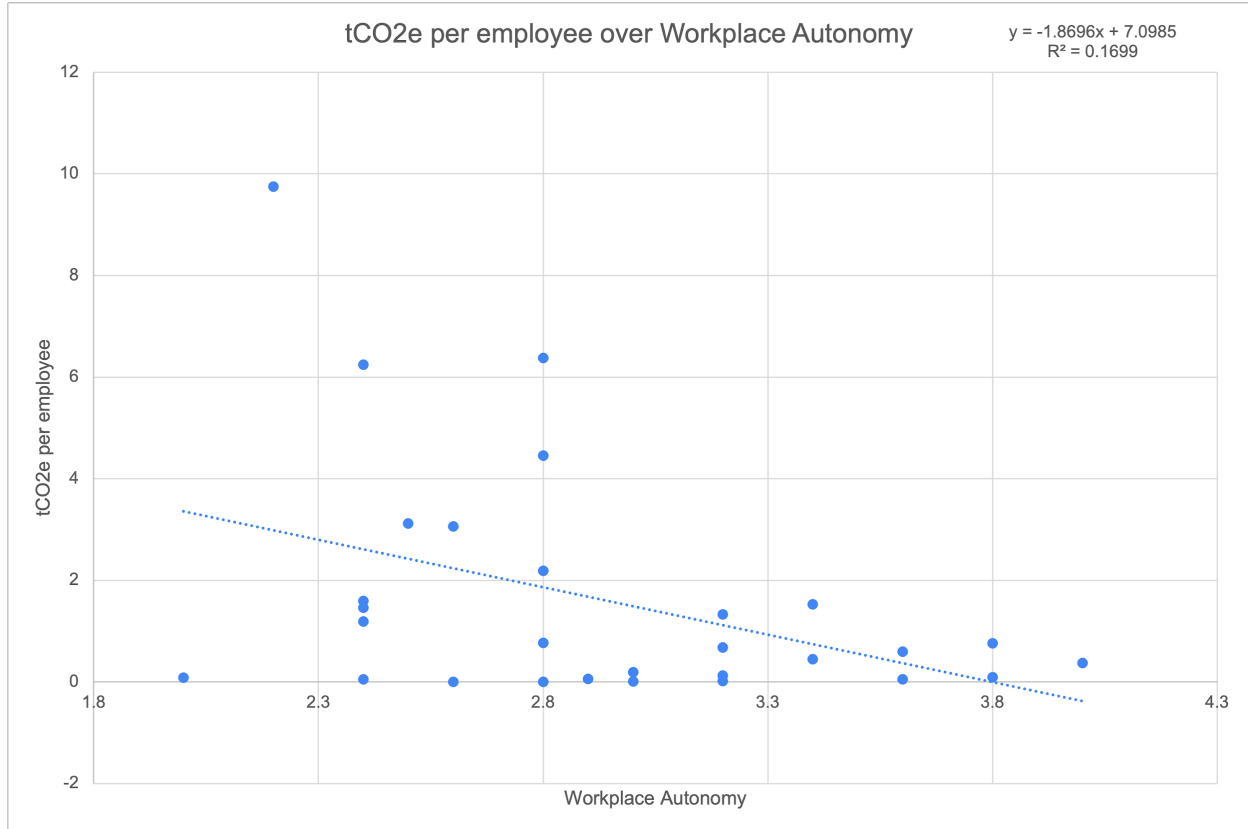
a. Dependent Variable: CO₂e/employee

b. Predictors: (Constant), Workplace Autonomy

4.3. Correlation

Since the ANOVA output did not give a significant model to show the relationship between the variables, *Graph 2* was made to visualize how the two variables look on a scatter plot and how they are related.

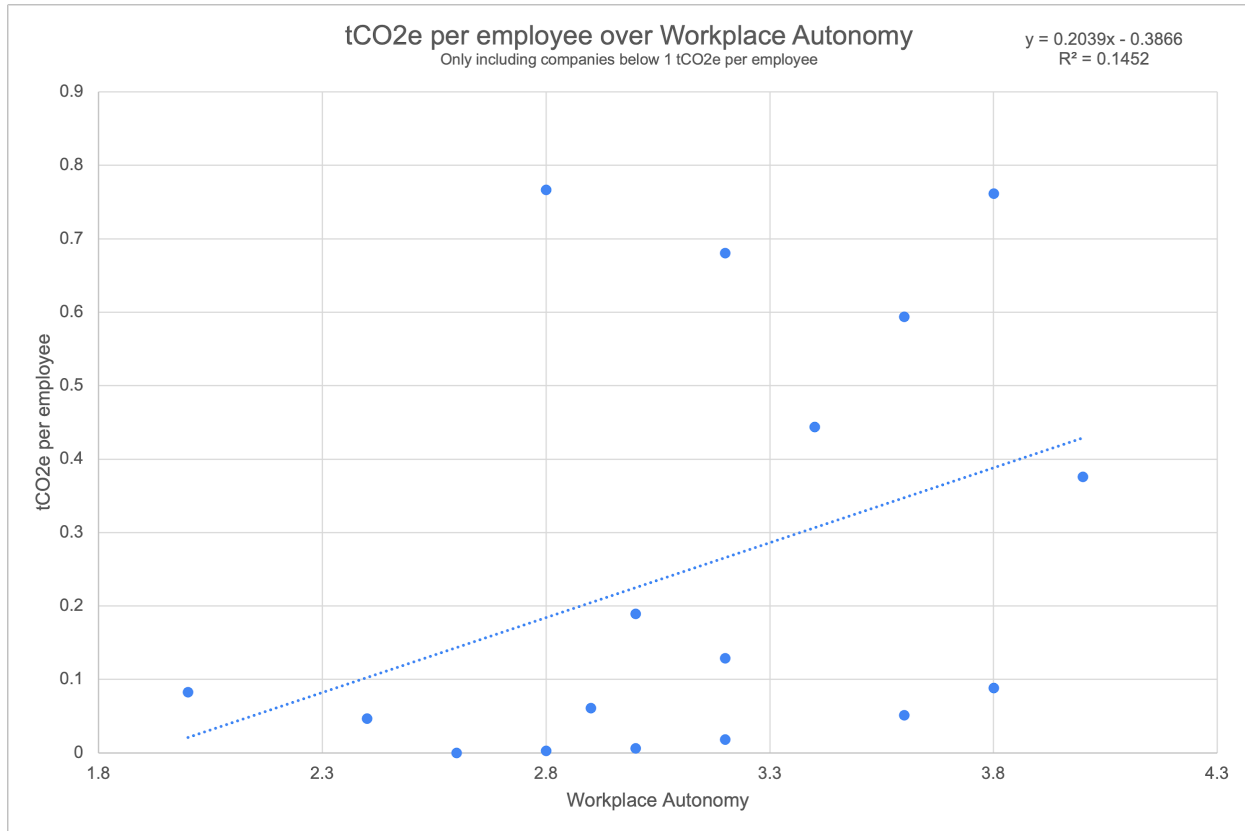
Graph 2: Environmental Performance over Workplace Autonomy Full Dataset Plot



As seen, there is a negative correlation between workplace autonomy and tCO₂e emissions. This means that for a higher level of autonomy, environmental performance, as measured by lesser emissions, increases. Therefore, this further indicates support for the hypothesis, although challenges of statistical insignificance remain. The relationship is weak, with an R² of only 0.1699. The R² value indicates how strong or how weak a relationship is between two variables. In this case, the R² is very low, and therefore, the relationship between the level of autonomy and the tons of CO₂ equivalents (tCO₂e) per employee around the regression line is shown with high variability. On the lower end of the y-axis (below 2 tCO₂e per employee), the environmental performance, there are observations on both the low and high end of the workplace autonomy, however on the high end of the environmental performance no company is above 2.8 in workplace autonomy. This gives the scatter a cone-like shape, narrowing down as the level of workplace autonomy increases.

As there is a big portion of the sample below 1 tCO₂e per employee (17 out of 31), an additional graph was made to more clearly visualize them, *Graph 3*.

Graph 3: Environmental Performance over Workplace Autonomy Low-Emitters Plot



Not only does this graph give a better insight of the low-emitters, but it also gives an interesting result, where the relationship is the opposite of the full sample. For this part of the sample there is a positive correlation between workplace autonomy and environmental performance, meaning that for a higher level of autonomy the emission per employee is higher. Important to note is that this graph only shows 17 observations and is therefore not as good of an indicator for the relationship. The R^2 is also lower for this relationship, at 0.1452 and no clear shape/pattern can be found in the graph. Seeing as the R^2 value is low once again, the relationship between the two variables shows a high variability in the plot.

4.3.1. Pearson Correlation

In *Table 5*, the Pearson correlation is analyzed. Here, further evidence of a negative correlation is found as when employee autonomy increases, CO₂e per employee decreases. This however is only a small change. The Pearson correlation coefficient analyzes how strong the linear relationship is between two variables.

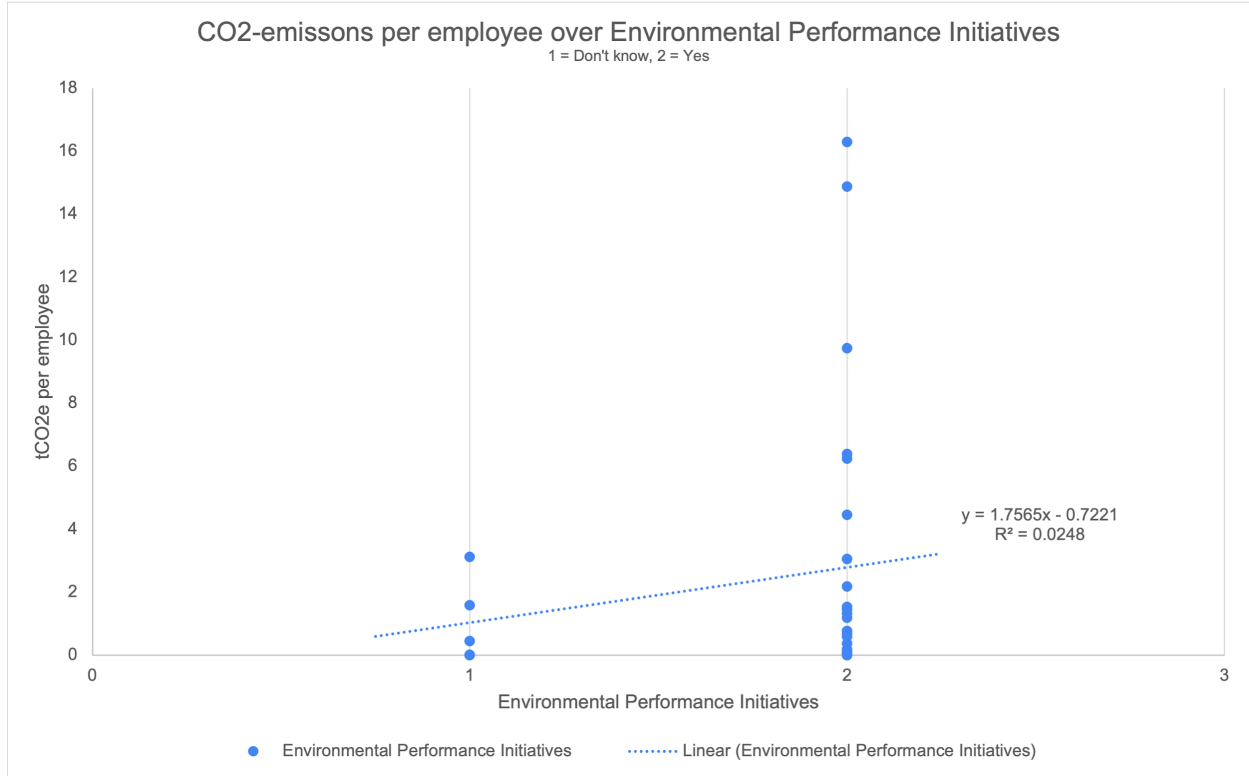
Table 5: Pearson Correlation

Correlations			
		Workplace Autonomy	CO ₂ e/employee
Workplace Autonomy	Pearson Correlation	1	-.244
	Sig. (2-tailed)		.186
	N	31	31
CO ₂ e/employee	Pearson Correlation	-.244	1
	Sig. (2-tailed)	.186	
	N	31	31

4.3.2. Environmental Performance Initiatives

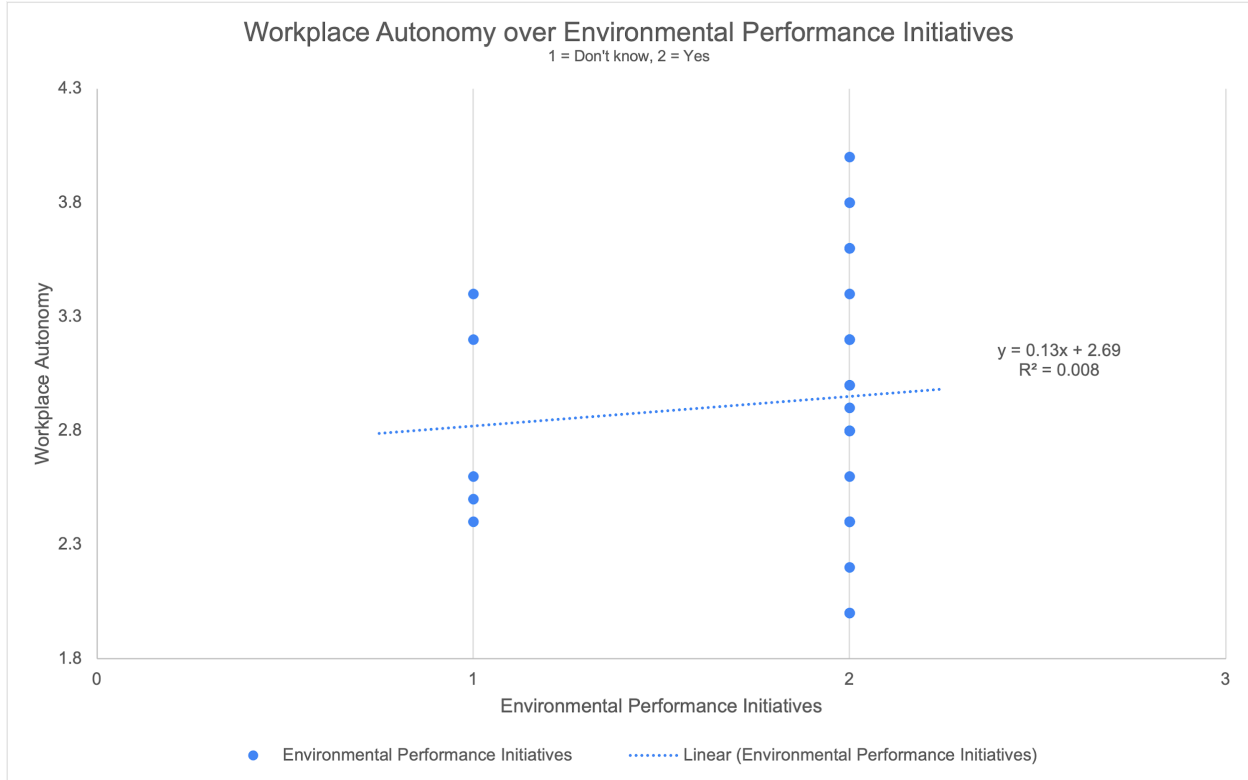
Graph 4 depicts the relationship between Environmental Performance Initiatives, initiatives to lower CO₂e-emissions at a company, and emissions per employee. No respondent answered “No” which makes the distinction more of a knowledge of the Environmental Performance Initiative. Although, in this graph it is not possible to tell whether there is a difference or not as the R² is low.

Graph 4: Environmental Performance over EP-Initiatives Plot



Graph 5 depicts the same x-axis as Graph 4 with Environmental Performance initiatives but in Graph 5 the y-axis instead shows workplace autonomy. The relationship between initiatives in the company to lower CO₂e-emissions and workplace autonomy is close to zero and there is no apparent correlation shown from our sample group.

Graph 5: Workplace Autonomy over EP-Initiatives Plot



4.4. Descriptive Statistics

4.4.1. Full Data Set

For the workplace autonomy variable, five different scales were put into an average, making the possible outcomes every 0.2 from 1-4, i.e., 1.0, 1.2 ... 3.8, 4.0. The observations all got in the range between 2 and 4, meaning that no company in the sample placed on the far low end of the scale, but one company had a maximum on all questions about autonomy. The sample mean was 2.929, which is higher than the true middle of the scale at 2.5, but lower than the middle between the highest and the lowest observation, which would be 3.0. With a standard deviation of 0.54, just above 68% of companies would fall between 2.38 and 3.47 on the created workplace autonomy variable. These numbers are all stated in *Table 5*.

The environmental performance variable has a low value of 0 and a high value of 16.29, with a mean of 2.51. As this is a continuous variable, starting at zero and does not have a maximum (theoretically), there is no telling if our sample is at the low end of the continuum especially since many respondents are service- or technological companies with low to no manufacturing.

Table 6: Ungrouped Descriptive Statistics

Ungrouped Descriptive Statistics					
	N	Minimum	Maximum	Mean	Std. Deviation
Workplace Autonomy	31	2.0	4.0	2.929	.5448
CO ₂ e/employee	31	.00	16.29	2.51	4.17
Valid N (listwise)	31				

4.4.2. Dataset Grouped by Manufacturing and Non-Manufacturing

Table 7 shows the same calculations as *Table 6* but this time the data set was grouped before the calculations. One group consists of the companies that have some sort of manufacturing in their value chain, the other group consists of those who do not. Manufacturing here is defined as the production of a physical good such as the cars of Mercedes-Benz or the microchips of Intel.

Table 7: Descriptive Statistics by Manufacturing/Non-Manufacturing

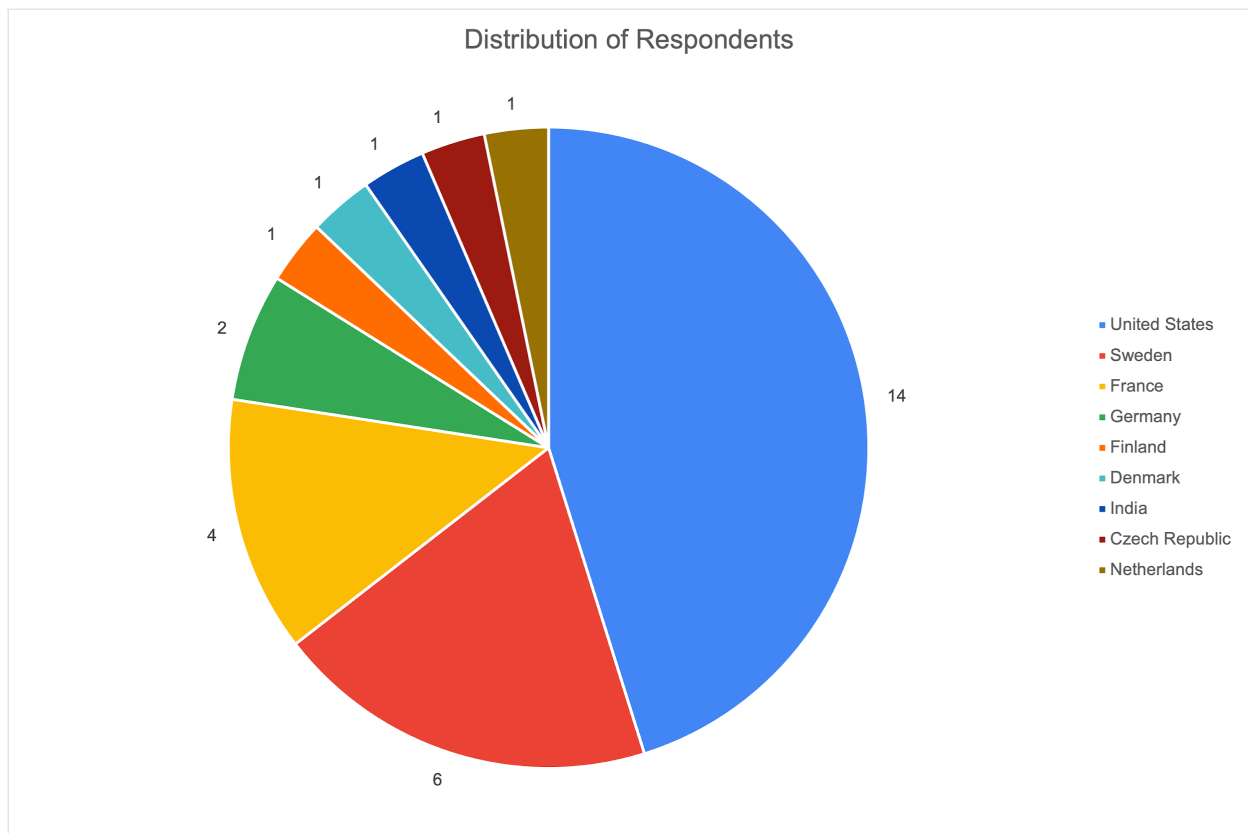
Grouped Descriptive Statistics						
Manufacturing		N	Minimum	Maximum	Mean	Std. Deviation
No	Workplace Autonomy	16	2.0	3.8	2.844	.4690
	tCO ₂ e/employee	16	.00	9.75	1.12	2.45
Yes	Workplace Autonomy	15	2.0	4.0	3.020	.6190
	tCO ₂ e/employee	15	.05	16.29	3.99	5.13

The table shows that in the sample, both the mean and the maximum value of workplace autonomy are in a company that includes manufacturing. The difference in mean workplace autonomy is almost 0.2, which means that in general one of the questions had a value of one step lower on the autonomy scale for non-manufacturing compared to manufacturing. However, when looking at environmental performance the mean value for non-manufacturing firms is only just above a quarter of the mean for manufacturing companies. What should be noted is that the standard deviation of workplace autonomy is higher for manufacturing companies than for non-manufacturing, meaning that the level of autonomy varies more for this group.

4.5. International Perspective

Below, *Graph 6* shows the origin of the companies in the sample. As seen most companies have their origin in Western countries, with only one representing Asia, that being a company from India. Just below half of the responses were from a company with their origin in the United States and over 75% are from only three countries. On top of that more than 50% of the responses were from countries within the European Union. Because the majority of the respondents do not come from companies originating out of countries such as Asia, Africa, nor Australia, the results can be interpreted as being “generalized”. Therefore, it is important to not interpret the results as being the same or similar in companies that originate from regions which were not surveyed. The results may have been similar at companies in other Western countries, due to similar cultural behavior, but it should be tested in order to be certain.

Graph 6: Distribution of Respondents per Country



5. Discussion

The discussion chapter provides what implications exist after analyzing the results. By referring back to the literature discussed in Chapter 2, the discussion shows how much the results found in this study correlate with the conclusions of previous researchers. The chapter focuses on the main points studied throughout the paper, autonomy and environmental performance, and what attributes characterize the relationship.

5.1. Research Aims

The aim of this thesis was to investigate the relationship between a firm's level of autonomy and how this correlates to its environmental performance. Based on the findings of this paper, the results indicate a positive correlation between autonomy within an organization and the environmental performance, however this cannot be said with confidence. A greater level of autonomy was found correlating to a greater environmental performance. Specifically, there was a negative connection between emissions and autonomy. However, because the significance of the effect of autonomy on emissions was too low to do a regression analysis, it can not be stated that this relationship has been proven and that the hypothesis is true, as there is still some amount of evidence suggesting otherwise. Thus, all conclusions drawn below must be treated with caution, as a replicative study can not be said to produce the exact same result with confidence.

5.2. Discussion on Descriptive Statistics

However, when analyzing *Table 7*, at first glance, an argument for rejecting the hypothesis seems evident. When divided between manufacturing companies and non-manufacturing companies, manufacturing firms are found to have, on average, a higher level of both autonomy and emissions. This could then entail that the level of autonomy does not affect CO₂e. It should be noted that neither of these sub-samples are sufficiently large to draw conclusions about, based solely on this evidence. Furthermore, this does not actually signify whether this is the case or not, as firms with manufacturing facilities will naturally produce higher CO₂e emissions as they have a physical product to manufacture which almost exclusively requires CO₂e emissions. Thereby, this data, when isolated, is not sufficient enough to detail whether there is a difference in the effect of autonomy on emissions between the two groups.

Another aspect to consider is in the descriptive statistics found within *Table 6*. There is a low standard deviation to be found for the level of autonomy (0.5) which signifies that all respondents believe that their level of autonomy is a relatively close set of values. Furthermore, the other responses for autonomy are relatively high values with an average of 2.9 out of 4 and a minimum value of 2, which signifies that the respondents surveyed believed there to be a relatively high degree of autonomy within their place of work. This could potentially signify that the study in truth only surveyed companies with a mid- to high-level of autonomy rather than the population at large. This may be due to the fact that the respondents, who felt less autonomous in

their workplace, may have felt less inclined to answer or feared that their responses would be saved, which disincentivized them to answer.

5.3. Practical Implications

From the general view of *Graph 2*, it is easy to see that the result of an increase in autonomy correlating to a decrease in CO₂e emissions does correspond with the general view of performance held by the self-determination theory, as the theory suggests a higher likelihood of intrinsic motivation leading to increased performance (Deci et al., 2015). However, the self-determination theory states that there are three basic needs that are the nutrients for intrinsic motivation, and therefore they cannot individually cause it themselves (Deci et al., 2015). Therefore, it can be said that the self-determination theory, described by Deci et al. (2015), accurately predicted the results found within *Graph 2*. Therefore, it can be said that having greater autonomy within the firm will lead to a greater environmental performance of the firm. However, this is only what can be concluded based on the surveyed firms. Further evidence that gives support for the hypothesis, although limited, can be found within the Pearson correlation of *Table 5*. It is seen that there exists a negative correlation between emissions per employee and autonomy. Together with what is already known from *Graph 2*, there is a great deal of inconclusive support for the hypothesis because this indicates a correlation, but the relationship is not significant.

Furthermore, after viewing *Graph 1*, it is clear that for the questions relating to Lartey's (2021) definition of autonomy, the average value of all questions are relatively even. Question 4, relating to where employees do their work, was given a higher score, which was likely impacted by the COVID-19 pandemic and the large-scale ability to work from home (Reisinger & Fetterer, 2021). With the questions developed through the help of the self-determination theory, there is a much greater degree of variance with Question 7. This question asks about a worker's ability to choose what to work on, and it receives the lowest average score of all questions. Question 8, relating to managers' confidence in workers' abilities to carry out their tasks unsupervised, receives the highest score of all questions. What these findings seem to indicate is that while firms trust and empower their employees regarding how, when, where, and the exact way they go about their tasks, they do not trust their employees to choose the tasks themselves. This may be due to the fear that perhaps the workers will choose the most interesting tasks, instead of the ones needing the most urgent attention.

COVID-19 has, as discussed previously, bolstered employees' ability to decide from where to do their work, which in turn has increased the strength of autonomy within the firm (Reisinger & Fetterer, 2021). However, it is important to note that if managers do not trust their employees, there is a risk of lessened autonomy. The perceived loss of individual control, as managers are no longer able to directly supervise their employees in an office, may cause them to restrict their ability to choose how to go about their work. Furthermore, it should be noted that while autonomy may increase, which can point to a greater probability of intrinsic motivation, the

self-determination theory states that there are three basic needs needed to promote intrinsic motivation, not only one. (Deci & Ryan, 1985). While autonomy may increase, it is likely that relatedness may possibly decrease, if sufficient steps to promote it are neglected, as workers do not interact with each other as frequently on an ad-hoc basis when working from home compared to working at the office. This may require managers to create opportunities for interaction in order to maximize the motivation of the workforce. Lastly, in regard to the need for competence, working from home likely has a relatively small impact, but it should be noted that if an employer is not used to offering online-based education and/or chooses not to invest in further educating the workforce while they work remote, this need may not be sufficiently met.

5.4. Theoretical Implications

Reviewing the results from the environmental performance aspect, there is an interesting detail to consider. It is known that the factors that influence the environmental performance of a firm all suggest “hard” aspects that influence it such as strategy, operations management, and purchasing decisions. However, this thesis outlines a “soft” aspect, an aspect that does not concern a specific decision or direction, but rather the promotion of an attribute or behavior. This may influence the environmental performance of a firm, through the level of autonomy. Does the level of diversity, generosity, or level of innovation potentially also influence environmental performance? Such implications could further suggest focus areas for managers to consider when trying to minimize their firm's carbon footprint, which is especially important given the challenges faced by global warming and the massive changes that need to be undertaken. With these massive changes, there are also bound to be a great deal of challenges. However, utilizing a greater degree of autonomy and other “softer” management tools can be a way to minimize their impact as motivated employees are more likely to follow the intended long-term strategic direction of the company in comparison to their unmotivated counterparts.

Furthermore, with autonomy potentially affecting CO₂ equivalent (CO₂e) emissions, it is possible that firms composed of flat organizations or ad-hoc organizations, which provide greater autonomy compared to their hierarchical counterparts, will then produce better environmental performance results. It could be possible that such organizations are more environmentally friendly in comparison. However, to argue for such a situation, does require more reliable empirical evidence than what is currently presented in this paper.

Should the relationship between environmental performance and autonomy hold true, it can also hold further implications for managers regarding its promotion, specifically in the context of corporate culture. Culture is likely to have a great deal of interference regarding whether a worker takes an autonomous action or chooses to blindly follow the orders of his or her superiors. For example, the rules and regulations may impact their choices. If a company has policies that reward initiatives, the worker may be more likely to take action than if these policies do not exist. Aspects such as the distribution of power between workers and managers may also have an impact. How the company manages failure and mistakes may also influence

the level of autonomy. Organizations, which harshly punish mistakes and failure, may cause workers to be disincentivized from taking initiative, lowering their amount of autonomous actions, whereas companies that celebrate failure could be seen as portraying greater levels of autonomy in comparison.

In *Graph 4* and *Graph 5*, where it is portrayed if employees are aware of internal activities aimed at lowering emissions, it is clear that the results indicate that greater employee knowledge of such activities does not lead to increased environmental performance nor does it lead to lowered emissions. This would then indicate that activities, which target spreading awareness of such initiatives, are futile if their goal is to decrease emissions. These companies did not have a greater level of autonomy, leading to suggest that more information-sharing companies, such as flat organizations which utilize such concepts, do not necessarily provide greater autonomy than their counterparts, where information is kept exclusively by senior management (Morgan, 2014). However, as discussed earlier, it is entirely possible that the companies surveyed here are in reality mid- to high level autonomy firms and that thereby the results do not mirror the population at large.

One aspect that may impact the findings of this study is the development of the variables. This study analyzes the Scope 1 CO₂e emissions per employee of a company compared with the corresponding firm's level of autonomy with the variable for autonomy built through the self-determination theory and the research of Dr. Lartey (2021). If the study had utilized other types of variables, there would have been different results and also greater significant values for the ANOVA Test as well. For instance, if the study had utilized i.e. other scopes of emissions (Hertwich & Wood, 2018), other types of emissions, other definitions of autonomy, or other revenue rather than employees as the "size equalizer", the results would have been significantly different.

Interpreting the results from the view of organizational structures, two of the concepts introduced in Chapter 2 are significant: standardization and specialization. In a highly specialized workforce, employees are given highly specified tasks relating to what their duties pertain to. This could theoretically explain why the results on Question 7, relating to an employee's freedom to choose what to work with, were lower than other questions. Standardization, the concept explained by Pugh et al. (1968), could also impact autonomy and the survey responses, by standardizing how tasks are performed, leading to less autonomy on how to go about the tasks. However, Question 6, relating to how much freedom employees have pertaining to how to go about their tasks, showed a high degree of freedom. This leads one to believe that there is a low degree of standardization within these organizations. This could also be explained by Pugh et al. (1968) by the fact that when analyzing the question through the lens of centralization, the fact that managers do seem to trust their employees to undertake their tasks unsupervised, suggests that these organizations, on average, are also fairly low on centralization as well. Thereby, it can be assumed that while these organizations on average are high on standardization

and specialization, this is lowering the level of autonomy for the aspect of being able to choose what to work with. They do, however, rank low for centralization, explaining the relatively high degree of autonomy in other areas found in the responses.

As seen earlier in this study, corporate social responsibility (CSR) makes employees more innovative and autonomy mediates this relationship (Li et al., 2021a). This could explain why autonomy and environmental performance are suggested to be correlated in this study. This may be because more innovative employees with a greater deal of autonomy of work may, for example, be more likely to introduce innovative sustainability solutions in projects that they are working on. They may also develop emission-lowering initiatives that they present to management compared to non-autonomous peers. Furthermore, organizations that offer higher degrees of autonomy may be able to attract more productive and/or knowledgeable workers than organizations that do not offer this benefit. The more productive employees may then have the knowledge or available time to focus on sustainability projects, other workers would not have the time or knowledge required to be able to introduce potential initiatives. This could have an effect, specifically that a greater environmental performance is also, to an extent, explained by the increased perceived value of the company brand, compared to those that do not offer an autonomous workplace.

Additionally, this proposes indirectly that by acting in a way that a company gives a relatively high level of priority to its CSR work and stakeholders by increasing the autonomy of its workforce, it can potentially benefit through the acquisition of higher quality talent, which in turn can also lead to increased productivity in the workplace. Thereby, it is possible that by trying to create a more productive workforce, the company becomes both a better global citizen and also a more profitable company. However, this relationship is not something that can be concluded to be true based solely on this study, and it will therefore require further examination in order to see if a connection exists.

Another aspect to mention is environmental regulation. As the climate crisis becomes worse, governments around the world are introducing more strict regulations regarding the environment for companies to adapt to. If autonomy can boost the companies' performance in this regard, it can bolster not just its CSR performance, but also its legislative performance, as the company will be less likely to be found in non-compliance of such laws when boosting their environmental performance. This will lead to an improved brand image but potentially also to lower costs through the greater avoidance of mechanisms such as taxes on carbon emissions. When the firms improve their performance, this can lead to greater profit margins compared to competitors that do not take such action.

It is, however, also possible that this correlation does not actually follow a causation. For example, it could be reversed, and it is instead lower emitters that tend to be more autonomous in their view of work rather than autonomous organizations being the lower emitters. Furthermore, it is possible that an untested variable is instead causing this correlation. For instance, the type of

sustainability strategy could potentially influence both these variables. The following statement is an example of this: a strategy that emphasizes “the triple bottom line” of “people, planet and profit”, as described by Crane and Matten (2007), could see both decreases in emissions through the emphasis on “planet” and an increase in autonomy through the emphasis on “people” compared to their peers utilizing different sustainability strategies. That being said, *Graph 2* does offer some inconclusive support to the hypothesis that the level of workplace autonomy within an organization does have an effect on the environmental performance of the firm.

5.5. Low Emitters

Looking at *Graph 3*, where the firms with less than 1 tCO₂e per employee are more clearly visualized, an interesting effect occurs. It is indicated that for firms with less than 1 tCO₂e per employee, a greater amount of autonomy leads to higher emissions rather than lesser emissions. This table should be viewed with caution, as there are less than 30 respondents in this sub-sample, which indicates that it has a lesser degree of reliability compared to *Graph 2*. Although less reliable, its results can not be ignored, and there are a multitude of possible explanations for why this relationship might be true in those companies. One reason could be that with less direct direction of how to go about a task or what to work with, there are multiple people trying to solve the same problem at once independently and/or people are performing duties that do not integrate with the work of others, which leads to the task having to be redone. Imagine a situation in a factory where multiple people are trying to build a new part to a product leading to a great deal of waste or one where one person fits the brakes to a car in an assembly line in such a way that the tires do not fit. Both of these inefficiencies would lead to greater CO₂e emissions. Another possible explanation is that environmental sustainability is not part of the duties or performance metrics of employees, and they thereby do not prioritize it over other metrics. Imagine a purchaser with a bonus scheme, choosing between either a low-cost alternative that pollutes more or a higher cost alternative that pollutes less. In such a scenario, without a metric for sustainability, the purchaser would be financially incentivized to pursue the low-cost high pollution alternative.

Further possible explanations can be found with the composition of this sub-sample. This sub-sample largely consists of professional services companies or tech companies rather than companies that produce physical goods. It is possible that in such a situation, more autonomy might lead to different results for the organization itself, than it does for their clients. Imagine a management consultancy firm that, through increased autonomy, often has to repeat its tasks, projects, or other issues related to lesser direction but with a generally higher quality of work for their clients. This company might then help their client lower their emissions which would not be seen in the Scope 1 emissions that are analyzed in this paper. Another explanation related to the type of companies found in this sample could be that there are often no physical goods produced. Instead, there is only a correlation between the level of autonomy and another variable, such as owning their office-buildings which would increase the Scope 1 emissions. If *Table 2* holds true, it would not offer support for our hypothesis, but it would instead only support the null

hypothesis, that the level of workplace autonomy within an organization does not have an effect on the environmental performance of the firm. It should once again be noted though that this sub-sample is too small to draw viable conclusions from and should thereby be treated with caution.

Lastly, as previously explained, the three basic needs also produce avenues of explanation. It could be that while the need for autonomy is met within these companies, the needs for competence and relatedness are not, which means that intrinsic motivation lacks the necessary nutrients to grow (Deci & Ryan, 1985). Looking at the composition and the amount of professional service companies, it is possible that the need for “relatedness” is not met given that the employees of these companies often do their actual work on-site for a different company altogether instead. Another explanation would be found in that, as explained previously, the three basic needs can not cause intrinsic motivation but will only produce the necessary conditions for it. (Deci & Ryan, 1985) It could also be that these companies in the sub-sample are not capturing the benefits to the extent that they can through other types of interference, which limits the ability for intrinsic motivation to grow. If this relationship holds true in another controlled study with a big enough sample, it is entirely possible that while the hypothesis would generally hold true for the population at large, the null hypothesis would instead hold true for the firms where there are no physical goods to produce.

5.6. Further Research

The most critical avenue for further research would be the attempt to repeat this study with a larger sample. It would be most efficient to sample companies from both within a single industry, as well as from a single country. This would allow for the researcher to single out the variables causing outside interference, and they would be able to see if there are any significant results found under ideal circumstances, in comparison to the results found in this study. Due to the nature of the results found, any conclusions drawn can not be used as evidence to describe a connection between the variables. The correlation only indicates that there might be a connection, and this would indicate researchers to further pursue this area of study.

If future research were to be conducted on this topic, it would be advantageous for it to focus on the other psychological needs of competence and relatedness, in order to further investigate the relationship between environmental performance and the self-determination theory. Such research could potentially follow a similar structure to this paper and in a straight-forward way investigate the impact of the other basic needs on environmental performance, or the study could utilize a qualitative research approach to better answer what it is that impacts environmental performance. For a study with a larger scope, all the psychological needs mentioned in the self-determination theory can be studied together to see if there is a possible relationship between self-determination the theory overall and cross-examine that with each aspect of the self-determination theory to see if autonomy has a stronger linkage than other parts of the theory.

Another aspect to study is whether other motivational theories besides the self-determination theory may be able to provide details to explain what other aspects can lower the emissions of a company. While self-determination can be currently considered the leading motivational theory in the world, this does not necessarily mean that it is the only significant motivation theory. There could be others which may better explain the relationship between autonomy and environmental performance.

As previously stated, a great novelty of this study is that it proposes a “soft aspect” that may influence the environmental performance of a firm. Thereby, researchers should focus on first validating this result by conducting follow-up studies to test that the result indicated by this paper is true and not just an indication. They should also analyze whether there is a causal relationship between the variables or not. Furthermore, an explanatory research of other possible “soft” factors, which could influence the environmental performance, could also yield significant results and bring about new insights in order to expand the horizon of knowledge in the field.

Additionally, further research could also more clearly describe the relationship between the organizational structure of a firm and their environmental performance. This additional research would do especially well to carry out a similar quantitative study. Specifically, it should focus on the differences in environmental performance between hierarchies, flat organizations, and ad-hoc organizations in order to see if they impact the environmental performance in a significant way. Furthermore, the impact of autonomy on other sources of environmental performance could be investigated as well. For instance, investigating its relationship with the probability of wastewater pollution, oil spills, and deforestation could improve knowledge in the field.

Further research can also be conducted on how the level of autonomy within an organization affects other types of performance. It has been established that the more autonomous workers are generally more efficient (Deci et al., 2015). Further investigation may prove if organizations with higher levels of autonomy have greater financial results, less turnover, or greater levels of employee innovation when compared to their less autonomous counterparts.

The design of the questions found in the survey can play a role in future research. As previously mentioned, it utilizes Lartey’s definition of autonomy. However, there are other definitions by various other researchers that could also be considered, and it is possible that designing the survey based on these definitions could potentially yield different results. Thus, future researchers could investigate this relationship with another framework to see whether the results differ or not. Further research could also potentially investigate this relationship based on one single definition of autonomy rather than the two found in the self-determination theory and that of Lartey used throughout this paper. This may have been a possible reason as to why the results found in the analysis were inconclusive. Therefore, the conclusions in this paper were treated with skepticism.

Additionally, an avenue to assess is to see whether the conditions found in *Graph 3* can be replicated again if done with a larger sample. Since the findings of this sub-sample completely contradict the results found in *Graph 2* and the expectations of the theory, it is imperative to understand why or why not these conditions hold true. Thereby, future research could focus specifically on this sub-sample and try to understand if it is the same, and if the results hold true, why these differences between lower emitters per employee and higher emitters per employee in relation to autonomy exist. It could also be investigated whether differences exist between different industries or the same result holds true globally regardless of context.

Another aspect to consider is whether these results hold true outside of multinational enterprises. Future researchers would do well to investigate this linkage in the context of small to medium enterprises to see whether the results differ or not. It also could be beneficial to consider whether the results stay the same in different cultural settings as well. As can be seen in *Graph 6*, the majority of the companies surveyed were originally from the USA. Would multinational enterprises from emerging markets surveyed in Japan find the same linkage as this study or would the results be completely different? These are difficult questions to answer and require investigation. If this essay had possessed a greater sample size, it would have been possible to analyze the differences among the home country's emissions. However, due to the size of the sample, such an analysis can not be done with confidence through statistical methods.

The differences in home country and culture may affect the results, and further research could investigate whether workplace legislation has an influence. For instance, in countries with less strict worker protection laws, employees may be more hesitant to take autonomous action that may introduce a risk of termination. They may therefore find themselves in a less autonomous organization when compared to their counterparts who have stronger worker protection laws. Thereby, this research could provide legislative bodies with greater knowledge of the effects of their actions.

Throughout further avenues of research, it can be possible to continue to reflect on the role of autonomy as the mediator in the relationship between innovation and CSR. There it could be possible to investigate, through a time-series based study, whether autonomy over time produces more emission-lowering or other types of environmental sustainability improving innovations, as well as its impact on the companies' sustainability performances over time.

6. Conclusion

The aim of this thesis was to investigate the relationship between autonomy and environmental performance. However, as stated previously, it is not possible for this thesis to reject neither the null hypothesis nor reject the hypothesis. It is not possible to conclude whether this is due to the size of the sample, the composition of the companies, the nature of the companies or the construction of the variables. What can be concluded is that there are indications, based on the result of this study, which indicate that there might be a correlation or a linkage between autonomy and lesser CO₂e equivalent (CO₂e) emissions.

This would introduce a new type of factor, a “soft factor” that influences CO₂e emissions rather than the major decisions, production processes and strategies discussed in the literature so far. Furthermore, this would also offer support to the self-determination theory’s view that intrinsic motivation and autonomy are linked with an increase in performance. Furthermore, it was discovered, although with weak results, that for companies that lack physical products in their production, there might be another type of relationship between autonomy and CO₂e emissions, where increased autonomy may instead lead to increased emissions.

There is also the potential that through the role of autonomy as a mediator between CSR performance and innovation, the effect of increased autonomy may also lead to an increase in the financial performance of the firm. This is due to the fact that the brand image will have been improved and taxes on pollution will have been avoided.

With the outlook of an increasingly severe climate crisis on the horizon, it is essential to further study what countermeasures would possibly be effective in limiting its expansion. Thus, repeated studies to test the validity of what might be a theoretical window of opportunity are desperately needed. If further studies find that this link is true, a whole new avenue of aspiring activities related to finding what “soft factors” can be utilized and promoted to decrease the carbon footprint will be opened. However, while there is hope that these results can provide some form of support, further research is needed to understand whether its indication of linkage may hold true or, if in fact, it does not produce anything of value at all.

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Appendix

Survey

Dear Participants,

Thank you for taking part in the following survey. The aim of our study is to investigate the relationship between the level of autonomy within an organization and its effect on the company's environmental performance. The following questionnaire will take around 5 - 10 minutes to complete.

The answers for this survey will be confidential and will only be used for academic purposes. By responding to this survey you consent to your answers being stored anonymously until the study is completed in June 2022 and then stored in aggregated format in Lund University's database and archive.

Sincerely,

Adrian von Glahn → adrianvonglahn@gmail.com

Fredric Idmark → fredricsmail@gmail.com

Tobias K. Korall → tobias.korall@gmail.com

Below you will find the questions to the survey.

The scale on questions 4-8 is as follows:

- 1 - To a very low extent
- 2 - To a low extent
- 3 - To a high extent
- 4 - To a very high extent

What company do you work for?

(Free Response)

Are you a manager/executive at your company?

- Yes
- No

From what country is your company originally from?

(Free Response)

To what extent can employees at your company choose *from where* to do their work? (i.e. can choose to work remotely)

1 2 3 4

To what extent can employees at your company choose *when* to do their work? (i.e. employees can plan their own work day)

1 2 3 4

To what extent can employees at your company choose *how* to do their work?

1 2 3 4

To what extent can employees at your company choose *what* to work with?

1 2 3 4

To what extent do managers at your company trust their employees to undertake their tasks without constant guidance?

1 2 3 4

Are there at present any active initiatives aimed to reduce CO2-emissions?

Yes

No