Corporate Social Responsibility: the accountability of companies operating in emerging economies

A case-study on CSR practices of companies operating in Brazil

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Master Thesis

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Abstract

This study aims to gain more insights in the environmental performance of companies operating in emerging markets. More specifically, this study examined to what extent companies that adopt environmental management systems (e.g. ISO 14001 standards) or self-regulation mechanisms (e.g. Environmental policy or Climate change policy) in emerging markets, in particular Brazil, truly behave in an environmental responsible way. This study examined whether companies that are more experienced with an environmental management system have a higher environmental performance. This was done by examining whether these companies are taking actions in order to reduce their usage of water, electricity, fuel, wood, and coal.

The data was obtained from an in-depth survey originated from the Análise environmental Management yearbook. The results show that companies that are more experienced with ISO 14001 standards significantly have more actions to reduce water, electricity and fuel usage. This also concerns to firms that have self-regulation mechanisms in. Here, it was found that companies with an Environmental policy truly act more responsible than companies who do not have an Environmental policy. Next to this, , it was found that a Climate change policy is also an influencer for behaving in a more environmental responsible way. The significant results show that self-regulation mechanisms and environmental management systems have a significant influence on the actual environmental performance of companies, in relation to actions for reducing water, electricity, and fuel usage. However, no significant effects were found in relation to wood and coal usage.

Keywords: Corporate social responsibility, Emerging market, Brazil, Self-regulation mechanisms, Environmental management systems, ISO 14001 standards, Environmental policy, Climate change policy.

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List of Abbreviations

CSR	Corporate social responsibility
EMS	Environmental management system
ISO	International Organization for Standardization
EMAS	Eco-Management and Audit Scheme

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Preface

In front of you, you see the final product of my master thesis. I hope that this thesis will provide new insights. Corporate social responsibility in the context in which it has been investigated is an exceptional one that has provided interesting results. For now, I would like to leave a personal note and thank all the people that contributed to this thesis. As many know, writing this thesis was not always the most easy and straightforward exercise.

Writing my master thesis has cost me a lot more effort than I expected. In the early stage of my thesis I was, to a certain point, very lost. I had too many ideas and it was hard for me to focus only on one topic. Unfortunately, I did not received the support that I needed in this stage. Unexpectedly, my first supervisor left. Luckily, I got a new supervisor which has quickly offered me the help that I needed. Since then, I have been able to regroup myself and deliver this final product.

Gratitude goes to my supervisor Prof. dr. H.L. van Kranenburg for guiding me through the process of writing this thesis. This process must not have been the easiest to supervise. Further thanks goes to Prof. dr. A.M.A. van Deemen, my second examiner, for additional suggestions and feedback.

Special thanks goes out to Jelske Vugs, Helma van Dokkum and Adinda Biesbroeck for reviewing this thesis. Your constructive feedback and support has been of great help and is greatly appreciated. Furthermore, my appreciation goes out to all of you who kept supporting me and cheering me up during this project. I could not have done this without their mental support.

"It does not matter how slowly you go, as long as you do not stop." – Confucius

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1. Introduction

1.1 Accountability of companies in the emerging markets

Since the 1990's the world has shown a growing importance of initiatives managed by businesses, social organisations and governments with the aim of pressuring companies behaving more socially responsible and accountable (Marshall & MacDonald, n.d.). Nowadays, companies can no longer continue to act as independent entities without taking the interest of the general public in mind (Syeddah, 2011). Consequently, companies need to act in line with public goodwill in order to gain competitive advantage (Syeddah, 2011). Their motive is that if stakeholders observe socially responsible behaviour, they might consider the firm as a preferred party to have transactions with (Misani, 2010). Furthermore, the stakeholders' goodwill allows the firm easier access to strategic resources, reduces operating and transaction costs, and in the end boosts its reputation (Misani, 2010). The increased global competition that companies encounter over time has forced companies to constantly adapt themselves to their surroundings. In order to remain competitive in the uncertain market, they have to differentiate themselves both technically and managerially from their competitors (Radonjic & Tominic, 2006). However, although most company's main objective is to remain profitable, environmental issues have become increasingly more important (Oliveira, Serra & Salgado, 2010). Oliveira et al. (2010) state that this is a result of the increased focus on consumer awareness and growing interest in how products and services are produced, used and disposed, and how they affect the environment. Furthermore, they mention there is an increasing demand for organizations to use cleaner production practices and to have internationally recognized certifications. As a consequence, more and more companies are adopting self-regulation mechanisms and certified environmental management systems (e.g. ISO 14001) in order to avoid environmental issues and to take the interest of the general public in mind (Gavronski et al., 2008).

The question that rises is if institutions are doing enough to avoid environmental implications and to improve usage of natural resources. For instance, previous studies comparing markets have shown that different markets have contrasting cultural- and social norms in relation to environmental issues, and encounter different demands by governments and the population (Oliveira Serra & Salgado, 2010; Visser, 2006). As a consequence, current approaches to corporate social responsbility (CSR) may not be related to circumstances encountered in developing economies (Carroll, 1999; Visser, 2006, Syeddah, 2011). Until now most CSR research has been carried out within the western mature markets (Syeddah, 2011) with a few exceptions (Al-Khater & Naser, 2016; Araya, 2006; Baskin, 2006; Muthuri

& Gilbert, 2011; Misani, 2010; Oliveira et al., 2010; Syeddah, 2011; Visser, 2007). However, emerging markets are getting more attention in the literature as they are expected to become the next big players in the economic, political and social sphere (Syeddah, 2011). Therefore, the need for research focused on the emerging economies is crucial. Recently, more and more managers in these markets believe that CSR leads to a higher productivity, efficiency, and a better employee morale (Schmidheiny, 2006). Together with these managers, companies in emerging markets are becoming rapidly aware of the importance and the implications of CSR, and this forces them into takings steps towards responsible behaviour (Schmidheiny, 2006). Besides, the development of democracy in these emerging markets has created opportunities for both people and institutions to speak up. Subsequently, governments tend to fall behind in meeting the needs of the environment, which leads to more pressure on the companies operating in these environments. This pressure of feeling responsible for the environmental issues is in the literature described as the 'accountability' of companies. When acting accountable, the company is in a certain way obligated to explain or justify its actions to the stakeholders involved, for instance the community or NGOs (Swift, 2001). Companies adopt several environmental management systems or self-regulation mechanisms in order to behave socially accountable, however, several previous CSR issues show us that adopting these systems does not necessarily mean that companies also behave in an accountable way (e.g., Volkswagen's 'environmental emission scandal'; Coca-Cola's 'pesticides scandal'; Apple's 'limited transparency supplier sustainability policy'; or the scale of the 2010 BP oil spillage disaster in the Gulf of Mexico).

Taking the issues mentioned above into account, it is interesting to investigate whether the CSR environmental management systems and self-regulations truly lead to companies behaving accountable. More specifically, looking into studies on accountability and CSR, Latin America seems to be the least covered emerging market in the literature (Visser, 2007). Schmidheiny (2006) argues that CSR in Latin America is hard to examine, since there is no general definition that different organisations in the various countries agree upon. One thing that can be said is that CSR in Latin America has always focused more on the social issues than on environmental issues (Schmidheiny, 2006). Due to the significant increase of democracy here, communities appear to be less afraid to hold companies accountable for dumping waste (Schmidheiny, 2006). De Oliveira (2006) states that the role of firms taking greater responsibility for social and environmental issues has shifted as a result of political, social and economic changes.

Brazil is one of the countries that represents the world's largest potential market with the most rapidly expanding economy in the emerging markets (Crisóstomo, Freire & Parente, 2014). Looking at CSR initiatives in Brazil, it is noticeable Brazil has become the regional powerhouse of CSR (De Oliveira, 2006). For instance, Araya's study (2006) has shown that Brazilian companies are more likely to report about CSR in comparison with European and American companies. This implies that businesses in these markets are accelerating in their development. However, governments have to be involved and should enforce laws to encourage this development. Many people in emerging markets see CSR as a reason for positive change in the existence of poverty, environmental degradation, corruption, and economic stagnation (Schmidheiny, 2006), which illustrates the importance of investigating CSR in emerging markets.

1.2 Problem Definition

1.2.1. Problem statement

More and more companies are adopting self-regulation mechanisms and environmental management systems, in order to improve environmental issues, avoid negative environmental impacts and improve the use of natural resources. Some companies have been adopting them for years, where others have currently started to adopt these systems. Unfortunately, this does not necessarily mean that these companies truly act environmental responsible. Therefore, the aim of this thesis is to determine to what extent companies that adopt environmental management systems or self-regulation mechanisms in emerging markets, and more particularly Brazil, truly behave in an environmental responsible way. Moreover, this study will examine whether companies that have more experience with an environmental management system have a higher environmental performance than companies with less experience. This will be investigated by examining the adoption process of the systems and by examining whether these companies are indeed taking actions in order to reduce water, electricity, fuel, wood and coal usage. In order to examine whether companies that adopt environmental management systems or self-regulation mechanisms in emerging markets are indeed behaving environmentally responsible. This research aims at answering the following question:

"To what extent do companies that adopt environmental management systems or self-regulation mechanisms in emerging markets, and more particularly Brazil, truly behave environmental responsible?"

1.2.2. Sub questions

In order to answer this problem statement adequately, it is dived into several sub questions:

A. *What is corporate social responsibility and how can it be defined?*

   Defining the concept of CSR is not always a straightforward exercise (Belu, 2013; Campbell, 2007; Dahlsrud, 2008; Rowley & Shawn, 2000; Syeddah, 2011). The reason for this is that CSR is a multi-dimensional construct (Dahslrud, 2008). For the purpose of this study, it is therefore necessary to gain insight in what is meant by CSR, in which dimensions it can be divided and how this concept can be defined in this study.

B. *What kind of CSR self-regulation mechanisms can companies adopt?*

   Besides the international standardized- and certified management systems, companies can also choose to adopt their own self-regulation mechanisms in order to behave more socially responsible. It may conduct its own targets or its own systems in the interest of becoming more socially responsible. With regard to the problem statement, it is necessary to get a clear overview of possible environmental policies that companies may consider to adopt.

C. *What kind of environmental certified management systems can companies adopt?*

   Companies can adopt several environmental certified management systems in order to behave more socially responsible. For the aim of this research it is necessary to present possible environmental management systems and investigate what each environmental certified management systems entails, including the possible consequences of adopting one of them.

D. *What is meant by accountability and how can they behave in this manner?*

   To identify whether companies behave in the same way as they claim to do so, it is crucial to define what is meant by behaving accountable. This will be examined by studying previous literature and by reviewing companies that claim to behave or actually behave accountable.

E. *What is an emerging market and, more particularly, how can the Brazilian market be defined?*

As introduced before, companies operating in emerging markets belong to a group that has encountered economic expansion and has begun to open up their markets onto the global market. Since the context in which the companies are operating in can be influential, it is essential to get a clear understanding of what is meant by this emerging market, and more particularly the Brazilian market and how it can be defined.

1.3 Sample of the study

The actual environmental behaviour is examined by looking at the environmental practices of companies operating in the Brazilian markets. The sample consists of both foreign companies as domestic companies; all operating in Brazil. The companies selected operated in four different industries; agriculture, commerce, manufacturing and service. In order to determine the actual environmental behaviour, companies are examined on their CSR initiatives. More specifically, they were examined on their actions to reduce water, electricity, fuel, wood and coal waste. The data date back from 2010 and is selected from the Análise Environmental Management yearbook, which is a finished example of an in-depth survey made with Brazil's largest companies.

1.4 Relevance

Addressing the extent to which companies that adopt environmental management systems or self-regulation mechanisms in emerging markets, truly behave environmentally responsible contributes to existing scientific literature and has managerial implications.

1.4.1 Scientific relevance

Since the emerging markets are where the social and environmental crises are usually most acutely felt in the world (Visser, 2007), the need for research on how these companies manifest themselves in terms of the CSR becomes crucial. Moreover, as previous literature has mainly focused on the developed market, it becomes more important to study the occurrence in the context and circumstances encountered in the developing economies. For instance, emerging markets still have less awareness and encounter fewer demands in relation to CSR, therefore, results might differ from the developed market. This study aims to fill the gap in the existing literature between corporate social accountability and the emerging

markets by investing whether companies in emerging markets are indeed taking actions in order to improve the environmental issues. It will be examined to what extent companies that adopt environmental management systems or self-regulation mechanisms in emerging markets, and more particularly in Brazil, truly behave environmental responsible. Moreover, this study will examine whether companies in emerging markets that have more experience with an environmental management system have a higher environmental performance.

One contribution of this research will be to increase the understanding in how companies truly behave environmental responsible by looking at their CSR initiatives. More particularly, this corporate social responsible behaviour will be determined by looking at their actions to reduce water, electricity, fuel, wood and coal usage. In other words, it gives more insight into the accountability of companies. Moreover, examining to what extent companies that adopt these environmental systems or policies truly behave environmentally responsible, might contribute to the existing literature regarding environmental management systems and self-regulation mechanisms. Previous studies have shown that adopting one of these systems or self-regulation mechanisms lead to certain advantages and better environmental performance (Bansal & Hunter, 2003; Campbell, Eden & Miller, 2012; Commission for Environmental Cooperation, 2005; Davies & Weber, 1998; Delmas, 2001; ISO, 1996; Marsh & Terrence, 2012; Rangang et al., 2012; Wrap, 2015). This study might confirm these results or show contrary results. Both could contribute to the existing literature.

By researching the environmental behaviour of these companies operating in Brazil, another contribution will be made. Brazil is an emerging market that has a rapidly expanding economy and has shown to face growing visibility in relation to CSR. Therefore, this study contributes to the scientific literature in a way that it attempts to fill in the gap between CSR studies, accountability and present research on the emerging market. The reason for focussing on the emerging market companies as the subject of this study lies in a variety of factors; (1) emerging markets have the potential to become the next big players in the future (Syeddah, 2011); (2) until now research on corporate social responsibility has mostly been carried within mature markets (Syeddah, 2011); (3) emerging markets present a distinctive set of CSR challenges which are quite different than those of the developed market and are, therefore, interesting to investigate (Visser, 2007); (4) the effects of globalization, economic growth, investments and business practices are likely to have the biggest social and environmental impacts in the emerging market (both positive and negative) (Visser, 2007).

1.4.2 Managerial implications

The results of this study may offer several managerial implications. Firstly, it stresses the importance of the difference between companies claiming to behave socially responsible and truly behaving accountable. The results could give the government and policymakers of emerging markets valuable insights in the accountability of companies operating in their market. Secondly, policymakers could use this information to come up with other campaigns to influence the actual environmental behaviour. Taken the results of the study into consideration, policymakers can decide whether the laws fully meet the environmental preservation needs or that adjustments are needed in order to improve the negative environmental issues.

Furthermore, these results can give more insights into the actual environmental behaviour of companies while adopting ISO norms or other self-regulation mechanisms in relation to the environment. Besides, this study determines whether the time of the adoption process of ISO norms influences the environmental behaviour. All these information can give the developers of the international certifications insights in the companies' behaviour in a way that they can adjust their policies or norms in order to push companies to behave more responsible in an early stage.

Lastly, this study can be used to provide managers of businesses insights into the possibilities of adopting environmental certified management systems or self-regulation mechanisms. It helps managers to understand why companies should behave accountable and how they can improve their own environmental performance. Besides, providing information about these environmental management systems and self-regulation mechanism might help managers to increase the firms' efficiency of operations by eliminating waste from production and distribution processes and increase awareness of environmental impacts among all employees (IISD as stated in Rondinelli & Vastag, 2000). In the end, this could lead to less waste and the avoidance of future environmental crises.

1.5 Outline of the thesis

Previous chapter described the cause and relevance of the problem statement at hand and how the problem is articulated in the literature. Argumentation for reaching the research objective has been given, which led to the central questions and sub-questions. In order to provide an outline of relevant theories with regard to the identified problem, the theoretical framework will be presented in chapter 2. This section will discuss several aspects of corporate social responsibility and will outline possible self-regulation mechanisms and environmental management systems. Moreover, clear and elaborated definitions of the concepts used in this study will be given. After relevant theories are discussed, chapter 3 will dive more into the context of this study. Since the context of the companies can influence the results, literature about this context will be presented. Chapter 4 will outline the methodology used. In this section the chosen research design, data collection technique and the operationalization are reviewed. Chapter 5 discusses the data analysis and results. Lastly, chapter 6 will provide a discussion and conclusion in which the central question and its sub-questions will be answered. Besides, limitations and directions for further research and managerial implications will be discussed.

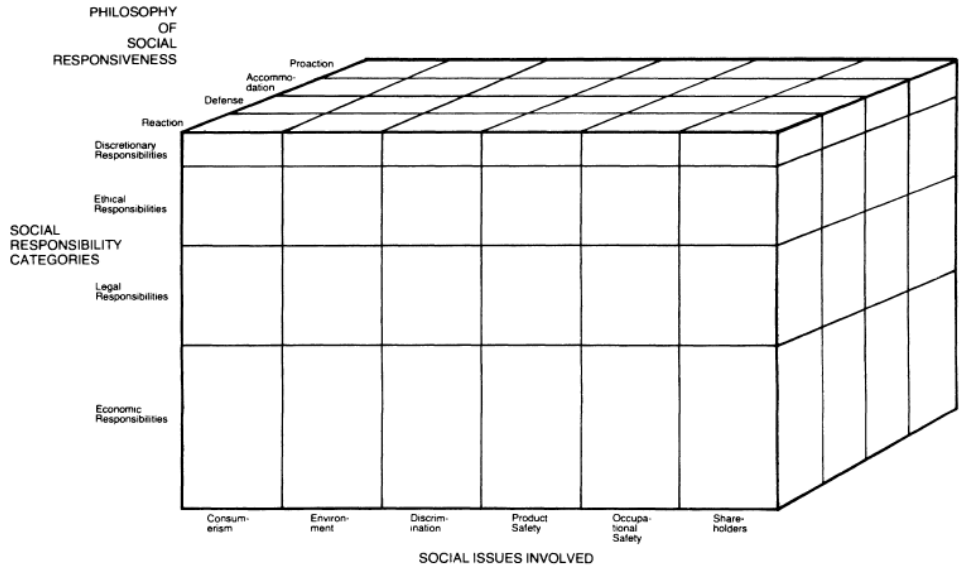
2. Theoretical Framework

In this section relevant literature will be discussed, major constructs will be defined and associated propositions will be given. More specifically, several aspects of corporate social responsibility will be outlined in section 2.1. Moreover, it will be explained what is meant by social issues and how organizations may respond to issues. As stated in the introduction, the increased global competition and the growing interest in how products and services are used forces companies to adopt self-regulation mechanisms and systems in relation to the environment. Section 2.2 will discuss self-regulation mechanisms, systems and standards. Lastly, section 2.3 will elaborate on the concept 'accountability'. It will be defined what is meant by firms behaving accountable and it will focus on the growing importance of initiatives managed by businesses, social organisations and governments with the aim of pressuring companies behaving in more socially responsible and accountable ways.

2.1 Corporate social performance

Corporate social responsibility, corporate social responsiveness and any other interaction between business and the social environment have often been used as synonyms (Wartick & Cochran, 1985). Carroll (1979) has proposed the conceptual corporate social performance model (CSP) that attempts to describe all these aspects. The model tries to address the three major questions (1) what is included in **corporate social responsibility (2.1.1)**; (2) what are the **social issues** the organization must address **(2.1.2)** and (3) what is the organizations strategy of **social responsiveness (2.1.3).** Instead of viewing responsibility, responsiveness and issues as separate, this CSP model determines the underlying interaction among the *principles* of social responsibility, the *process* of social responsiveness and the *policies* developed to address social issues (Wartick & Cochran, 1985). Each of the components has its own direction, however, they attempt to provide an integrated conceptualization of corporate social involvement (Wartick & Cochran, 1985). In order to discuss the relevant literature in a structured manner, the three different aspects of the CPS model, as presented in figure 1, will be discussed separately in the upcoming sections.

Figure 1*: The Corporate Social Performance Model* (Carroll, 1979, p.503)



2.1.1. Corporate social responsibility

In the interest of determining the first aspect of the Carroll's three-dimensional model of corporate performance, first, the nature of social responsibility has to be specified. Companies encounter more often demands from multiple stakeholders to engage in CSR. These demanding pressures emerge from stakeholders such as customers, employees, suppliers, community groups, activists, governments, media, and some stakeholders, especially institutional shareholders (Campbell, 2007; McWilliams & Siegel, 2001; Misani, 2010). Seen all the stakeholders' conflicting goals, defining the concept of corporate social behaviour is not always a straightforward exercise (Belu, 2013; Campbell, 2007; Dahlsrud, 2008; Rowley & Shawn, 2000; Visser, 2007; Wartick & Cochran. 1985). The reason for this is that CSR is a multi-dimensional construct (Dahslrud, 2008). Multi-dimensionality entails that various aspects of the firm need to be taken into consideration at the same time before estimating a company's CSR performance (Belu, 2013). McWilliams et al. (p.1, 2001) explain corporate social behaviour by "*the actions that appear to further some social good, beyond the interests of the firm and that which is required by laws*". Campbell, Eden & Miller (2012, p.88) elaborated by saying that "*CSR involves activities by private firms that appear to further some social good where the activity level is above and beyond the mandated by government".*

As shown in figure 1, Corporate Social Responsibility (CSR) consists of four components: *economic, legal, ethical and discretionary* (Carroll, 1979). These four categories are not mutually exclusive, nor are they intended to present a continuum with one concern on one end the other on the other (Carroll, 1979). The first component, the economic component of CSR, represents the fundamental of social responsibility (Pinkston & Carroll, 1996). According to this component, it is the firms' responsibility to produce services and goods and sell them at fair prices, which in return allows the company to make profit and to pursue growth (Carroll, 1979). The second component, the legal component of CSR, presents the obligation of obeying to law (Pinkston & Carroll, 1996). In order to ensure that companies comply with the legislation, several policies and structures are set. Although the first two categories include ethical norms, there are some additional activities that are not coded precisely into law but are still expected by stakeholders (Carroll, 1979). Therefore, the ethical responsibilities involve activities that are not included into law (Carroll, 1979). This area is difficult to define and is therefore seen as the 'grey area' (Pinkston & Carroll, 1996). The last component of CSR is called the discretionary, voluntary or philanthropic component. Since there are no laws or codified expectations that define corporate activities, this component is characterized by the discretion of the business. The essence of these activities is that if a business does not participate in them, it is not necessarily considered as unethical (Carroll, 1979).

After Caroll (1979), many attempts have been made to create a better understanding of CSR and to develop a more robust definition of CSR. However, none of them is suitable for studying the definition of CSR as socially constructed through discourse (Dahlsrud, 2008). Therefore, Dahlsrud (2008) presented a method in which the relative usages of the proposed dimensions of CSR were calculated. His results showed that CSR definition should consist of 5 dimensions; the environmental, social, economic, stakeholder and voluntariness. As Dahlsrud (2008) claims, the most used definition of CSR is proposed by the Commission of the European Communities (2001, p.6), which states that CSR is *"a concept whereby companies integrate social and environmental concerns in their business operations and in their interaction with their stakeholders on a voluntary basis*". Nowadays, the Commission of the European Communities puts forward a new and simpler definition, namely; "*CSR is the responsibility of enterprises for their impacts on society"* (2017).

2.1.1.1 Economical and institutional motives for complying with CSR

When it comes to the motives of adaptation of CSR policies, there is still the recurring question as 'why companies choose to respond to this increasing demand for corporations engaging in social action?'. The most often cited reason is that corporate social performance offers the company a positive and distinctive reputation (Marquis, Glynn & Davis, 2007; Rangang et al., 2012). This good reputation can provide many benefits such as attracting consumers (Creyer & Ross, 1997; Sen & Bhattacharya, 2001), attracting potential employees, (Turban & Greening, 1997; Beddewela & Fairbrass, 2015) lower costs, the ability to request premium prices, higher status and more positive performance (Campbell, Eden & Miller, 2012; (Rangang et al., 2012). Besides, this positive reputation may affect the willingness of buyers and suppliers to transact with the firm (Campbell, Eden & Miller, 2012). Moreover it might influence the support from local communities (Rangang et al., 2012) and it could lead to better financial results (Belu, 2013; Cavaco & Crifo, 2014; Campbell, 2007; Falck & Heblich, 2007; Marquis, Glynn & Davis, 2007; Rangang et al., 2012).

Institutionalization theorists argue that interconnectedness rather than competition is the underlying mechanism of companies adopting or copying CSR policies (Oliver, 1988). They claim that due to similar internal and external pressures and interaction among organizations, firms might be isomorphic to one another. As DiMaggio and Powell (1983) suggested, institutional isomorphism can be facilitated by coercive, normative and mimetic mechanisms. The first one, coercive isomorphism, results from both formal and informal pressures initiated by other firms upon which they are dependent and by cultural expectations of the society in which the firm operates (DiMaggio & Powell, 1983). Sometimes organizational change is a response to government mandate (DiMaggio & Powell, 1983). Examples of these governmental mandates are manufacturers who need to adopt new pollution control to conform to environmental regulations or non-profit organizations maintaining an account in order to meet tax law requirements. According to Chuang (2000), coercive forces arise from regulatory agents or dominant firms. By conforming to the rules and expectations of certain institutional environment, firms could benefit from maintaining their resource stability and organizational visibility (Chuang, 2000).

Another mechanism that can facilitate CSR is the mimetic mechanism. According to DiMaggio and Powell (1983), firms model themselves on other firms when technologies are poorly understood, when goals are ambiguous, or when the environment creates uncertainty. As a consequence, other firms will undertake that course of action without thinking. If enough of one type of business adopt a course of action, then others will imitate them (DiMaggio &

Powell, 1983). Imitating each other's CSR policies can also arise from imitation of successful organizations. Firms imitate other firms when they are perceived by organizational decision makers to be successful (DiMaggio & Powell, 1983). In the profit sector, extremely profitable organizations are, obviously, viewed as more successful than less profitable. Therefore, the most profitable firms are serving as models for the rest.

The last mechanism that can facilitate CSR is the normative mechanism. This type of isomorphic organizational change arises from professionalization (DiMaggio & Powell, 1983). DiMaggio and Powell (1983) mention two aspects of professionalization as important sources of isomorphism. As they state, universities and professional training institutions are important centres for the development of organizational norms among professional managers and their staff (DiMaggio & Powell, 1983). The similarity in professionalization can make it easier for organizations to transact with one another, to attract career-minded staff, and to fit into administrative categories to define qualification for public and private contracts (DiMaggio & Powell, 1983). This similarity in professionalization can lead to organizational isomorphism.

There are some studies that have shown that the level or participation in corporate social behaviour may differ between small and medium-sized and large firms (Langlois & Schlegelmich, 1990; Perrini et al., 2007; Udayasankar, 2007). Given the smaller scale of operations, resource access constraints and lower visibility, it is argued that smaller firms are less likely to participate in corporate social behaviour (Udayasankar, 2008; Perrini et al., 2007). For instance as larger firms tend to be more visible, they are expected to gain more from enhanced legitimacy and reputation effects or may also suffer more damages to their reputation for inadequate participation in corporate social activities (Udayasankar, 2008). Therefore, it is expected that larger firms are more likely to be socially involved (Udayasankar, 2007; Langlois & Schlegelmich, 1990). This in contrary to the smaller firms, by which they are expected to face fewer pressures or gain little recognition from corporate social initiatives given their comparatively lower visibility (Udayasankar, 2008). Another argument why larger firms are expected to be more socially involved is the access to more resources. As Johnson and Greening (1999) found, larger firms are associated with greater resource-slack. Their results suggest that large firms may be better able than smaller ones to donate to communities and to invest in recruitment and human resource activities, because larger companies have slack resources that the smaller ones lack (Johnson & Greening, 1999). This broader access to resources will have an effect on the involvement of corporate social activities. Given the greater scale of operations, resource access and the higher visibility of

larger firms, it is suggested that larger firms have a bigger social impact. Therefore, it is assumed that the duty to act social responsible falls on them, rather than on medium or small-sized firms.

2.1.2 Social issues

In order to determine the second aspect of Carroll's (1979) three-dimensional model of corporate performance, not only the nature of social responsibility has to be specified (economic, legal, ethical, discretionary), but the social issues to which these responsibilities are tied also have to be identified. Carroll (1979) listed the major social issues that firms could face (consumerism, environment, discrimination, product safety occupational safety and shareholders).The major problem in identifying these social issues is that they change over time (Carroll, 1979). For instance, product safety, occupational safety, health and business ethics were not a major interest decades ago compared to now. Similarly, to preoccupation with the environment, consumerism and employment discrimination which only recently have evolved (Carroll, 1979). As times change, so does the emphasis on the range of social issues (Carroll, 1979). However, as time has an influence on the emphasis of social issues, so does type of industry has. For example, a bank is not as pressed on environmental issues as a manufacturer (Carroll, 1979).

Diving a bit more into the environmental issues that firms could face, recently, preoccupation with the environment has evolved (Carroll, 1979). For instance, climate change is likely to have a significant impact on the environment (Steinfeld, Gerber, Wassenaar, Castel, Rosales & de Haan, 2006). The faster the climate changes, the greater will be the risk of damage exceeding our ability to deal with the consequences (Steinfeld et al., 2006). As a result, many ecosystems will decline and individual species extinct (Steinfeld et al., 2006). The greenhouse effect is a key element of the regulation of temperature. Greenhouse gases involved in this process include carbon dioxide (CO2), methane, nitrous oxide and chlorofluorocarbons (Steinfeld et al., 2006). Now it is known that there is an increase in the concentration of these gases in the atmosphere, which has resulted in global warming (Steinfeld et al., 2006). As the origin of the greenhouse effect has become clear, international policies were created to address the issue. In 1992 the United Nations Framework Convention on *Climate Change* (UNFCCC) started international negotiations to address this issue. Their objective is "*to stabilize greenhouse gas concentrations in the atmosphere within an ecologically and economically acceptable timeframe"* (Steinfeld et al., p. 82, 2006). In order

to reduce emissions that lead to global warming, more and more companies are adopting a policy aimed at climate change.

Other examples that have significant impacts on the environment are water, noise, and land pollution. The first one takes place when water is affected by the addition of large amounts of materials into the water (MBGnet, 2006). The type of water pollution can be divided into two categories, point source or non-source point of pollution (MBGnet, 2006). The first type of pollution occurs when the polluting item is emitted directly into the water (MBGnet, 2006). For instance, a pipe spewing chemicals directly into the water. The second type, non-point source, occurs when there is an overflow of pollutants into the water (MBGnet, 2006). For instance, when fertilizers from the land is carried into a stream by surface runoff (MBGnet, 2006).

Noise pollution occurs when there is an excessive amount of noise that causes temporary disruption of the natural balance (Conserve Energy Future, 2017). Examples of causes of noise pollution are industrialization (machines), social events, transportation and construction activities (Conserve Energy Future, 2017).

Land pollution is caused by industrial waste, agricultural pesticides and fertilizers, impacts from mining and other forms of industry, urbanization and systematic destruction of soil through over-intense agriculture (Woodford, 2012).

In order to reduce these kind of pollutions and social issues, companies choose to adopt an *Environmental policy*. In this case, firms carry out specific regulations, laws or other policies in order to improve environmental issues. The extent to which companies integrate these environmental policies in other policies differs per company. For instance, companies can choose to fully integrate their policy into other policies, they can choose to have one specific for the environment or they could choose to adopt nonsystematized practices.

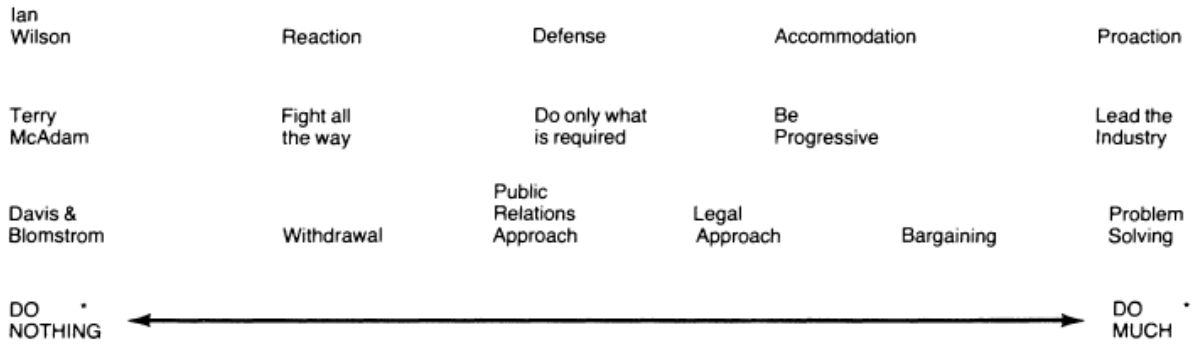
The Climate Change policy and the Environmental policy are examples of self-regulation mechanism that are adopted by firms to improve the environmental issues. However, adopting these policies does not necessarily mean that this will prevent them from environmental issues. Issues can arise anywhere at any time. When these issues occur, companies have to respond. The manner of responding to these issues can vary among companies. The strategies behind business response to social issues will be discussed in the next subparagraph.

2.1.3 Corporate social responsiveness

To identify the third aspect of Carroll's (1979) three-dimensional model of corporate performance, the strategy behind business response to social responsibility and social issues has to be reviewed (Carroll, 1979). As shown in figure 1, the firms' response to social responsibility can range from doing nothing (no response) to doing much (proactive response). Here, the assumption was made that firms have social responsibility and that their core activities are not aimed at moral obligation but on the level of managerial action (Carroll, 1979). Watrick and Cochran (1985) used the terms reactive, defensive, accommodative and proactive to characterize corporate strategy towards social responsiveness (also known as the RDAP scale). This scale is based on three concepts; rating, strategy and performance. Strategy was added to make the scale more practical in terms of the concepts of stakeholder relationships and responsibilities (Clarkson, 1995). This concept has become one of the two elements of evaluating the level of responsibility that a firm has concerning its management of stakeholder relationships and issues (Clarkson, 1995).

Several authors have suggested conceptual frameworks that describe the responsiveness continuum (Carroll, 1995). Wilson claimed that there are four possible business strategies; reaction, defence, accommodation and proaction (Wilson as cited in Carroll, 1995). Likewise, McAdam (1973) came up with social responsibility strategies that are in line with Wilson's strategies. He presented his philosophies as fight all the way, do only what is required, be progressive and lead the industry. Davis and Blomstrom presented their philosophies as withdrawal, public relations approach, legal approach, bargaining and problem solving (as cited in Carroll, 1995). Figure 2 below, represents these social responsiveness categories of several authors on a continuum.

Figure 2: *Social responsiveness categories* (Carroll, 1979, p. 502)



2.2 Corporate social responsible mechanisms adopted by companies

As stated in the introduction, the increased global competition that companies encounter over time, has forced organizations to constantly adjust in order to differentiate themselves *technically* as well as *managerially* from their competitors (Radonjic & Tominic, 2006). The increase in consumer awareness and the growing interest in how products and services are produced, used and disposed are demanding organizations to use cleaner production practices (Oliveira et al., 2010). As a consequence, as discussed in section 2.1, companies choose to incorporate corporate social self-regulation mechanisms or may implement management systems in their business strategy. This has widely led to the adoption of CSR programs, certified environmental management systems and environmental targets in order to improve and solve the most diverse environmental issues; avoid negative environmental impacts and improve use of natural resources (Gavronski et al., 2008). This section will first elaborate on the possibilities in **corporate social responsible self-regulation mechanisms**, this will be done by describing what kind of CSR programs and environmental targets companies can choose to adopt **(2.3.1),** where after, the most widely used international standards (**EMS)** are being discussed **(2.3.2.)**

2.2.1 Corporate social responsible self-regulation mechanisms

Given the enormous benefits of undertaking corporate initiatives, the question is not whether to engage or not engage in these activities but what is the best way forward to come up with CSR programs that reflect the company's values, while addressing social, humanitarian and environmental challenges (Rangan et al., 2012). To ensure that companies truly behave responsible, one might set standards, adopt corporate self-regulations or have voluntary initiatives involving, codes of conducts, environmental management systems, social and environmental reporting or support community projects. Most companies have standards in order to describe the various criteria that a product must have for reasons of quality and safety (ISO, 1996). Many of these standards are internal to an organization. They have been developed in order to improve and promote consistency, efficiency and competitive advantage (ISO, 1996). Codes of conduct are designed by companies, business and industry associations (UNRISD, 2004). However, company codes tend to be more common in sectors where brand reputation and export orientation are important (UNRISD, 2004). Company- and business association codes are often limited; they mainly focus on working conditions in core businesses and subject that high importance in the richer industrialized countries, such as deforestation and pollution (UNRISD, 2004).

According to Singh (2007), companies can adopt 5 types of codes of conduct, namely; the specific company codes; business association codes; multi-stakeholder codes; inter-governmental codes and international framework agreements. The majority of these codes are expected to be related to working conditions and environmental issues. However, these codes tend to be concentrated in a few business sectors. More specifically, environmental codes are usually found in the chemistry, forestry, oil and mining sectors (Singh, 2007).

Perrini et al. (2007) presented possible CSR programs that companies might implement. The CSR programs were identified focusing on specific categories of stakeholders. The categories that were identified are: (1) Employees; (2) Members/shareholders, Financial community; (3) Clients; (4) Suppliers; (5) Financial partners; (6) Government, local authorities and public administration; (7) Community and (8) Environment. Starting with an amount of variables, they narrowed down to 6 main factors which were labelled as: (1) Environmental management; (2) Employment; (3) Supply chain; (4) Local community; (5) Controlling and reporting and (6) Community volunteering. The variables included several items. For example, environmental management was measured by pollution reduction, noise reduction, energy reduction, water reduction, waste management packaging recovery and alternative energy. An overview of the specific measurements and their items can be found in appendix A.1. Companies implement such corporate programs or self-regulations to maintain compliance with environmental regulations, lower environmental costs, reduce risks, train employees, develop indicators of impact and improve environmental performance (Christini et al., 2004). Specific examples of environmental regulations have been discussed in section 2.1.2.

2.2.1.1 Potential benefits of implementing self-regulation mechanisms

As stated before, there are different motivations for companies to undertake corporate social initiatives. Rangan et al. (2012) enumerated in his article the most- and least important drivers for attending CSR programs. As previous studies show, the motivation for adoption of CSR programs and the expected benefits that companies hope to derive can be very different in several cases. Some of the possible benefits of the implementation of self-regulation mechanisms are summarized in figure 3 (Campbell, Eden & Miller, 2012; Rangang et al., 2012). A full overview of possible benefits of the implementation of self-regulation mechanisms can be found in appendix A.2 (Campbell, Eden & Miller, 2012; Rangang et al., 2012).

Figure 3: *Benefits of the implementation of self-regulation*

Type of benefit	
Financial advantage	✓ Generates new business and market opportunities ✓ Reduces operating costs ✓ Promises long-term gains by sign. changing its business environment
Productivity	✓ Improved process control ✓ Reduction of resource use, waste and emissions ✓ Protects resources on which the company depends ✓ Promises sign. new operations or supply chain or manufacturing efficiency
Management	✓ Reflects preferences operating managers ✓ Fulfills senior management or chief executive's social mission ✓ Clearly defined objectives and targets

2.2.1.2 Limitations of self-regulation mechanisms

In recent years, the limitations of company codes of conduct and corporate self-regulation have been addressed (UNRISD, 2004). Given the voluntary character of these approaches, they have some weaknesses and operational difficulties. First of all, corporate codes are voluntary and non-binding instruments, which means that no company can be held legally accountable for violating them (Singh, 2007). As Singh (2007) states, companies can be forced to implement codes only through moral persuasion and public pressure. Secondly, despite existing for many years, the number of adoption of codes is still relatively small (Singh, 2007). Furthermore, as mentioned before, corporate codes are limited to a few sectors (UNRISD, 2004; Singh, 2007). Moreover, the corporate codes are generally lower than existing regulations and are limited in scope (Singh, 2007). Note that there is an increasing concern that code of conducts are being misused to keep off public criticism on corporate activities and to reduce the demand for state regulation (Singh, 2007). As Singh (2007) states, there are examples of codes that have actually worsened the conditions and the bargaining power of labour unions. This limitations have led to other initiatives; multi-stakeholder initiatives. Examples of multi-stakeholder initiatives are the international certified management systems such as ISO 14001 or EMAS. These kinds of initiatives are considered as more credible, since NGOs and labour unions are involved as external monitors (Singh, 2007). In the next section the type of multi-stakeholder initiatives and address the limitations that go along with this type of initiatives will be discussed.

2.2.2 Environmental Management Systems (EMS)

The increasing awareness about the importance of the environmental depletion, natural resources and legal pressures for companies has led to manage their processes in a sustainable manner. As a result environmental certified management systems (EMS) are becoming a more interesting alternative for many companies (Oliveira et al., 2010). In order to improve the situation regarding to the environmental issues, managers around the world adopt environmental management systems in order to solve the most diverse environmental issues (e.g. avoid negative environmental impacts, improve use of natural resources, workforce awareness, process standardization and compliance with legislation) (Gavronski et al., 2008).

An EMS is '*a systematic approach to managing the organisation's impact on the environment' (*Wrap, p.2, 2015). It is a '*set of management processes that requires firms to identify, measure and control their environmental impacts'*. Moreover, it helps the companies' employees to understand the environmental impact of their actions (Wrap, 2015). Besides, it ensures that all operations have procedures that minimize their impacts and it will help identify opportunities to reduce waste, which could lead to lower costs (Wrap, 2015). Having such system is voluntary (Bansal & Hunter, 2003), however, organisations with an EMS have an explicit commitment to continual environmental improvement *(*Wrap, 2015). Setting up an EMS will provide companies worldwide with a framework through which its environmental performance can be controlled and improved *(*Wrap, 2015). Firms can decide to implement self-regulation mechanisms, without having to go through the time and expense of an international standard certification, however, self-regulation mechanisms often lack the legitimacy of the international standards, which is easily recognized by external stakeholders (Bansal & Hunter, 2003; Delmas, 2001). Moreover, without external certification, firms could indicate that they had adopted an EMS, but not follow through on those activities (Bansal & Hunter, 2003). This in contrary to self-regulation mechanisms, where there is no audit process to ensure that the company achieves what it was set out to do.

2.2.2.1 Potential benefits of implementing a certified EMS

Why would an organization want to get its EMS registered? From a business perspective, this is because both the financial as non-financial benefits outweigh the costs (Davies &Weber, 1998). Figure 4 summarizes common possible benefits of the implementation of environmental management systems (Campbell, Eden & Miller, 2012; Rangang et al., 2012). A full overview of the most common possible benefits of the adaptation of an registered EMS can be found in appendix A.3 (Bansal & Hunter, 2003;

Commission for Environmental Cooperation, 2005; Davies & Weber, 1998; Delmas, 2001; ISO, 1996; Marsh & Terrence, 2012; Wrap, 2015).

Figure 4: *Benefits of the adaptation of an registered EMS*

Type of benefit	
Financial advantage	✓ Superior economic performer ✓ Identification of opportunities to reduce waste such as raw material, utility and disposal costs ✓ Increased profits ✓ Reduced risk of fines for non-compliance with environmental legislation ✓ Lower insurance premiums as risks and liabilities are reduced ✓ More easily obtainable bank loans as result of lower risks, lower cost of capital ✓ Attracting shareholders and investors ✓ Improved international trade ✓ Barriers to imitation
Productivity	✓ Improved process control ✓ Reduces process waste and use of raw materials; efficiency ✓ Reduction of resource use, waste and emissions ✓ Involved employees can lead to increased operational efficiencies
Management	✓ Keeping ahead of environmental legislation ✓ Better relations with regulators ✓ Continual improvement and structured approach to environmental issues ✓ Clearly defined objectives and targets

2.2.2.2 Types of EMS

What distinguishes the certified international environmental management systems from the self-regulation mechanisms? In general, this is the requirement of an audit. Mostly, this audit is represented by a third party. Third-party registration entails '*the periodic audit of an organization's management system by an independent third party'* (Davies & Weber, p.56, 1998). This third party was set up to provide consistent registration of environmental management systems that meet the relevant standards (Davies & Weber, 1998). In contrary to the certified environmental management systems, self-regulation mechanisms have no audit process to ensure that the company achieves what it was set out to do. Therefore, self-regulation mechanisms often lack the legitimacy of the international standards, which is easily recognized by external stakeholders (Bansal & Hunter, 2003; Delmas, 2001). For this reason, an increasing number of companies choose to meet the requirements and adopt an international certified environmental management system. This thesis will be continued by outlining the most widely used management systems.

2.2.2.3 ISO 14001

The origin of the International Standards of Organization (ISO) dates back to 1947 (Marsh & Terrence, 2012). It was developed in order to set international standards for different sectors (Marsh & Terrence, 2012). It must help companies operating across different countries in order to increase trade, quality and productivity and reduce costs of goods and services (Marsh & Terrence, 2012). ISO has developed over 3000 standards, ISO 14000 is one of the most widely used voluntary approach (Arimura, Darnall, Ganguli & Katayama, 2016). Table A.4 in the appendix, summarizes the ISO 14000 series standards.

Many of the world's largest companies have certified their environmental management systems (EMS) under one of the most well-known type of ISO 14000 standard, namely; the ISO 14001 standards. The first ISO 14001 standards were published in 1996 by the International Organisation for Standardization (ISO, 1996). By December 2014, 324, 148 facilities worldwide had received an ISO 14001 certification (Arimura et al., 2016). As Rondinelli and Vastag (2000) state, these guidelines may create a framework for developing an environmental policy, identifying environmental aspects, defining objectives and targets, implementing a program to attain a company's goals, monitoring and measuring effectiveness, correcting deficiencies and problems and reviewing management systems in order to promote continuous improvement. The International Organization of Standardization defines the ISO 14001 standard as "*the part of the overall management systems that includes organisational structure, planning activities, responsibilities, practices, procedure and resources for developing, implementing, achieving, reviewing and maintaining the environmental policy. "It is a management tool which enables an organization of any size or type to control the impact of its activities, products, or services on the environment"* (Marsh, p.1, n.d.). The ISO 14001 is unique for itself, since it is designed to be applicable for any company, regardless of industry, size, location, and the level of their environmental responsibilities (Rondinelli & Vastag, 2000). ISO 14001 follows the same structure as illustrated in appendix A.5.

Previous studies of ISO 14001 have shown mixed results (Arimura et al., 2016). In contrary to the non-adopters, ISO 14001 adopters operating in the United States, Japan, Germany, Canada, France, Hungary, Norway and Mexico has shown improved environmental performance (Arimura et al., 2016). However, other studies in Mexico, United Kingdom and the US show no change in environmental performance or pollution (Arimura et al., 2016). Arimura et al. (2016) argue these mixed results can be explained by the institutional pressures arising from differences in regulatory settings across and within countries. These institutional

pressures have already been discussed in section 2.1.1. Countries have different types of environmental laws, with some being more prescriptive than others. Arimura et al. (2016) suggests that the flexibility in the regulatory systems create more stimuli for adopters to find more cost-effective approaches to reduce their environmental impacts.

2.2.2.4 ISO 14001 Requirements

The ISO 14001 does not require any requirements other than committing to legislation and regulations and implementing continual improvement process (Christini et al., 2004). It is also possible to adopt some or all element of the ISO 14001 without becoming certified. The standard contains 17 key elements divided into five areas: environmental policy, planning, implementation and operation, checking and corrective action and management review (ISO, 1996). These five components must be addressed in order for an organization to qualify for registration:

* *Environmental policy*: the company's policy must commit to regulatory compliance, prevention of pollution and continual improvement (ISO, 1996; Marsh & Terrence, 2012). This policy needs to be communicated to all employees and made widely accessible to the public. The environmental policy must be appropriate to the organisation in terms of size, scale and environmental impacts (Marsh & Terrence, 2012).

* *Planning:* includes (1) identification of environmental aspects, (2) identification of legal and other requirements, (3) establishment of objectives and targets and (4) establishment of environmental programs (ISO, 1996). Key is to identify the environmental aspects and impacts of the organization (Marsh & Terrence, 2012).

* *System of implementation and operations:* this element concentrates on the 'doing' aspect of the standard, at this stage the roles and responsibilities are defined (Marsh & Terrence, 2012). The system of implementation and operations includes the responsibility for environmental management, programs for training awareness and competence, internal and external communication of the system, a documentation control system, procedures for operational controls of environmental impacts and the emergency preparedness and responses (ISO, 1996; Rondinelli & Vastag, 2000).

* *Checking and corrective action:* includes (1) monitoring and measurement in relation to the plan; (2) record keeping and; (3) environmental management system audit. In this phase, any environmental non-conformance should be identified and preventive action should be taken. Moreover, internal audits should be scheduled, planned and conducted (ISO, 1996; Marsh & Terrence, 2012).

* *Management review:* includes a process by which the senior management re-examined the suitability, effectiveness and adequacy of the EMS at periods in time in order to ensure continuous improvement (Rondinelli & Vastag, 2000). This is sometimes defined as the adjustment phase of the Plan-Do-Check-Adjust (PDCA) cycle (Marsh & Terrence, 2012).

2.2.2.5 Advantages of ISO 14001

Proponents state that the adoption of ISO 14001 will help organizations to reduce their environmental incidents and liabilities, increase efficiency of operations by eliminating waste from production and distribution processes, increase awareness of environmental impacts among all employees and establish a strong image of corporate social responsibility (IISD as stated in Rondinelli & Vastag, 2000). Moreover, it improves investor confidence and it gives international competitive advantages over those that did not adopt (ISO, 1996). The standard will have an influence on the pollution prevention, which can save companies money by improving efficiency, reducing costs of energy, materials, fines and penalties (Davies & Weber, 1998; Rondinelli & Vastag, 2000; Wrap, 2015). As a consequence, registration under ISO 14001 makes the company better at managing environmental risks (Davies & Weber, 1998). Since ISO 14001 is voluntary, it is possible to develop EMSs that are applicable to their operations, characteristics, location and levels of risk (Marsh & Terrence, 2012; Rondinelli & Vastag, 2000). A key of ISO 14001 is that it does not set performance standards and does not measure environmental performance; it helps organisations in meeting a target of increased performance (Marsh &Terrence, 2012). ISO 14001 is more concerned about the process rather than the actual outcomes. Although 14001 might be defined as "voluntary", pressure may exist on companies to achieve certification due to pressures from stakeholders such as customers, shareholder, external supplier, local government or other companies operating in their sector (Marsh & Terrence, 2012).

2.2.2.6 Limitations of ISO 14001

System improvements involve and require dedication of resources in terms of time, energy and its costs (Davies & Weber, 1998; Marsh & Terrence, 2012). The costs and time used to get certification vary on size and demographics of the firms (Marsh & Terrence, 2012). The costs are dependent on whether it operates locally, nationally and/ or globally and its organisational structure. Costs of implementation and certification for large businesses can range from £50,000 to over £500,000, in contrary to SMEs whereby this can vary from £5,000 to £50,000 (Marsh & Terrence, 2012). Although ISO 14001 has many good intentions,

it has some weaknesses that may reduce its positive environmental impacts. This might lead to variation and inconsistency in its success rate among companies, which could reduce its sustainability for the long term (Marsh & Terrence, 2012). A key difference between ISO 14001 and other EMS standards is the omission of an annual environmental performance statement. As Marsh and Terrence (2012) state, this lack of transparency is a major limitation of ISO 14001 since there is no requirement to make any information public about the organisation's environmental impact. This may have an influence on the successfulness of ISO 14001 (Marsh & Terrence, 2012). However, although ISO 14001 may have some flaws, the benefits of having a systematic approach to environmental management, and in particular one that meets the requirements, outweigh the costs.

2.2.2.7 EMAS

The Eco-Management and Audit Scheme (EMAS) is a European voluntary scheme implemented in 1993, which was designed for companies to evaluate, manage and improve their environmental performance (EMAS, 2008). The European commission (2016) defines EMA on their website as "*a premium management instrument developed by the European Commission of companies and other organisations to evaluate, report, and improve the environmental performance"*. Its aim is to encourage firms to take responsibility for their environmental practices and to decrease harmful environmental impacts in a self-regulatory and voluntary way (Honkasalo, 1998). Moreover, it aims to reward those organisations that go beyond minimum legal compliance and attempt to improve their environmental performance continuously (EMA, 2008). Like the ISO 14001 standards, it is a voluntary plan that enables organizations to get a third-party certification for their environmental management systems (Wenk, 2004). In line with the ISO 14001 standards, the EMAS certification can be earned by firms operating in all sort of economic sectors, public or private, no matter what size.

2.2.2.8 EMAS Requirements

In order to obtain a EMAS registration, six steps must be taken; environmental policy, environmental review, environmental management system, environmental audit, environmental statement and registration by Competent Body and the use of EMAS logo. These six components must be addressed in order for an organization to qualify for registration:

* *Environmental review:* the company should have a comprehensive analysis of the environmental problems caused by their own practices (European Commission, 2016). An effective environmental review includes a clear picture of the firms' current environmental performance, identifies direct and indirect environmental impacts, identifies applicable legal requirements, sets criteria for assessing the significance of the environmental aspects and evaluates the results of previous accidents (European Commission, 2016).

* *Environmental policy:* this is a public document that describes the firms' commitments to the environment and specifies the their overall intentions and directions in terms of environmental performance (European Commission, 2016). Initially, the role of the EMS is to ensure successful implementation of the environmental policy and program (European Commission, 2016). This program is an action plan that translates the policy into specific objectives, goals and performance requirements (European Commission, 2016).

* *Environmental management system:* the implementation of what is learned from the environmental review. It is part of the firms' management consisting of structure, responsibilities to individuals, planning activities, development of processes and resources, and implementing, reviewing and maintaining the environmental policy (European Commission, 2016).

* *Environmental audit:* in order to check the effectiveness of the EMS, an internal environmental audit can be assigned. This helps to monitor the firms' performance of procedures and practices. To carry out an effective internal audit the company should develop audit procedures and protocols, select and train the auditors, collect the appropriate evidence and translate the findings into action that in the end will improve the environmental performance (European Commission, 2016).

* *Continuous environmental performance improvements:* the management should periodically check the consistency of the organisational approach to meet the goals stated in the policy and program (European Commission, 2016)

* *Environmental report (statement):* this is a comprehensive document that communicates the environmental performance to its stakeholders (European Commission, 2016).

* *Verification, validation and registration:* previous steps must be verified by an independent environmental verified who is licensed by an EMAS accreditation. The validated environmental statement will be sent to EMAS Competent Body for registration. When this is done the company can now use the EMAS logo to promote its registration and show its environmental commitment (European Commission, 2016)

2.2.2.9 Advantages of EMAS

A company may encounter several benefits when implementing an EMAS. The most important benefits are cost reduction as a result of better management of resources, risk minimisation, greater awareness of regulatory awareness, regulatory relief, increased staff commitment through increased participation, improved relationship with both internal as external stakeholders and competitive advantage as the EMAS registration can lead to improved market access and increased market share (Commission Européenne, n.d; Lucideon, 2016; Milieu Ltd. & RPA Ltd., 2009). The main benefits of the EMAS certification are quite similar to those of the ISO 14001, however, it differentiate itself from ISO since it has a verified and publically available environmental statement. The statement contains accurate and reliable environmental information that has been checked independently (Nqa, n.d.).

2.2.2.10 Limitations of EMAS

In contrary to the international standards (e.g. ISO series), EMAS is a governmental regulation (Daughtry, 2014). Moreover, it involves dedication of resources in terms of time energy and costs (Davies & Weber, 1998; Marsh & Terrence, 2012). Research found that organisations identified the costs of implementation a key barrier to registration (Milieu Ltd. & RPA Ltd., 2009). The estimated costs of a typical EMAS organisation is €48,000 for the first year and €26,000 annually for subsequent years (Milieu Ltd. & RPA Ltd., 2009). The average total costs estimated for organizations differ per size. The total average cost of maintaining and implementing EMAS for a large company are expected to be around €66,000 at the first year and €38,000 annually for subsequent years (Milieu Ltd. & RPA Ltd., 2009). In contrary, the SMEs' expected average costs of maintaining and implementing EMAS vary from €38,000 to €41,000 at the first year and from €17,000 to €22,000 annually for the subsequent years (Milieu Ltd. & RPA Ltd., 2009). Moreover, the lack of financial incentives and regulatory relief seem to be another key barrier for registration (Milieu Ltd. & RPA Ltd., 2009). Lastly, organizations serving principally the non- EU market tend to favour ISO 14001, since the latter is an internationally recognized standard (Milieu Ltd. & RPA Ltd., 2009).

2.2.2.11 Differences ISO 14001 and EMAS

The commission recognized that ISO 14001 could become a stepping-stone for EMAS in a way that the adoption of the management system element of ISO 14001 allows the company to easily progress from ISO 14001 to EMAS (European Commission, 2008). If the company is already ISO 14001 certified, it becomes easier to register for EMAS. Minor modification will be made as well as some additional steps specific to EMAS (European Commission, 2008). However, the main difference between EMAS and ISO 14001 lies in the fact that EMAS focuses more on the distribution of information to the public, external communications and responsibility outside of the organization and on environmental performance which makes the company more transparent (Daughtry, 2014; European Commission, 2016). Moreover, ISO 14001 and EMAS differ in the steps that are required for registration *(*Daughtry, 2004). These differences can be found in the figure in appendix A.6. The main differences between ISO 14001 and EMAS are summarized in figure 5.

Figure 5*: Differences ISO 14001 and EMAS (EMAS, 2008)*

	EMAS	**ISO 14001**
Status	Under legal bases. European Council and public law.	Under no legal bases. ISO standard under private law.
Organisation	The entity to be registered shall not exceed the boundaries other member state, and it is intended to go towards entities.	Does not go towards entities.
Environmental Policy	Included commitment to continual improvement of environmental performance of the organization.	Does not include a commitment to the continual improvement of environmental performance but of the performance of the system.
Initial environmental review	Verified initial review.	Initial review is recommended but not required.
Environmental aspects	Identification and evaluation of the environmental aspects. Establishment of criteria for assessing the significance of the environmental aspects.	Required only a procedure able to identify environmental aspects.

	EMAS	**ISO 14001**
Legal Compliance	Obligatory to demonstrate it. Required full legal compliance. There is a compliance-audit.	Only commitment to comply with applicable legal requirements. There is no compliance/audit.
External communication	Open dialogue with public. Public Environmental statement validated for verifiers.	No open dialogue with public. Only is required to respond to relevant communication from external interested parts. Control by public is not possible.
Continual improvement	Required annual improvement.	Required periodically improvement without a defined frequency.
Management review	Is wider and requires an evaluation of the environmental performance based in performance-audit.	Required an environmental performance in the management, but not through a performance audit.
Contractors and suppliers	Required influence over contractors and suppliers.	Relevant procedures are communicated to contractors and suppliers.
Employees involvement	Active involvement of employees and their representatives.	No.
Internal environmental auditing	Includes: system-audit, a performance audit and an environmental compliance audit.	Included only system audit against the requirements of the standard.
Auditor	Required the independence of the auditor.	Advised the independence of the auditor.
Audits	Check for improvement of environmental performance. Frequency required: 3 year cycle during which all areas are verified at least once.	Check environmental system performance. No frequency required.
External verification	Accredited environmental verifiers.	No
Verification/ certification scope	Verifiers accredited according to NACE codes.	Certifiers accredited according to EAC code.
Authorities are informed	Obligation by validation of Environmental Statement.	No obligation.
Logo	Yes.	No.

2.3 Corporate social accountability

As been discussed, companies encounter more often demands from multiple stakeholders to improve their environmental performance. As governments have fallen behind in meeting social and environmental needs, pressure on the companies operating in these markets increases (Schmidheiny, 2006). Recently, this has led to increasing calls for corporate accountability. The corporate accountability agenda includes proposals to create institutional mechanisms to hold corporations account for their behavior, rather than pressuring companies to improve standards or to report voluntarily (UNRISD, 2004). Corporate accountability initiatives promote complaints procedures, independent monitoring, compliance with national and international law and other agreed standards and mandatory reporting (UNRISD, 2004). It tries to re-establish the authority of states and intergovernmental institutions over corporations (UNRISD, 2004). In its core sense, accountability has been seen as '*a concept and process through which we can be held to account and we can hold others to account'* (Andrew, p.6 2001). In general, accountability has been defined as "*the requirement or duty to provide an account or justification for one's actions to whomever one is answerable*" (Swift, p.17, 2001). Whilst the definitions of accountability slightly differ, in the end accountability is about *"the provision of information between two parties where the one who is accountable, explains or justifies actions to be on to whom the account is owed*" (Swift, p. 17, 2011). Note that the information exchange can also be expanded to include groups larger than the individual, such as corporations or governments (Andrew, 2001).

Theory about accountability was rooted in the economic agency theory. According to this theory agents are prey to opportunism if they stay unchecked by regulation or other social controls established by the society (Swift, 2011). Accountability in this case is about whether stakeholders have sufficient, accurate, understandable and timely information on which to act (Swift, 2011). Specifically, it assumes that agents (organizations) cannot be trusted to act in the best interest of the principal (society) when there is a conflict between the two (Swift, 2011). This distrust results in an increased demand for regulation and other social controls in order to monitor information flow between the parties (Swift, 2011). According to Mulgan (2000), this form of accountability has several characteristics. First, it is external, in a way that the account is given to some other person outside the person being held accountable. Moreover, it involves interaction and exchange, which refers to the one that is calling for the account seeks answers, while the other side that is being held accountable (Mulgan, 2000). Lastly, it entails rights of authority, which means that those calling for an account claim to

have superior authority over those who are accountable, including the rights to demand answers and to impose sanctions (Mulgan, 2000).

As the economic agency theory shows, within the accounting literature accountability is often linked to financial information. However, accountability and the environment can no longer be considered as mutually exclusive (Andrew, 2001). Andrew (2001) claims that if only financial accounting will be used for decision-making purposes, it actually would encourage organizations to adopt an environmentally irresponsible behaviour. Therefore, a shift in the type of accountability is required. Gray et al. (p. 38, 1996) defined accountability as "*the duty to provide an account (by no means necessarily a financial account) or reckoning of those actions for which one is held responsible*". Holding on to this perspective, one might argue that accountability could play a significant role in re-orienting social values towards the environment (Andrew, 2011). Diving more into the form of environmental accountability, it is shown that companies can choose to use appropriate measures in order to improve their environmental performance. Such measures will address several issues; the extent of compliance with regulations, the extent of effectiveness of pollution control procedures, extent of energy usage, extent of waste produced in the production process, usage of sustainable resources and the extent of usage of recycled materials (Crowther & Aras, 2008).

To improve the companies' environmental performance, companies are adopting more often self-regulation mechanisms and environmental management systems (e.g. ISO 14001). However, as discussed in the research of Arimura et al. (2016), ISO 14001 has shown mixed results in relation to the environmental improvement. Moreover, several previous CSR issues show companies that are adopting these self-regulation mechanisms or environmental management systems not automatically truly behave accountable (e.g. Volkswagen's 'environmental emission scandal'; Coca-Cola's 'pesticides scandal'; Apple's 'limited transparency supplier sustainability policy'; or the scale of the 2010 BP oil spillage disaster in the Gulf of Mexico). This stresses the importance of the difference between claiming to behave corporate socially responsible and truly behaving environmental accountable.

3. Emerging markets: Brazil.

3.1. Emerging economies

As mentioned in the introduction, this study focuses on domestic and foreign companies operating in the emerging markets. The reason for focussing on the emerging markets as the subject lies in a variety of factors, as discussed in the introduction section. In order to get a clear understanding of what is meant by an emerging market company, this section will describe the characteristics of the context in which companies in emerging markets operate.

An emerging market economy is an economy that is moving to become advanced (Amadeo, 2016). This can be seen by the lower-than average income per capita, rapid growth, high volatility and their higher-than-average return for investors (Amadeo, 2016). Hoskisson et al. (2000, p.1) defined emerging economies as *"low-income, rapid-growth countries using economic liberalization".* In contrary to the developed countries, emerging markets are not as advanced but still have economies and infrastructures that are more advanced than the markets that are generally too small to be considered to be emerging markets. However, in these markets, institutional development is a complex and long process (Khanna & Palepu, 2010). It is shaped by the country's history, political, social systems and its culture (Khanna & Palepu, 2010).

Frequently used categories for defining emerging markets are poverty, capital markets and growth potential. Coined by economists at the International Finance Corporation (IFC) in 1981, countries that have low- or middle-income can be categorized as emerging economies (Khanna & Palepu, 2010). Moreover, it has low to average living standards and it is not industrialised (Khanna & Palepu, 2010). When it comes to the capital markets, emerging markets have low market capitalisation relative to their gross domestic product (GDP) (Khanna & Palepu, 2010). In addition, their capital markets have low stock market turnover and a few listed stocks (Khanna & Palepu, 2010). Besides, emerging markets have low sovereign debt ratings (Khanna & Palepu, 2010). Another category that was coined by the economists of IFC is the growth potential. According to them, the emerging markets have an open character to foreign investment (Khanna & Palepu, 2010). The last criteria that was used to define emerging markets is recent economic growth (Khanna & Palepu, 2010). Rapid economic growth defines an emerging market. Great examples of emerging markets are Brazil, Russia, India, China and South Africa (BRICS) (Maixner, 2013). The green highlighted countries in the figure in appendix A.7 represent the group of the emerging economies. At present, the IFC identifies 51 rapid-growth developing countries in Asia, Latin

America, Africa and the Middle East as emerging economies (Hoskisson et al., 2000). Despite their rapid-growth potential, unfortunately, some argue that the corruption in these markets will halt them altogether (Maixner, 2013).

3.1.1. An Institutional theory perspective of the emerging markets

The managerial challenge for domestic firms from emerging markets is to successfully compete with companies from the developed countries. Developed companies have two advantages over emerging market companies. First, they are well established and therefore have the benefits of incumbency, which refers to brand name, organizational capabilities and advanced technologies (Khanna et al. 2005). Moreover, they have leverage their access to vast resources, finances, talent, suppliers and distribution networks (Khanna et al., 2005). Unfortunately, domestic companies in the emerging markets do not encounter these advantages, even worse, they operate in markets that suffer from several market failures (e.g. lack of institutions and infrastructures) (Khanna & Palepu, 2010). These disadvantages are characterized as "*institutional voids".* Institutional voids can be defined as *'the absence or underdevelopment of specialized intermediaries such as database vendors, and quality certification firms, regulator corporations, and control enforcing mechanisms*' (Khanna et al., p.4, 2005). In western markets, there are several specialized intermediaries that can provide the needed information and contract enforcement in order to complete transactions (Khanna & Palepu, 2010). However, emerging markets lack these sorts of intermediaries that intermediate between buyers and sellers of goods, service and capital (Khanna & Palepu, 2010). Looking more into institutional voids, the figure in appendix A.8 presents the difference in the extent of institutional voids, comparing dysfunctional markets with developed markets.

Khanna and Palepu (2010) claim that the development of business strategy in any economy is driven by three markets: product, labour and capital. Institutional voids, explained above, can be found in any, or all of these dysfunctional markets. In developed markets, consumers can look for their desired products based on the provided information though advertising in newspapers, magazines or websites (Khanna & Palepu, 2010). Moreover, consumers have access to rating information on the quality and efficacy of variety of products and services (Khanna & Palepu, 2010). Khanna and Palepu (2010) state that a developed product market is dependent on a network of infrastructures. They divide these types of infrastructures into soft and hard infrastructures. *Soft infrastructure* consists of advertising and media agencies that promote corporate communication, market research companies and

logistics consultants that helps retailers (Khanna & Palepu, 2010). Emerging markets usually take this type of infrastructure for granted (Khanna et al., 2005). Likewise, the *hard infrastructure* (e.g. roads and bridges) is also crucial for low-cost movement of goods from producers to retailers. Besides, the role of public institutions such as national, state, local governments and courts that promote rules and enforce rules are also fundamental (Khanna & Palepu, 2010).

Additionally, there are also mechanisms in the capital market that may influence the functionality of the market. For example, financial reporting facilitates investor communication. Moreover, independent auditors and accounting standards increase the credibility of financial reports (Khanna & Palepu, 2010). In developed markets the capital market is strictly regulated. In these markets the central bank, security regulators and stock exchange enforce the rules (Khanna & Palepu, 2010). Moreover, investors in these markets can hold corporate managers and directors accountable for their practices. By reducing the perceived risks of investors, institutions make is possible for new companies to raise capital (Khanna & Palepu, 2010).

The last market that drives the development of business is the labour market. In this market, education institutions facilitate human capital and guarantee the quality by the graduation requirements (Khanna & Palepu, 2010). Agencies help employers to find talent and employment contracts and regulations enable the employer and the employee to guard their interests (Khanna & Palepu, 2010). On the contrary, in developing markets many of these intermediary institutions are either underdeveloped or absent.

3.1.2. A Transaction cost economics perspective of the emerging markets

In developed markets, companies can simply rely on several outside institutions to minimize their change of market failure (Khanna & Palepu, 2010). Although emerging markets have developed some of these institutions, they still miss intermediaries that easily lead to market failures. The transaction cost is also a measure to estimate how well a market is working (Khanna & Palepu, 2010). Transaction costs are "*costs that are incurred in arranging, managing, and monitoring transactions across markets, such as the costs of negotiation, drawing up contracts, and monitoring accounts receivable*" (Child & Faulkner, p.20, 1998). As Khanna and Palepu (2010) explain, markets that are functioning well will have, compared to dysfunctional markets, low transaction costs, a greater degree of transparency and shorter time periods to complete transactions. The figure in appendix A.9 shows a comparison of the transaction costs in emerging and developed markets. Looking at

the emerging markets that have the most rapid economic growth (BRIC countries), it can be noticed that it takes clearly more time for BRIC countries to register their new start-up business than in the developed countries (e.g. Brazil 18 days compared to 2 days in Canada). Moreover, looking at the costs (e.g. time that is takes to enforce a contract) a huge difference in the transaction costs in the BRIC countries compared to the developed countries is shown (e.g. 1420 days in India compared to 300 in the United States). As the figure shows, it can be stated that it is easier to transact in developed than in emerging markets. Therefore, transaction costs in emerging markets are overall much higher. Transactions costs, as result of arranging, managing and monitoring transactions across markets, are expected to be higher in emerging markets than in developed markets (Hoskissons et al., 2000). High transaction costs make an economy inefficient, leading to higher costs of capital, less labour mobility and increased cost of trading (Khanna & Palepu, 2010).

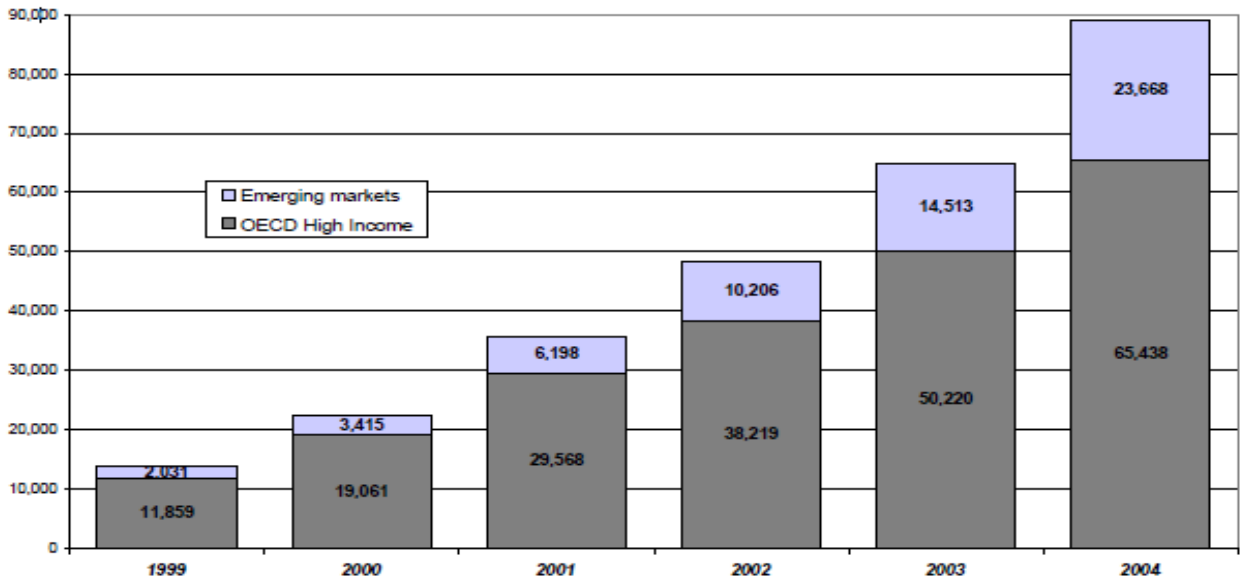
3.1.3 Corporate social responsibility of companies in an emerging market

As stated, there is very little empirical research on the nature and extent of CSR in emerging markets (Visser, 2007). Previous studies have shown that companies operating in the emerging markets (both domestic as foreign companies) do not share the same cultural- and social norms and encounter more or fewer demands by governments and the population in relation to environmental issues in contrast to developed markets (Oliveira Serra & Salgado, 2010; Visser, 2007). In contrary to the well-functioning markets, developing markets encounter fewer demands by governments and other stakeholders. An interesting exceptional study on the emerging market is Baskins's study (2006) that examines the level and extent of corporate responsibility reporting by domestic and foreign companies operating in emerging markets. Moreover, he compared corporate responsibility in emerging markets with that in developed countries by looking at three main generic indicators; composition of the Dow Jones Sustainability Index, Global reporting initiatives and the level of ISO 14001 certifications. He found that companies in emerging markets have a decent representation in the Dow Jones Sustainability index and are showing increasing levels of Global Reporting initiatives and the ISO 14001 certification (as shown in figure 6). Moreover, he found that two-third of the companies had a sustainability report or had specific sections on their website or annual report concerning CSR. However as Baskin (2006) showed, corporate responsibility in emerging markets tend to be less integrated in corporate strategies in comparison to developed markets.

As described, CSR in developing countries differs from the developed ones. Visser (2007) summed up the most distinctive characteristics. As he state, in contrary to the developed markets, their corporate social responsibility benchmarks tend to be less formalised. (e.g. CSR codes, reporting guidelines or management system). Moreover, this type of responsibility in emerging markets is used to be more associated with charity and philanthropy (Visser, 2007). Bedsides, the priority of these CSR issues is shown to differ between the two markets (Visser, 2007). Taking the CSR pyramid of Carroll discussed in section 2.1.1 in mind, it strikes that the CSR pyramid of emerging markets differ from Carroll's classic pyramid. In the developing countries, economic responsibilities get the most emphasis, followed by philanthropy as the second highest priority, followed by legal- and ethical responsibilities (Visser, 2007). Looking at the legal responsibilities of companies operating in the developing market, they generally have a lower priority than in developed countries. However, Visser (2007) states that this does not necessarily mean that companies ignore the law but they encounter less pressure for good conducts. Looking at, Carroll's proposed ethical responsibilities, in developing countries, ethics have the least influence on the CSR agenda (Visser, 2007). Note that this does not mean that emerging markets do not encounter global pressures towards improved governance.

To summarize, the CSR pyramid of emerging markets differs from the by Carroll's proposed classic pyramid. In contrary to the developed markets, legal- and ethical responsibilities get less attention. However, this does not mean that they fully ignore other responsibilities. Like the classic pyramid, economic responsibilities are still getting the highest priority in both markets.

Figure 6: *Growth in ISO14001 certifications worldwide* (Baskin, 2006, p. 33)



3.3 Brazil

3.2.1 Brazilian Context

Brazil is a good example of an emerging market that has the most rapidly expanding economy and has the world's largest potential market. This country has shown to face growing visibility (Crisóstomo, Freire & Parente, 2014). More specifically, diving into Brazil's CSR it is shown that it has become the regional powerhouse (De Oliveira, 2006). Knowing this, the question raises; where does this CSR movement come from in Brazil? In order to answer this question adequately, the context of Brazil has to be taken into account. This because the development, as described, is eventually shaped by the country's history, political, social systems and its culture (Khanna & Palepu, 2010).

Brazil, officially called the Federative Republic of Brazil, is one of the most powerful emerging market and a contributor to global growth (CIA, 2016). Moreover, it is the largest country in South and Latin America (CIA, 2016) and consists of twenty-six states (Oliveira, Serra & Salgado, 2010). It has a total area of 8,515,770 sq. km, which is somewhat smaller than the U.S. (CIA, 2016). The Brazilian population was in 2016 estimated at 205,8 million inhabitants, which have Portuguese as their official language (CIA, 2016). The estimated population growth rate is 0.75% and the percentage of the total population that can read and write contains 92.6%, which is very high (CIA, 2016). The Brazilian economy is characterized by large and well-developed agricultural, mining, manufacturing and service sectors and has a rapidly expanding middle class (CIA, 2016). However, the country has one of the highest levels of income inequality. The poorest 20% of the population is responsible for only 2.8% of the GNP and the richest 20% is responsible for 61.1% (Yamahaki & Ursini, 2010). Unfortunately, the country has a shirking economy, growing unemployment and rising inflation since 2013 (CIA, 2016). At the moment, Brazil has a GDP per capita of 15,048 dollars which is compared to previous year an economic growth of -3.8% (Focuseconomics, 2016). Of this total income 13% was earned by companies within the agriculture, 38% within the industry sector and 49% within the services sector (CIA, 2016).

3.2.2 Brazilian priority issues

The Portuguese colonization in Brazil has influenced the social situation in Brazil Yamahaki & Ursini, 2010). Moreover, the exclusion of black population after the abolition of slavery also has an impact on the current situation (Yamahaki & Ursini, 2010). Due to democratic reforms in the 1980's, Brazil is gaining more economic and political stability. However, the nation still faces an extensive range of social and environmental problems

(extreme inequality, land concentration, child labour, racial discrimination, deforestation, poor access to health and medication and pollution in the big cities) (Yamahaki & Ursini, 2010). The Brazilian government has shown to be financially incapable when dealing with these social and environmental problems. This has resulted in a gap for the private sector to step in and tackle these issues (Yamahaki & Ursini, 2010).

Looking at the institutional context of Brazil, it is noticed that it has a vibrant democracy. However, corruption exists in the federal and state governments (Khanna et al., 2005). Moreover, foreign companies partner with domestic ones in order to gain local expertise (Khanna et al., 2005). To explain the development of Brazil, the Brazilian market needs to be divided into three markets: product, labour and capital. Looking at the product market, there is a good network of highways and airports ports. Next to that, in the labour market managers have varying degrees of proficiency in English (Khanna et al., 2005). Trade Unions tend to be very strong, which means that firms choose to sign agreements with them (Khanna et al., 2005). Looking at the credibility of corporate performance information, it is noticed that financial-reporting systems are functioning very well. Moreover, a good banking system exists and there is a healthy market for initial public offerings (Khanna et al., 2005). Diving into the political system of Brazil, it is noticed that the form of government is that of a democratic federative republic which has a presidential system (Khanna et al., 2005). Here, the president is head of state and head of the government of the Union. Lastly, the social system shows that local media are very influential and serve as watchdogs, however, the influence of local NGOs remains marginal (Khanna et al., 2005).

Besides the social issues, environmental issues also arise in Brazil. For instance, deforestation in Amazon Basin destroys a number of plant and animal species in the area (CIA, 2016). Deforestation is a significant problem in terms of the loss of carbon storage capacity provoked by the expansion of national and international markets for beef, soybeans and cocoa (Yamahaki & Ursini, 2010). Yamahaki and Ursini (2010) state that if the Brazilian emissions from deforestation were considered, the county would be ranked as the world's fifth biggest polluter (Yamahaki & Ursini, 2010). Moreover, Rio de Janeiro and other large cities suffer from air and water pollution. Moreover, land degradation and water pollution in Brazil is caused by improper mining activities (CIA, 2016).

3.2.3 Brazilian legislation and codes

In contrary to other emerging markets, legislation is not an effective driver for CSR in Brazil (Yamahaki & Ursini, 2010). As the quality of legislation is considered as good, even advanced in case of environmental laws, it is noticed that the enforcement of these laws is seen as the biggest problem (Yamahaki & Ursini, 2010). Besides, enforcement is very complicated by the judiciary system because it is very slow, unreliable and sometimes corrupt (Yamahaki & Ursini, 2010).

Brazil has numerous international environmental treaties. In 1988, environmental protection was considered as fundamental when engaging in social, political and economic activities (Yamahaki & Ursini, 2010. This perspective can be seen as an innovation in contrary to other countries. The extent to what environmental requirements are enforced by regulators differs marginally per state. For example, in Sao Paulo, environmental laws are enforced by the state environmental agency (Thomson Reuters, 2016). As where in other states environmental regulators have jurisdiction over environmental matters (Thomson Reuters, 2016). Although a gradual improvement can be seen, still some state agencies are dependent on public prosecutors or NGOs to initiate their enforcement of environmental laws (Thomson Reuters, 2016). The key pieces of environmental legislation and the regulatory authorities in Brazil are listed in the figure in appendix A.10.

Thomson Reuters (2016) state that individuals and organizations that do not hold to the required licences can be seen as the cause to administrative and criminal liabilities, even if their practices did not resulted in environmental damage. Penalties in Brazil include shutdowns and fines ranging from BRL 500 to BRL 10 million. Pollution to water resources can be fined up to BRL 50 million, depending on the extent of the damage (Thomson Reuters, 2016). Diving into the national targets for reducing greenhouse gas emissions, increasing the use of renewable energy and/or increasing energy efficiency, Brazil has announced a national target for reducing greenhouse gas emissions by 2020 (Thomson Reuters, 2016). At the moment, each sector is presenting plans for decreasing its emissions. However, states and several authorities are still issuing additional laws and regulations concerning climate change (Thomas Reuters, 2016). The federal law defines a polluter as *"a person/company who directly or indirectly causes environmental degradation"*. (Thomas Reuters, p.1, 2016). Any disposal of waste violating the environmental standards is forbidden and can lead to fines or other types of sanctions (Thomas Reuters, 2016). However, businesses do not need to carry out internal or independent audits since no federal law gives a general guideline to perform mandatory environmental audits (Thomas Reuters, 2016). As a consequence, some states (e.g.

Rio de Janeiro) have established laws to regulate compulsory audits. Lastly, Brazilian companies are obligated to report information about environmental issues to the environmental protection agencies (Thomas Reuters, 2016). Besides the government regulations, Brazil has a number of voluntary codes. The Brazilian Code of Corporate Governance is the most relevant one since represents the best practices in corporate governance. Moreover, this code has led to the promotion of transparency in Brazil (Yamahaki & Ursini, 2010).

3.2.4 Trends in Brazil

As Yamahaki and Ursini (2010) claim, the importance of CSR is increasing in the private sector. However, most of the CSR initiatives still remain philanthropic. This can be explained by the Catholic tradition of charitable giving and the pressuring social needs of the society (Yamahaki & Ursini, 2010). For example, firms investing in community development increased in 2004 from 59% to 69% (Yamahaki & Ursini, 2010). Motives given by companies are humanitarian motives (57%), requests from different entities (47%) and the perceived need of companies contribute to this development (38%) (Yamahaki & Ursini, 2010).

In terms of data related to the institutionalization of CSR in Brazil, seven Brazilian companies are listed in the Dow Jones Sustainability World Index and even 339 companies have joined the UN Global Compact (Yamahaki & Ursini, 2010). As figure 7 shows, the number of ISO14001 certifications in Brazil has obviously increased over time (Baskin, 2006; Oliveira, Serra & Salgado, 2010; Yamahaki & Ursini, 2010). As Oliveira, Serra and Salgado found in their study (2010), Brazil had in 2008 2447 ISO 14001 certificated firms. This number shows that Brazilian companies want to be more a part of the solution rather than the problem. Nowadays, an increase of managers in Brazil belief that CSR leads to better productivity, efficiency and employee morale (Schmidheiny, 2006).

To explain where the CSR movement from Brazil comes from, the explanation is as follow; this is a combination of elements (1) a healthy economy, which has made CSR easier (2) the huge divide between the rich and the poor inhabitants of Brazil, an issue to which organizations want to be a part of the solution rather than as a cause and (3) the fact that organizations want to distance themselves from the reputation of corruption, which is still be seen as a major problem in Brazil (Oliveira, 2006).

Figure 7: *IS0 14001 certification for selected emerging markets. Baskin, 2006.*

	1999	2000	2001	2002	2003	2004
China	222	510	1,085	2,803	5,064	8,862
Brazil	165	330	350	900	1,008	1,800
India	111	257	400	605	879	1,250
South Africa	82	126	169	264	378	393
Russia	0	3	12	23	48	118

3.3 Hypothesis development

To improve the environmental performance, companies set self-regulation mechanisms and adopt environmental management systems. Some of them adopted them already for years, some currently started issuing these regulations or adopting these systems. Seen the issues that have passed, it can be questioned if companies who claim to behave environmental responsible, truly behave so. Therefore, hypotheses were drawn up in order to examine whether domestic and foreign companies operating in the Brazilian market, that adopt environmental management systems or self-regulation mechanisms, truly behave in line with what they are claiming. Moreover, this study examines whether the duration of the adoption process of the management systems has an influence on the environmental performance of these firms. In order to determine their environmental performance the time that the systems are adopted and whether companies are taking actions in order to reduce water, electricity, fuel, wood and coal usage will be examined.

The environmental performance of companies operating in the emerging markets is determined by using a case study. In this study, the focus is on Brazil. This country has shown growing visibility in relation to CSR initiatives (Crisóstomo, Freire & Parente, 2014). Brazil has been gaining economic and political stability, however, it still faces social and environmental problems (e.g. deforestation or air- and water pollution in the big cities). Looking at the national targets for reducing greenhouse gas emissions, increasing the use of renewable energy and/or increasing energy efficiency, Brazil has announced a national target for reducing greenhouse gas emissions by 2020 (Thomson Reuters, 2016). These facts show that CSR is becoming a more pressing subject in Brazil. However, if firms really behave environmentally responsible, can be questioned. The researcher expects that self-regulation mechanisms and environmental management systems will have a positive influence on the environmental performance of companies. Moreover, the researcher expects that companies with more experience with an environmental management system have a higher

environmental performance. However, if this is really the case will be examined with the help of three hypotheses drawn up below:

H1: Companies with more experience with an *environmental management system* have a higher *environmental performance (a. water, b. electricity, c. fuel and d. wood and coal reduction actions)* compared to companies with no experience.

H2 : Companies with self-regulation mechanisms, more specifically an *Environmental policy*, have a higher *environmental performance (a. water, b. electricity, c. fuel and d. wood and coal reduction actions)*.

H3: Companies with the self-regulation mechanisms, more specifically a *Climate change policy*, have a higher *environmental performance (a. water, b. electricity, c. fuel and d. wood and coal reduction actions)*.

4. Methodology

Chapter 2 and 3 focused on theoretical concepts such as corporate social responsibility, self-regulation mechanisms and environmental certified management systems. Moreover the emerging markets and outlined motives for companies operating in these markets to undertake CSR initiatives were discussed. The purpose of this study is to examine to what extent companies in emerging markets, in particular Brazil, that adopt environmental management systems or self-regulation mechanisms, truly behave environmentally responsible. Moreover, it will be examined whether companies with more experience with an environmental management system have a higher environmental performance compared to companies with no experience. In order to answer the hypotheses that were drawn up in previous chapter adequately, this chapter will introduce empirical foundations and assumptions. This will be done by using the selection of research design, development of the data analysis technique and the development of the operationalization scheme.

4.1 Research design

A secondary analysis was performed in order to answer the hypotheses of this research adequately. Secondary analysis is a form of research in which the data is collected and processed by one researcher and is reanalysed by another (Babbie, 2013). This indicates that in this study, the same data was analysed with a slightly different interest. A major advantage of this secondary analysis is that present study could benefit from the work of professionals (Babbie, 2013). On the other hand, the key problem of this design involves the recurrent question of validity (Babbie, 2013). Questions that were asked by the researcher come close to measuring the interest of this study, however, questions asked are asked just a little differently (Babbie, 2013). The original data was collected from September to November in 2010. The information was obtained through sector-specific questionnaires (Análise Gestão Ambiental, 2011). The used edition, the Análise environmental Management year book, is an in-depth survey made with Brazil's largest companies (Análise Gestão Ambiental, 2011). When executing a survey-research, it is important that it concerns a significant large group of similar items, which are composed in order to gain certain specific data that are collected in a systematic way (Vennix, 2010). Moreover, it is important to take the size of the research sample into account. A researcher may choose to have a specific research sample when the population tends to be too large to involve the whole population (Vennix, 2010). The aim of sampling is to generalize from a specific sample to the whole population in general.

In order to analyse the results of the secondary data set, a quantitative analysis was performed. A quantitative analysis is "*the numerical representation and manipulation of observations for the purpose of describing and explaining the phenomena that those observations reflect" (*Babbie, p.414, 2013). To conduct one, researchers must engage in a coding process after the data was collected. For instance, in order to measure the firms' actual environmental performance the researcher coded possible actions for reducing water, electricity, fuel and wood and coal usage into different categories (e.g. monitor with indicators; re-use targets; reduction targets; structured programs; employee awareness actions or no specific actions). The more they fall into several categories, the better they are behaving in relation to the environment. This indicates that the possible categories of environmental performance were *not* mutually exclusive. This in contrary to the questions regarding environmental policies or environmental management systems: firms simply have it or do not. To ensure that the comparison among companies will be meaningful, the researcher only used data that was collected only from one specific country. This has been done in order to minimise host-country effects such as cultural, economic, social and political factors (Beddewela & Fairbrass, 2015).

4.2 Sample description

The sample that was used dates back from 2010 and was collected from the Análise Environmental Management yearbook (Análise Gestão Ambiental, 2011). More than 700 companies (representatives of several business areas) answered the questionnaire that was proposed. The purpose of this questionnaire was to outline an analysis about the relationship between private initiatives and the environment (Análise Gestão Ambiental, 2011). The Análise Environmental Management yearbook consists of three chapters; (1) Environmental practices of companies; (2) Environmental practices of banks and; (3) Profile of environmental NGOs. Company names, banks and NGOs were ordered alphabetically and by type of industry. In total, 1,411 companies and 58 banks were contacted by the team of researchers of Análise Editorial (Análise Gestão Ambiental, 2011). In this edition, 573 companies and 21 banks answered the questionnaire.

Only the first part of this yearbook was used in order to answer the hypotheses adequately. It comprised 573 companies operating in the Brazilian market. The companies that took part in this survey were selected according to their net revenue. Moreover, transnational companies that did not published a balance sheet in Brazil and companies that are part of corporate groups with a minimum net revenue of R$ 60 million a year also took

part in the survey (Análise Gestão Ambiental, 2011). The companies selected were from four different type of industries; agriculture, commerce, manufacturing and service. Since the data set consists of firms from different type of industries results can be more easily generalized. The distribution of the industries is presented in figure 8.

Figure 8: Distribution of industries

Sector	**N**	**%**
Agroindustry	65	11.3
Commerce	33	5.8
Manufacturing	283	49.4
Services	192	33,5
Total companies	**573**	**100**

4.3 Operationalization

In this section the operationalization of the variables will presented. It will explain how each variable was measured. This allows understanding what is meant with each variable in this study.

4.3.1 Independent variables

ISO 14001 standards

As a result of the increasing awareness about depletion, natural resources and legal pressures for companies to manage their practices in a sustainable manner, environmental certified management systems (EMS) are becoming a more interesting alternative for many companies (Oliveira et al., 2010). An EMS is '*a systematic approach to managing the organisation's impact on the environment' (*Wrap, p.2, 2015). It is a '*set of management processes that requires firms to identify, measure and control their environmental impacts' (*Wrap, p.2, 2015). In this study, the adoption of the ISO 14001 will be examined. The International Organization of Standardization defines the ISO 14001 standard as "*the part of the overall management systems that includes organisational structure, planning activities, responsibilities, practices, procedure and resources for developing, implementing, achieving, reviewing and maintaining the environmental policy. "It is a management tool which enables an organization of any size or type to control the impact of its activities, products or services on the environment"* (Marsh, p.1, n.d.).

In this research, this first independent variable was measured by determining whether the company has an ISO 14001 policy and for how long it is adopting these standards. When looking at the ISO 14001 policy variable it was noticed that it consists of seven categories; all mutually exclusive. This indicates that firms were only able to pick one of the seven options. Firms could have (category 1) ISO 14001 standards for up to 2 years; (category 2) ISO 14001 standards from 2 to 5 years; (category 3) ISO 14001 standards from 5 to 10 years; (category 4) ISO 14001 standards from more than 10 years; (category 5) has no ISO 14001 standards but has plans to implement it; (category 6) has no ISO 14001 standards but is in process of obtaining it; or (category 7) has no ISO 14001 standards and it is not considered necessary at the moment. The frequency table in appendix C.5 shows that 31 fall in category 1 (Yes. For up to 2 years), 60 in category 2 (Yes. From 2 to 5 years), 151 category 3 (Yes. From 5 to 10 years), 47 category 4 (Yes. From more than 10 years), 116 category 5 (No. but plans to implement it), 76 category 6 (No. But is in process of obtaining it) and 92 category 7 (Not considered as necessary at the moment). Analysing these categories, it can be determined whether companies have ISO 14001 standards and for how long they are meeting these standards.

Self-regulation mechanisms: Environmental policy

As described, water-, noise- and land pollution have significant impacts on the environment. In order to reduce these kind of pollutions and other social issues, firms adopt an environmental policy. In this case, they carry out specific regulations, laws or other policies in order to improve their environmental performance. Determining whether the company has an environmental policy and to what extent firms integrated this policy to other policies was examined by analysing the possible categories firms could fall in. They could fall into four categories; likewise all were mutually exclusive. They could have (category 1) an environmental policy integrated to other policies; (category 2) an environmental policy specific for the environment; (category 3) *not* have an environmental policy but could adopt nonsystemaized practices or; (category 4) *not* have an environmental policy at all. The frequency table in appendix C.6 shows that 368 firms fall into category 1 (Yes. Integrated to other policies); 129 into category 2 (Yes. Specific for environment); 70 into category 3 (No. It adopts nonsystematized practice) and 6 into category 4 (No). By analysing the proposed categories, the researcher can examine whether companies have an environmental policy and to what extent they have integrated this policy.

Self-regulation mechanisms: Climate change policy

Another environmental issue the world faces is the climate change. Human activities are responsible for changes in the climate system. Although there are many uncertainties about the precise nature of the link between human activities and climate change, many scientist point to the effect from people emitting too much CO2 and other greenhouse gasses (GHG) (Shogren & Toman, 2000). CO2, released from use of fossil fuels (coal, oil and natural gas), is the most human created greenhouse gas. Other gases are methane, chlorofluorocarbons, nitrous oxides associated with fertilizer use. (Shogren & Toman, 2000). The accumulation of these gases in the atmosphere has changed and will continue to change the climate (Shogren & Toman, 2000).

In order to reduce the emission of these harmful gases, companies implement measurements, emission level targets or adopt a Climate Change Policy. The objective of this policy is "*to stabilize greenhouse gas concentrations in the atmosphere within an ecologically and economically acceptable timeframe"* (Steinfeld et al., p. 82, 2006).

In this research, firms could fall in three categories when it comes their Climate change policy. Likewise previous variables, the categories of this variable were all mutually exclusive. Companies could fall in (category 1) having a Climate change policy; (category 2) *not* have a Climate change policy; or (category 3) could have plans to implement it. The frequency table in appendix C.7 shows that 156 firms fall into category 1 (Yes); 303 into category 2 (No) and 114 into category 3 (Plans to implement it).

4.3.2. Dependent variables

Company's environmental performance

The environmental performance was determined by looking at the company's actions to reduce water, electricity, fuel, and wood and coal usage. Firms could take several actions regarding water, electricity, fuel, and wood and coal reduction. The more actions firms have, the higher they scored on the dependent variable. For instance, if a firm has a score of 0 it indicates that the firm does not have any specific action regarding water, electricity, fuel, and wood and coal reduction. If a firm scored a 3 it indicates that the firm took 3 specific actions in order to reduce usage of the dependent variables. In addition, respondents that checked the alternative "not applicable to our business activity" were eliminated from the analysis. It has to be kept in mind that these outcome variables are *not* mutually exclusive, since companies could undertake several actions in order to improve their environmental performance. How each type of environmental behaviour was measured will be described below.

a. Environmental performance regarding water

In order to determine the companies' environmental performance in relation to water, firms were asked to fill out how water was used within the company. As described above, categories were *not* mutually exclusive so they could fall into several categories. Firms could monitor their water use with indicators (category 1); could have re-use targets (category 2); could have reduction targets (category 3); could have a structured program (category 4); could have employee awareness actions (category 5) or; could have no specific actions (category 6). If firms fell into the latter category, they did not undertake any specific actions to reduce water usage and therefore could not fall in one of the other five categories.

In order to test whether independent variables have an influence on the firms' water reduction actions, the dependent variable was recoded into a different variable namely, the water_sum variable. If a firm filled in that they had one of the possible actions they got a 1 score on this dependent variable. If a firm filled in that they had two of the possible actions, they got a 2 score on this sum variable, and so on. However, if the firm filled in that they did not engage in any of the actions, they got a zero score. This indicates that the higher the score on the variable water_sum, the more firms engage in water reduction actions. Looking at the descriptive statistics of the water variable in appendix C.1, 572 companies filled in the question regarding water reduction actions. Here, the score on water reduction actions ranged from 0.00 to 5.00, with an average of 3 water reduction actions (*SD* = 1.55). 26 firms turned out to have no specific water reductions at all, where 130 firms claimed to have all the possible actions regarding water reductions.

b. Environmental performance regarding electricity

To measure the environmental performance in relation to electricity, companies were asked to fill in how electricity was used within the company. Likewise their performance regarding water, firms could monitor their electricity use with indicators (category 1); could have re-use targets (category 2); could have reduction targets (category 3); could have a structured program (category 4); could have employee awareness actions (category 5) or; could have no specific actions (category 6). If firms fell into the latter category, they did not undertake any action to reduce electricity usage and therefore could not fall in the other five categories.

To check whether the independent variables have an influence on the firms' electricity reduction actions, the dependent variable was recoded into a sum variable (electricity_sum). If a firm declared to have one action, they got a 1 score on this dependent variable. If they did

not have any, they got a zero. This indicates that the higher the score on the variable electricity_sum, the more firms engage in electricity reduction actions. The descriptive statistics of the electricity variable in appendix C.2 shows that 573 companies filled in the question regarding electricity reduction actions. The firms' scores on electricity reduction actions ranged from 0.00 to 4.00, with an average of 2.5 electricity reduction actions (*SD* = 1.28). 33 firms claimed to have no specific electricity reductions, where 176 firms claimed to have all them all.

c. Environmental performance regarding fuel

In order to examine the environmental performance in relation to fuel, firms were asked how fuel was used within the company. Firms could fell into four different categories. They could monitor their fuel use with indicators (category 1); could have reduction targets (category 2); could have a structured program (category 3) or; could have no specific actions (category 4). Like previous dependent variables, firms that fall in the latter category did not undertake any specific action to reduce fuel usage and therefore could not fall into other categories.

To examine whether the independent variables have an influence on the firms' fuel reduction actions, the fuel variable was recoded into a sum variable (fuel_sum). Firms that claimed to take one of the possible actions, got a 1 score. If they did not have any, they got a zero. So, this means that the higher the score on the variable fuel_sum, the more firms engage in fuel reduction actions. 573 companies filled in the question regarding fuel reduction actions. As appendix C.3 shows, the firms' scores on fuel reduction actions ranged from 0.00 (194 firms) to 3.00 (91 firms), with an average of 1.17 fuel reduction actions (*SD* = 1.07).

d. Environmental performance regarding wood and coal

In order to determine the environmental performance in relation to wood and coal, 573 firms were asked how wood and coal were used within the firm. Firms could undertake several actions. They could monitor their wood and coal use with indicators (category 1); could have reduction targets (category 2); could have a structured program (category 3) or; could have no specific actions (category 4). However, since the question regarding wood and coal usage is not applicable to every business, this variable has the category 'not applicable' (category 5). Firms that fell into this category were eliminated from the analysis.

To predict whether the independent variables have an influence on firms' wood and coal reduction actions, the outcome variable was recoded into a sum variable (wood_sum).

Firms with no engagement in wood and coal reduction actions were coded as 0, where firms with 1 action were coded as 1, and so on. This indicates that the higher the score on the variable wood_sum, the more firms engage in wood and coal reduction actions. Looking at the descriptive statistics in appendix C.4, 573 companies filled in the question regarding wood and coal usage. However of those, 465 filled in that this question was not applicable to their business. The score of companies that did filled in to have specific actions ranged from 0.00 to 3.00, with an average of 1.4 (*SD* = 0.99). Appendix C.4 shows that 20 firms did not have any specific actions and only 19 firms claim to have all the possible wood and coal reduction actions.

4.4 Operationalization scheme

In this section the operationalization will be presented. As described in section 4.3, all the predictor variables are categorical. In order to perform the correct analysis (described in section 4.5), the predictor variable categories were transformed into dummy variables. *A dummy variable is a way of recoding a categorical variable with more than two categories into a series of variables all of which are dichotomous and can take on values of only 0 or 1*' (Field, p. 785, 2010). How each independent variable was coded can be found in appendix B. As these coding schemes show, firms that have 'no policy' regarding the environment were used as reference category and were coded as '0'. The outcome variables were measured as sum variables. If a firm filled in that they take any of the possible actions, they got a 1 score on the outcome variable. If they did not have any, they got a zero. This demonstrates that the higher the score on the environmental performance variable, the more they have water, electricity, fuel, and wood and coal actions to reduce usage. The operationalization scheme of the discussed predictor and outcome variables is presented below in figure 9.

Figure 9: *Operationalization scheme*

Variable	**Indicators**	**Possible answers**
Independent variable: ***Environmental management systems***	Does the company have ISO 14001?	1= Yes. For up to 2 years. 2= Yes. From 2 to 5 years. 3= Yes from 5 to 10 years. 4= Yes from more than 10 years. 5= No. It plans to implement it. 6= No. But is in process of obtaining it. 7= Not considered necessary at the moment
Independent variable: ***Environmental policy***	Does the company have an environmental policy?	1 = Yes. Integrated to other policies. 2 = Yes. Specific for environment. 3= No. It adopts nonsystematized practice. 4 = No.
Independent variable: ***Climate change policy***	Does the company have policy aimed at climate change?	1= Yes. 2 = No. 3= Plans to implement.
Dependent variable: ***Company's environmental performance***	a. How was water used?	1= Monitored with indicators. 2= Has re-use targets. 3= Has reduction targets. 4= Has structured program. 5= Has employee awareness actions. 6= Has no specific actions.
	b. How is electricity used?	1= Monitored with indicators. 2= Has reduction targets. 3= Has structured program. 4= Has employee awareness actions. 5= Has no specific actions.
	c. How is fuel used?	1= Monitored with indicators. 2= Has reduction targets. 3= Has structured program. 4= Has no specific actions.
	d. How is wood and coal used?	1= Monitored with indicators. 2= Has reduction targets. 3= Has structured program. 4= Has no specific actions. 5= Not applicable.

4.5 Data analysis technique

The purpose of the data analysis is to test the three hypotheses formulated in the third chapter. The program SPSS was conducted in order to analyse the results. In order to determine whether there is a correlation between the independent variables and the dependent variable, a linear regression analysis was performed. The essence of the regression analysis is to fit a model to the data and use it to predict values of the dependent variable from one or more independent variables (Field, p. 198). Since every variable in this study can be measured directly, a factor analysis and reliability test does not have to be performed.

The linear regression is used to predict an outcome variable from one or several predictor variables. A multiple regression is an extension of simple regression in which an outcome is predicted by a linear combination of two or more predictor variables (Field, 2010). As Field (2010) state, this tool is very useful because it allows to go a step beyond the data that was collected. Each predictor has a regression coefficient b1 associated with it, and b0 is the value of the outcome when all predictors are zero. To perform the linear regression analysis, both independent as dependent variables need to be metric. If independent variables are categorical they can be transformed into dummy variables. Therefore, dummification was used in order to include these variables in the analysis. The dependent variables have been recoded into sum variables. If a firm filled in that they undertake one specific actions to reduce water, electricity, fuel, and wood and coal usage, they got a 1 score on the dependent variable. If a firm filled in that they had two of the possible actions, they got a 2 score, and so on. However, if the firm filled in that they did not engage in any of the actions, they got a zero score. This indicates that the higher the score on the dependent sum variables, the more firms undertake reduction actions. Recoding these dependent variables into sum variables, make them metric variables. Dummification of the independent variables and recoding the dependent variables into metric ones indicates that the multiple regression analysis is now the correct one to perform.

A linear regression analysis can only be conducted if several assumptions are met (Field, 2010). The five assumptions that first should be met to allow a multiple regression analysis are; (1) normality; (2) variable types; (3) linearity (4) no multicollinearity and (5) homoscedasticity (Field, 2010). Since the model only consists of predictor variables that are transformed into dummy variables, linearity does not exist. Therefore, it is allowed to ignore this assumption. The rest of the assumptions will be explained in the next chapter and appendix D. If no other assumptions are violated, it is allowed to continue the multiple regression analysis. Performing the regression analysis, the significance of the overall models

is tested (R^2) and the regression coefficients (B) are examined. These coefficients illustrate the direction and strength of each possible relationship between the independent and the dependent variables (Field, 2010).

After the main hypotheses of the research have been tested, it was checked check whether the data could provide more information besides already shown by the regression analysis conducted so far. With the help of type of industry as a control variable in the Regression Analysis, it was checked whether the type of industry sector might have an influence on the companies' environmental performance. Moreover, an ANOVA test was conducted in order to test whether different industries differ in the amount of reduction actions.

4.6 Research ethics

This subparagraph discusses the research ethics of this study. The secondary data that was used for this study was not freely available. The supervisor of the researcher provided it. The data is property of the institute and the researcher was not allowed to use it for any other purpose aside from the master thesis. Secondary data vary in terms of the amount of identifying information in it. If the data contains identifying information on participants or information that could be linked to identify participants, then the participants' privacy and confidentiality of the data has not been protected (Iran, 2013). The Análise Environmental Management yearbook from which the data has been collected, presented 573 companies that answered the proposed questionnaire. The answers were presented individually and later grouped. The companies' names were presented in alphabetical order and by business sector (Análise Gestão Ambiental, 2011). This indicates that anonymity has not been guaranteed. The research groups were invited to participate in the survey by e-mail and telephone (Análise Gestão Ambiental, 2011). This indicates that companies had the freedom to withdrawn from the research at any time. All those who received the questionnaires were informed in advance and received a login and password to answer the questionnaire through Análise Editorial's online system (Análise Gestão Ambiental, 2011). This indicates that participants were adequate informed about the research goals and results of the study. The answers sent by telephone or email were registered in the same order and choice offered and were validated by the participants (Análise Gestão Ambiental, 2011). Análise Editorial checked the information where necessary to verify data integrity (Análise Gestão Ambiental, 2011).

In contrary, confidentiality and anonymity are guaranteed in our research by excluding the names of the firms in the analyses. However, there are other issues in relation to the data

that arises from secondary analysis. Firstly, the researcher should provide transparency of research goals. As been discussed above, the data that was used was only used for the purpose from the master thesis and the researcher has provided transparency. Secondly, the secondary data will not result in any damage of distress, since the outcomes of the analysis does not allow re-identifying participants. As the companies from the original data set were invited to participate in the survey, companies were not forced to participate and could freely withdraw from the research at any time. Moreover, they have been informed and accept the fact that information will be published freely and could be used for secondary analysis. The limitation of this secondary data set is that participants of the survey will not be informed about the results of this study. However, as the names of these companies were excluded, confidentiality and anonymity is guaranteed.

5. Data analysis and results

In this fifth chapter, the data obtained from the secondary data set will be analysed. With the help of the linear regression analysis the three hypotheses will be tested. This method was used to predict an outcome variable from several predictor variables. As described, the independent variables are categorical and were transformed into dummy variables (appendix B). The dependent variables were recoded into sum variables. The sum of each dependent variable refers to the amount of reduction actions that firms undertake in order to reduce water, electricity, fuel, and wood and coal usage. Thus, the higher the scores on the sum variables, the better their environmental performance. After the linear regression, an additional regression analysis and ANOVA analysis is performed in order to provide us more information besides what has already been shown.

Before the main hypotheses are tested by performing a linear regression analysis, first check every assumption of the regression analysis is checked. As the results showed, all assumptions are met. The elaboration can be found in appendix D. In order to test whether companies with more experience with an environmental management system have more reduction actions, several regression analyses will be performed. Moreover, with the help of the regression analysis it will be examined whether companies with self-regulation mechanisms have a higher environmental performance. The summary of the results is presented below in figure 10. The results were presented based on the *four* different regression analyses relating to **1)** water, **2)** electricity, **3)** fuel and **4)** wood and coal reduction actions. Model 1 represents the differences in reduction actions when the first independent variable 'ISO 14001' was entered. Model 2 represents the differences between companies in reduction actions when the 'Environmental policy' was entered and Model 3 shows the differences in reduction actions when the last independent variable 'Climate change policy' was added into the model. Each regression model explained if the model is significantly better at predicting the change in the actions for reducing water, electricity, fuel and wood and coal usage than having no model (having no environmental management system or self-regulation mechanism at all). In appendix E.1, E.2 and E.3 it can be seen that including all the independent variables into the model (model 3) lead to significant changes in the F change. Given the significant F changes it can be concluded that including every independent variable into the model lead to the highest explanatory power, therefore, the results of model 3 will be used to interpret the possible significant effects.

Figure 10: *Summary of Linear regression analyses (N = 573)*

		Model 1		Model 2		Model 3	
Reduction		**B**	**SE(B)**	**B**	**SE(B)**	**B**	**SE(B)**
1) Water	Constant	2.359	0.138	0.817	0.576	0.695	0.560
	2 years vs. no	0.583*	0.296	0.429	0.272	0.348	0.264
ISO 14001	2-5 years vs. no	0.830***	0.225	0.582*	0.231	0.534*	0.224
	5-10 years vs. no	1.377***	0.178	1.123***	0.187	0.959***	0.183
	>10 years vs. no	1.750***	0.247	1.484***	0.252	1.232***	0.249
	Plans vs. no	-0.092	0.187	-.164	0.184	-0.172	0.180
	Process vs. no	0.335	0.211	0.147	0.213	0.140	0.207
Environment	Integrated vs no.			1.727**	0.581	1.630**	0.565
policy	Specific vs. no			2.001***	0.590	1.865***	0.574
	Nonsystem vs. no			1.182*	0.596	1.175*	0.580
Climate	Yes vs. no					0.827***	0.140
policy	Plans vs. no					0.337*	0.150
	R^2		.182		.212		.259
	F		20.983		16.828		17.781
2) Electricity	Constant	2.078	0.114	1.030	0.480	0.908	0.462
	2 years vs. no	0.451*	0.224	0.289	0.226	0.220	0.218
ISO 14001	2-5 years vs. no	0.491**	0.148	0.255	0.192	0.221	0.185
	5-10 years vs. no	1.041***	0.206	0.801***	0.155	0.645***	0.151
	>10 years vs. no	1.160***	0.155	0.910***	0.210	0.664**	0.205
	Plans vs. no	-0.170	0.187	-0.234	0.153	-0.230	0.148
	Process vs. no	0.135	0.175	-0.042	0.177	-0.042	0.171
Environment	Integrated vs no.			1.234*	0.483	1.168*	0.466
policy	Specific vs. no			1.452**	0.491	1.348**	0.473
	Nonsystem vs. no			0.675	0.496	0.693	0.478
Climate	Yes vs. no					0.789***	0.155
policy	Plans vs. no					0.198	0.123
	R^2		.158		.191		.254
	F		17.708		14.780		17.340
3) Fuel	Constant	0.845	0.099	0.442	0.423	0.338	0.406
	2 years vs. no	0.401*	0.195	0.341	0.199	0.268	0.191
ISO 14001	2-5 years vs. no	0.399*	0.163	0.292	0.169	0.251	0.162
	5-10 years vs. no	0.679***	0.129	0.570***	0.137	0.429**	0.133
	>10 years vs. no	0.771***	0.179	0.654***	0.185	0.441*	0.180
	Plans vs. no	0.042	0.135	0.005	0.135	-0.005	0.130
	Process vs. no	0.106	0.153	0.029	0.156	0.022	0.150
Environment	Integrated vs no.			0.458	0.426	0.361	0.409
policy	Specific vs. no			0.670	0.433	0.540	0.416
	Nonsystem vs. no			0.239	0.437	0.217	0.420
Climate	Yes vs. no					0.714***	0.101
policy	Plans vs. no					0.349**	0.108
	R^2		.081		.095		.170
	F		8.325		6.579		10.476

Reduction		Model 1		Model 2		Model 3	
		B	**SE(B)**	**B**	**SE(B)**	**B**	**SE(B)**
4) Wood & Coal	Constant	1.338	0.235	0.920	1.025	0.939	0.995
	2 years vs. no	-0.005	0.607	-0.014	0.621	-0.179	0.618
	2-5 years vs. no	-0.005	0.460	0.036	0.479	-0.041	0.467
ISO 14001	5-10 years vs. no	0.430	0.312	0.431	0.325	0.208	0.326
	>10 years vs. no	0.662	0.399	0.664	0.412	0.338	0.414
	Plans vs. no	0.056	0.290	0.080	0.297	0.061	0.288
	Process vs. no	-0.358	0.306	-0.359	0.313	-0.427	0.305
Environment policy	Integrated vs no.			0.428	1.003	0.235	0.975
	Specific vs. no			0.327	1.017	0.099	0.990
	Nonsystem vs. no			0.443	1.021	0.293	0.993
Climate Policy	Yes vs. no					0.594*	0.234
	Plans vs. no					0.507*	0.256
	R^2		.092		.095		.165
	F		1.703		1.141		1.729

Note: ISO 14001 standards was represented as six dummy variables with no standards as reference group. Environmental policy was represented as three dummy variables with no policy as reference group. Climate change policy was represented with two dummy variable with no policy as reference group. Green seal policy was represented with one dummy variable with no policy as reference group.

5.1 Environmental management system

In order to test whether companies with more experience with an environmental management system have more reduction actions, several regression analyses will be performed. As described in subparagraph 5.1 all the assumptions are met. The elaboration can be found in appendix D. The summary of the results of this regression analysis is presented in figure 10.

5.1.1 Influence of ISO 14001 on the firm's actions for reducing water usage

In this subparagraph, the first hypothesis of this research, relating to the environmental management system, will be tested. The first (a) hypothesis was the following:

H1a: Companies with more experience with an *environmental management system* have more *actions for reducing water usage* compared to companies with no experience.

A multiple linear regression was calculated to predict the firms' water reduction actions based on ISO 14001 policy. A significant regression equation was found ($F(6,565) = 20.983$, $p < .001$), with an R^2 of .182. Appendix E.1 shows that by entering the ISO 14001 policy dummy variables can explain 18.2% of the variance in the change in actions for reducing water usage. In other words, 18.2% of the variance in the change in the actions for reducing water usage can be explained by whether the firm has ISO 14001 standards. The regression model explains that the model is significantly better at predicting the change in the actions for reducing water usage than having no model. However looking at all the models in figure 10, model 3 (with ISO 14001, Environmental policy and Climate change included) has the highest explanatory power (25.9%). Besides, including all the independent variables into the model lead to significant changes, therefore, the results of model 3 will be used to interpret the results.

Appendix E.1 shows the Coefficients table for the dummy variables. The first dummy variable (Yes. For up to 2 years vs. having No ISO 14001 standards) shows the difference between the change in actions for reducing water usage for the 'No' group and the 'Yes'. For up to 2 years group'. First, the B value of the dummy variables will be examined (figure 10). The B value explains the change in the outcome due to a unit change in the predictor (Field, 2010). So, the B value tells us the relative difference between each group and the group chosen as a reference category. If this value tends to be significant, this means that the group coded with 1 is significantly different from the reference category, coded as 1 (Field, 2010). The output for the first dummy variable can be found in appendix E.1 The results shows that the t-test is not significant (B = 0.348, $p = .189$), so the change in actions does not go up as a firms change from having no ISO 14001 standards to having ISO 14001 standards for up to 2 years. Moving on to the next dummy variable, this one compares firms with ISO 14001 standards from 2 to 5 years. The B value represents the shift in the change in actions if a firm has no ISO 14001, compared to firms that have it from 2 to 5 years. In contrary to the first dummy variable, the t-test of the second dummy variable is significant (B = 0.534, $p < .05$). Therefore, it can be concluded that firms with ISO 14001 standards from 2 to 5 years do significantly differ in actions for reducing water usage compared to firms that do not adopt ISO 14001 standards. For the third dummy variable, firms with ISO 14001 standards from 5 to 10 years are compared with those that do not support the ISO 14001 standards. The B value, as shown in figure 10, represent the shift in the change in actions if a firm has no ISO 14001 standards, compared to firms that adopt those from 5 to 10 years. As the output in appendix E.1 shows, the t-test is significant (B = 0.534, $p < .001$) and the B value is positive

so it is possible to say that the change in actions for reducing water usage goes up as a firm changes from having no ISO standards to having them from 5 to 10 years. If firms that have no ISO 14001 standards are compared with those who have it over more than 10 years, again a significant t-test and a positive B value (B = 1.232, $p < .001$) is shown. However, looking at firms who are planning to implement the standards or are in process of obtaining it, it can be seen that compared to firms who did not have ISO 14001 do not differ significantly (B = -0.172, $p = .338$; B = 0.140, $p = .500$). As can be seen in appendix E.1, for those two dummy variables the t-test is not significant. Thus, the change in actions for reducing water usage is the same if a firm has no ISO standards or has plans to implement it or is in process of obtaining it. In other words, the change in actions is not predicted by whether firms are planning to implement or in process of obtaining it compared to if they do not have ISO 14001 standards at all.

The output in figure 10 and appendix E.1 show that the null hypothesis can be *rejected* and the alternative hypothesis can be accepted by saying that there is a positive relationship between the companies´ experience with environmental management system and their amount of actions for reducing water usage. This relationship only exists if companies have ISO 14001 standards for 2 or more years.

5.1.2 Influence of ISO 14001 on firm's actions for reducing electricity usage

After the assumptions for the second regression analysis are checked, the research can be continued by examining the hypothesis regarding reduction actions for electricity usage (appendix D.2). The hypothesis was the following:

H1b: Companies with more experience with an *environmental management system* have more *actions for reducing electricity usage* compared to companies with no experience.

In order to predict the firms' actions for reducing electricity usage based on ISO 14001 standards, a multiple linear regression was performed. A significant regression equation was found ($F(6,566) = 17.708$, $p < .001$), with an R^2 of .158. Appendix E.2 shows that by entering the ISO 14001 policy dummy variables it can explain 15.8% of the variance in the change in the actions for reducing electricity usage. So it can be stated that 15.8% of the variance in the change in the actions for reducing electricity can be explained by whether the firm has ISO 14001 standards. Like the first regression analysis, model 3 has the highest

explanatory power (25.4%), as shown in figure 10. Besides, including all the independent variables into the model (model 3) lead to significant changes in the F change. Given the significant F changes it can be concluded that including every independent variable into the model lead to the highest explanatory power, therefore, the results of model 3 will be used to interpret the possible the results.

As can be seen in appendix E.2, the first two dummy variables (Yes. For up to 2 years vs. having No ISO 14001 standards) and (Yes. From 2 to 5 years vs. having No ISO 14001 standards) do not show any significant difference in actions for reducing electricity (B = 0.220, p = .312; B = 0.211, p = .253). This shows that firms with ISO 14001 standards for up to 2 years and firms with ISO 14001 standards from 2 to 5 years compared to firms that do not have ISO 14001 standards, do not have significantly more actions. Moving on to the third dummy variable, this compares firms with ISO 14001 standards from 5 to 10 years to firms with no ISO 14001 standards. The t-test in appendix E.2 shows that there is a significant difference and the B value is positive (B = 0.645, p < .001), which means that the change in the actions for reducing electricity goes up as a firm changes from having no ISO 14001 standards to having ISO 14001 standards from 5 to 10 years. The B value in figure 10 represents the shift in the change in the firms' actions. For the fourth dummy variable, the t-test is significant and, again, the B value is positive (B = 0.664, p < .001) which indicates that the change in the actions for reducing electricity usage goes up as a firm changes from having no ISO 14001 standards to having them more than 10 years. However, looking at firms who are planning to implement the standards or are in process of obtaining it, it can be seen that compared to firms who did not have ISO 14001 do not differ significantly. The t-tests in appendix E.2 do not show significant differences (B = -0.230, p = .120; B = -0.042, p = .807), which indicates that the change in actions for reducing electricity is the same if a firm has no ISO standards or has plans to implement it or is in process of obtaining it. So, the change in actions for reducing electricity usage is not predicted by whether firms are planning to implement or in process of obtaining it compared to if they do not have ISO 14001 standards.

The results in figure 10 and appendix E.2 show that the null hypothesis can be *rejected* and the alternative hypothesis can be *accepted* by saying that there is a positive relationship between the companies´ experience with environmental management system and their amount of actions for reducing electricity usage. However, this relationship only exists when companies have ISO 14001 standards for 5 or more years.

5.1.3 Influence of ISO 14001 on firm's actions for reducing fuel usage

After the assumptions for the third regression analysis are checked (see appendix D.3), the research can be continued by examining the hypothesis regarding reduction actions for fuel usage. In this subparagraph, the first (c) hypothesis will be tested:

H1c: Companies with more experience with an *environmental management system* have more *actions for reducing fuel usage* compared to companies with no experience.

A multiple linear regression performed for the essence of predicting the firms' actions for reducing fuel based on ISO 14001 standards. A significant regression equation was found ($F(6,566) = 8.325$, $p < .001$), with an R^2 of .081. As appendix E.3 shows, by entering the ISO 14001 policy dummy variables it can explain 8.1% of the variance in the change in actions for reducing fuel. Besides, including all the independent variables into the model (model 3) lead to significant changes in the F change, therefore, model 3 will be used to interpret the results.

In line with previous regression analyses, the first two dummy variables (Yes. For up to 2 years vs. having No ISO 14001 standards) and (Yes. From 2 to 5 years vs. having No ISO 14001 standards) do not show any significant difference in reduction actions (B = 0.338, p = .405; B = 0.251, p = .163). In other words, firms with ISO 14001 standards for up to 2 years and firms with ISO 14001 standards from 2 to 5 years compared to firms that do not have ISO 14001 standards, do not have significantly more actions for reducing fuel usage. Looking at the third dummy variable, which compares firms with ISO 14001 standards from 5 to 10 years to firms with no ISO 14001 standards, the t-test in appendix E.3 shows that there is a significant difference and the B value is positive (B = 0.429, p < .001). This indicates that the change in actions for reducing fuel goes up as a firm changes from having no ISO 14001 standards to having ISO 14001 standards from 5 to 10 years. The t-test for the fourth dummy variable also turns out to be significant (B = .441, p < .05). As can be seen in figure 10, the B value is also positive which refers that the change in actions for reducing fuel goes up as a firm changes from having no ISO 14001 standards to having them more than 10 years. In line with previous analyses it is noticeable that compared to firms that did not have ISO 14001, firms who are planning to implement the standards or are in process of obtaining it, do not differ significantly (B = -0.005, p = .967; B = 0.022, p = .884). The t-tests in appendix E.3 illustrate that the change in actions for reducing fuel is the same if a firm has no ISO standards or has plans to implement it or is in process of obtaining it. Therefore, it can be

concluded that the change in actions for reducing fuel is not predicted by whether firms are planning to implement or in process of obtaining it compared to if they do not have ISO 14001 standards.

The significant results in appendix E.3 and positive B values in figure 10 show that the null hypothesis can be *rejected* and the alternative hypothesis can be accepted by saying that there is a positive relationship between the companies´ experience with environmental management system and their amount of actions for reducing fuel usage However, this relationship only exists when companies have ISO 14001 standards for 5 or more years.

5.1.4 Influence of ISO 14001 on firms' actions for reducing wood and coal usage

After the assumptions for the fourth regression analysis are checked (see appendix D.4), the research can be continued by examining the hypothesis in relation to the firms' actions for reducing wood and coal usage. The first hypothesis was the following:

H1d: Companies with more experience with an *environmental management system* have more *actions for reducing wood and coal* usage compared to companies with no experience.

Like previous analyses, a multiple linear regression was conducted in order to predict the firms' actions for reducing wood and coal usage based on ISO 14001 policy. As appendix E.4 shows, a non-significant regression equation was found ($F(6,101) = 1.703$, $p = .128$). Thus, the ISO 14001 policy dummy variables do not explain the variance in the change in actions for reducing wood and coal usage. Since the regression equation was found to be not significant, the B values in figure 10 remain meaningless. Therefore, the null hypothesis *cannot* be *rejected*. Thus, it can be concluded that there is no significant positive relationship between the companies´ experience with environmental management system and their amount of actions for reducing wood and coal usage.

5.2 Self-regulation mechanisms: Environmental policy

In this paragraph it will be examined whether companies with self-regulation mechanisms, more specifically an Environmental policy, have a higher environmental performance. As described in subparagraph 5.1 all the assumptions of the regression analyses were met (see appendix D). The results of the regression analyses relating to the Environmental policy will now be interpreted. The summary of the results of the performed regression analyses are presented figure 10.

5.2.1 Influence of Environmental policy on firms' actions for reducing water usage

In this subparagraph, the second hypothesis of this research relating to reducing water usage will be tested. The second (a) hypothesis was the following:

H2a: Companies that have an *Environmental policy* have *more water reduction actions* compared to companies that did not have one.

In order to determine the influence of the Environmental policy on the firms' actions for reducing water usage, a multiple linear regression was performed. A significant regression equation was found ($F(9,562) = 16.828$, $p < .001$), with an R^2 of .212. Appendix E.1 shows that by entering the environmental dummy variables, 3% of the variance in the change in actions for reducing water usage can be explained. In other words, 3% of the variance in the change in the actions for reducing water usage can be explained by whether the firm has an environmental policy (Sig. F Change = < .001). Looking at all the models in figure 10, model 3 has the highest explanatory power. Besides, including all the independent variables into the model (model 3) lead to significant changes in the F change, therefore, model 3 will be used to interpret the results.

Appendix E.1 shows the Coefficients table for the dummy variables. The first dummy variable ('Yes. Integrated to other policies' group vs. having 'No' environmental policy) shows the difference between the change in the actions for reducing water usage for the 'No' group and the 'Yes. Integrated to other policies' group. As the output in appendix E.1 shows, the t-test is significant and the B value is positive ($B = 1.630$, $p < .01$). This indicates that the change in the number of actions goes up as a firm changes from having no Environmental policy to having them integrated to other policies. Moving on to the second dummy variable, this compared firms with no environmental policies with firms that have them specific for the

environment. The B value in figure 10 represents here the change in the number actions for reducing water usage if a firm has no Environmental policy compared to firms that have them specific for the environment. For this dummy variable, the t-test turns out to be significant and the coefficient is positive (B = 1.865, $p < .001$). Thus, it can be concluded that firms with an Environmental policy specific for the environment have significantly more reduction actions compared to firms that do not have an Environmental policy. Looking at the last dummy variable, the t-test in appendix E.1 showed to be significant and the coefficient is positive (B = 1.175, $p < .05$). For this reason, it can be concluded that the change in the number of actions for reducing water usage goes up as a firm changes from having no Environmental policy to adopting nonsystematized practices. So overall, this analysis shows us that compared to having no Environmental policy, firms with an integrated Environmental policy, with a policy specific for the environment and firms which adopt nonsystematized practice, have significantly more actions for reducing water usage.

The results in figure 10 and the output in appendix E.1 show that the null hypothesis can be *rejected* and the alternative hypothesis can be *accepted* by saying that there is a positive relationship between the Environmental policy of companies and their reduction actions regarding water.

5.2.2 Influence of Environmental policy on firm's actions for reducing electricity usage

In this subparagraph, the second hypothesis of this research relating to reducing electricity usage will be tested. The second (b) hypothesis was the following:

H2b: Companies that have an *Environmental policy* have *more electricity reduction actions* compared to companies that did not have one.

A multiple linear regression was calculated in order to examine the influence of an Environmental policy on firms' actions for reducing electricity. A significant regression equation was found ($F(9,563) = 14.780$, $p < .001$), with an R^2 of .191. Figure 10 shows that by entering the environmental dummy variables and the ISO 14001 dummy variables, 19.1% of the variance in the change in the actions for reducing electricity can be explained. Appendix E.2 show that 3.3% of the variance in the change in actions for reducing electricity can be explained by whether the firm has an Environmental policy (Sig. F Change = < .000). Figure 10 shows that model 3 has the highest explanatory power, therefore the results of this model will be interpreted.

Looking at the Coefficients table for the dummy variable (appendix E.2), the first dummy variable ('Yes. Integrated to other policies' group vs. having 'No' Environmental policy) shows the difference between the change in actions for reducing electricity for the 'No' group and the 'Yes. Integrated to other policies group'. By looking at the t-test in appendix E.2, it was founded that this difference is significant and the B value is positive (B = 1.168, $p < .05$). In other words, the change in actions for reducing electricity goes up as a firm changes from having no Environmental policy to having them integrated to other policies. Next, the second dummy variable, this one compared firms with no Environmental policy with firms that have them specific for the environment. Again, the t-test turns out to be significant and the coefficient is positive (B = 1.1348, $p < .01$). Thus, it can be concluded that firms with an Environmental policy specific for the environment have significantly more electricity reduction actions compared to firms that do not have an Environmental policy. However, looking at the last dummy variable in appendix E.2, it is noticeable that the t-test is not significant (B = 0.693, $p = .147$). For this reason, it can be concluded that the change in actions for reducing electricity is the same when a firm has no Environmental policy. In other words, the change in actions for reducing electricity is not predicted by whether firms adopt nonsystematized practices compared to the ones that do not have an Environmental policy.

The B values in figure 10 and the significant results in appendix E.2 show the null hypothesis can be rejected and alternative hypothesis can be *accepted* by saying that there is a positive relationship between the Environmental policy of companies operating in the Brazilian market and their environmental performance in relation to actions for reducing electricity usage. This relationship exists if companies have an Environmental policy integrated to other policies or have an Environmental policy for the environment.

5.2.3 Influence of Environmental policy **firm's actions for reducing fuel usage**

In this subparagraph, the second hypothesis relating to the reduction of fuel usage will be tested. The second (c) hypothesis was the following:

H2c: Companies that have an *Environmental policy* have *more fuel reduction actions* compared to companies that did not have one.

To determine the influence of environmental policies on firms' actions for reducing fuel, a multiple linear regression was calculated. A significant regression equation was found ($F(9,563) = 6.579$, $p < .001$), with an R^2 of .095. Figure 10 shows that by entering the Environmental policy dummy variables and the ISO 14001 dummy variables, 9.5% of the variance in the change in actions for reducing fuel can be explained. Hence, 1.4% of the variance in the change in actions for reducing fuel can be explained by whether the firm has an Environmental policy (Sig. F Change = < .05).

Looking at the coefficients table for the dummy variable (appendix E.3), it can be seen that the dummy variables are not significant (B = 0.361, $p = .378$; B = 0.540, $p = .195$; B = 0.217, $p = .606$). In other words, the change in the actions does not significantly differ when a firm has an Environmental policy integrated in other policies, when a firm has specific policy for the environmental or when it adopts nonsystematized practices compared to firms that do not have an Environmental policy.

The non-significant results in appendix E.3 show that the null hypothesis *cannot* be *rejected*. Thus, it can be concluded that there is no positive relationship between the Environmental policy of companies operating in the Brazilian market and environmental performance in relation to actions for reducing fuel usage.

5.2.4 Influence of Environmental policy on firms' actions for reducing wood and coal usage

In this subparagraph, the second hypothesis in relation to the reduction of wood and coal usage will be tested. The second (d) hypothesis was the following:

H2d: Companies that have an *Environmental policy* have *more wood and coal reduction actions* compared to companies that did not have one.

As well as the analysis above, a non-significant regression equation was found ($F(9,98) = 1.141$, $p = .342$). Thus, it can be concluded that the Environmental policy dummy variables do not explain the change in actions for reducing wood and coal usage. Seen the non-significant results in appendix E.4, the null hypothesis *cannot* be *reject*. Thus, it can be concluded that there is no positive relationship between the Environmental policy of companies operating in the Brazilian market and their environmental performance in relation to actions for reducing wood and coal usage.

5.3 Self-regulation mechanisms: Climate change

In this paragraph it will be examined whether companies that have a Climate change policy, have more reduction actions compared to companies that did have one. As described in subparagraph 5.1 all the assumptions of the regression analyses were met (see appendix D). The research can now be continued by interpreting the results of the regression analyses relating to the Climate change policy. The summary of the results of the performed regression analyses is presented in figure 10.

5.3.1 Influence of Climate change policy on firm's actions for reducing water usage

In this subparagraph, it will be tested whether a Climate change policy has an influence on the environmental performance in relation to the reduction of water usage. The third (a) hypothesis was the following:

H3a: Companies that have a *Climate change policy* have *more water reduction actions* compared to companies that did not have one.

The possible influence from Climate change policy on firms' actions for reducing water usage will be examined. A significant regression equation was found ($F(11,560) = 17.781$, $p < .001$), with an R^2 of .259. Figure 10 indicates that by entering the Climate change dummy variables and the ISO 14001 and Environmental policy variables, the model explains 25.9% of the variance in the change in the actions for reducing water usage. Generally, this shows that by entering the Environmental dummy variables and the ISO 14001 dummy variables, 21.2% of the variance in the actions for reducing water usage can be explained. In other words, 4.7% of the variance in the change in the actions for reducing water usage can be explained by whether the firm has Climate change policy (Sig. F Change = < .001). As can be seen in figure 10, model 3 has the highest explanatory power. Therefore, the results of model 3 will be interpreted.

Appendix E.1 shows the Coefficients table for the Climate change dummy variables. The first dummy variable (Yes vs. No) shows the difference between the change in the actions for reducing water usage for the 'No' group and the 'Yes' group. The coefficients table shows us that the t-test is significant and the B value is positive (B = 0.827, $p < .001$). This illustrates that the change in actions for reducing water usage goes up as a firm changes from having no Climate change policy to having one. The output in appendix E.1 shows that the t-test for the last dummy variable is also significant, with a positive B value (see figure 12) (B = 0.337, $p <$

.05). So, it can be argued that firms that have plans to implement a Climate change policy have significantly more actions for reducing water usage, compared to firms that do not have plans to implement them.

To conclude, the B values in figure 10 and the significant output of the analysis in appendix E.1 shows that compared to having no Climate change policy, firms that have one and firms that have plans to implement one, have significantly more actions for reducing water usage. Therefore, the null hypothesis can be *rejected* and the alternative hypothesis can be *accepted* by saying that there is a positive relationship between the Climate change policy of companies operating in the Brazilian market and their environmental performance in relation to actions for reducing water usage.

5.3.2 Influence of Climate change policy on firm's actions for reducing electricity usage

In this subparagraph, it will be examined whether a Climate change policy has an influence on the environmental performance in relation to the reduction of electricity usage. The third (b) hypothesis was the following:

H3b: Companies that have a Climate change policy have *more electricity reduction actions* compared to companies that did not have one.

Now it will be determined whether a Climate change policy has influence on firms' actions for reducing electricity. A significant regression equation was found *(*$F(11,561) = 17.340$, $p < .001$), with an R^2 of .254. Figure 10 shows that by entering the Climate change dummy variables and the ISO 14001 and Environmental policy variables, the model explains 25.4% of the variance in the change in actions for reducing electricity. This means that 6.3% of the variance in the change in actions can be explained by whether the firm has a Climate change policy (Sig. F Change = < .001). Like previous regression, the results of model 3 in figure 10 will be interpreted, since it has the highest explanatory power.

The first dummy variable (Yes vs. No) represents the difference between the change in the actions for reducing electricity for the 'No' group and the 'Yes' group. As can be seen in appendix E.2, t-test is significant for the first dummy variable and the B value in figure 10 is positive (B = 0.789, $p < .001$). This demonstrates the change in the actions for reducing electricity goes up as a firm changes from having no Climate change policy to having one. In contrary to the first, the second dummy variable is not significant (B = 0.198, $p = .110$). So, it can be concluded that firms that have plans to implement a Climate change policy do not significantly differ in actions for reducing electricity compared to firms that do not have plans

to implement them. To conclude, this analysis shows that compared to having no Climate change policy, only firms that have one have significantly more actions for reducing electricity.

The significant results in appendix E.2 and the B values in figure 10 show the null hypothesis can be *rejected* and the alternative hypothesis can be *accepted* by saying that there is a positive relationship between the Climate change policy of companies operating in the Brazilian market and their environmental behaviour in relation to actions for reducing electricity usage, only if they have already adopted one.

5.3.3 Influence of Climate change policy on firm's actions for reducing fuel usage

In this subparagraph, it will be examined whether a Climate change policy has an influence on the environmental performance in relation to the reduction of fuel usage. The third (c) hypothesis was the following:

H3c: Companies that have a *Climate change* policy have *more fuel reduction actions* compared to companies that did not have one.

Now, it will be examined whether a Climate change policy has influence on firms' actions for reducing fuel usage. A significant regression equation was found ($F(11,561) = 10.476$, $p < .001$), with an R^2 of .170. As figure 10 shows, by entering the Climate change dummy variables and the ISO 14001 and Environmental policy variables, the model explains 17.0% of the variance in the change in actions for reducing fuel. This means that 7.5% of the variance in the change in actions for reducing fuel can be explained by whether the firm has a Climate change policy (Sig. F Change = < .001).

First, the dummy variable Yes vs. No will be examined, this represents the difference between the change in actions for reducing fuel for the 'No' group and the 'Yes' group. For this dummy variable, t-test turns out to be significant and the B value is positive (B = 0.714, $p < .001$) (shown in appendix E.3 and figure 10). This indicates that the change in actions for reducing fuel goes up as a firm changes from having no Climate change policy to having one. The second dummy variable is also significant and has a positive B value (B = 0.349, $p < .001$). Therefore, it can now be concluded that firms that have plans to implement a Climate change policy does significantly differ in actions for reducing fuel compared to firms that do not have plans to implement them. In other words, this analysis shows that compared to

having no Climate change policy, firms that have them and firms that have plans to implement them, have significantly more actions for reducing fuel usage.

The significant results in appendix E.3 and the positive B values in figure 10 show that the null hypothesis can be *rejected* and the alternative hypothesis can be *accepted* by saying that there is a positive relationship between the Climate change policy of companies operating in the Brazilian market and environmental behaviour in relation to actions for reducing fuel usage.

5.3.4 Influence of Climate change policy firms' actions for reducing wood and coal usage

In this subparagraph, it will be examined test whether a Climate change policy has an influence on the environmental behaviour in relation to the reduction of wood and coal usage. The third (d) hypothesis was the following:

H3d: Companies that have a *Climate change* policy have *more wood and coal reduction actions* compared to companies that did not have one.

Together with the ISO 14001 and the Environmental policy, Climate change policy has a non-significant regression equation ($F(11,96) = 1.729$, $p = .078$). The results in figure 10 indicate that by entering the Climate change dummy variables the model does not explain the variance in the change in actions for reducing wood and coal usage. As a consequence, looking at the coefficient table becomes meaningless. The non-significant results in appendix E.4 show that the null hypothesis *cannot* be *rejected*. Therefore, it can be concluded that there is no positive relationship between the Climate Change policy of companies operating in the Brazilian market and their environmental behaviour in relation to actions for reducing wood and coal usage.

5.4 Additional information from data analysis

In the previous paragraph of this chapter, the hypotheses of this research have been tested. To examine whether the data provide more information besides the already shown information by the regression analysis conducted so far, some additional analyses will be conducted.

5.4.1 Type of industry as control variable: linear regression analysis

In this subparagraph, it will be examined whether type of industry possibly influenced the relationship between the self-regulation mechanisms and environmental management systems and their reduction actions. When entering the independent variable 'type of industry' it can be seen that the regression equation is significant ($F(12,558) = 18.036$, $p < .001$), with an R^2 of .279 (27.9%). The results in appendix F.1 shows us that entering the control variable can explain 2.1% more of the variance in the actions for reducing water usage (Sig. F Change = < .001). Looking at the coefficients table of model 4 (when entering type of industry), the results do not change dramatically. For instance, there is still a positive relationship between the companies´ experience with environmental management system and their amount of actions for reducing water usage. This relationship only exists if companies have ISO 14001 standards for 2 or more years. Moreover, entering the control variable in the second equation it can be seen that the explained variance increases with .008 (0.8%). Looking at regression equation ($F(12,559) = 16.460$, $p < .001$), there is still a positive relationship between the companies´ experience with environmental management system and their amount of actions for reducing electricity usage. This relationship also only exists when companies have ISO 14001 standards for 5 or more years. Like previous regression analyses, it was also found in the third regression equation ($F(12,559) = 10.108$, $p < .001$) that there is a positive relationship between the companies´ experience with environmental management system and their amount of actions for reducing fuel usage. This relationship only exists when companies have ISO 14001 standards for 5 or more years. Lastly, looking at the fourth regression equation of wood and coal ($F(12,95) = 1.569$, $p = .114$), it can be seen that results remain the same; there is no significant positive relationship between the companies´ experience with an environmental management system and their amount of actions for reducing wood and coal usage. From this additional analysis it can be concluded that type of industry has a significant influence on the amount of reduction actions firms undertake. However, diving into this significant effect, it is noticeable that this not dramatically changes the already founded results; significant results stay significant and non-significant results remain non-significant.

5.5.2 Comparing industries in their environmental performance: ANOVA

In this subparagraph, it will be examined whether the amount of reduction actions undertaken by the companies differ per type of industry. It is expected that the average on the dependent variable differ per industry. In other words, the four industries are compared, it is expected that some industries score higher on reduction actions compared to other industries. In order to test this statement adequately, an ANOVA analysis will be performed. Before starting the ANOVA test, the assumptions of ANOVA need to be checked. As appendix F.2 show, all these assumptions are met. Figure 11 shows the means and standard deviations of each type of industry in relation to the number of reduction actions.

Figure 11: *Means and Standard Deviations of the industries on the measure of reduction actions.*

Type of business sector	*M* water	*SD* water	*M* electricity	*SD* electricity	*M* fuel	*SD* fuel	*M* wood & coal	*SD* wood & coal
Agroindustry	2.78a	1.53	2.15	1.27	1.14	0.966	1.33	1.02
Commerce	3.21b	1.66	2.61	1.20	1.24	1.03	1.50	1.29
Manufacturing	3.52c	1.42	2.92	1.22	1.36	1.12	1.47	0.92
Services	2.32d	1.48	2.01	1.18	0.90	0.97	1.50	1.18

Note: a. The maximum score is 5. b. The maximum score is 4. c. The maximum score is 3. d. The maximum score is 3.

As can be seen in appendix F.2, the one-way analysis of variance showed a significant effect of type industry on the actions for reducing water usage ($F(3,567) = 26.204$, $p < .001$). In order to check how these groups differ on their actions, a post hoc test is conducted. Results show that companies operating in the agroindustry do not differ in water reduction actions compared to companies operating in the commerce ($p = .678$). However, looking at figure 11 and comparing companies operating in the agroindustry with companies operating in the manufacturing it can be seen that there is a significant difference (Magroindustry = 2.78 vs. Mmanufacturing = 3.52; ($F(3,567 = 26.204$, $p < .01$), with the manufacturing industry having more water reduction actions. Comparing the companies operating in the agroindustry and services, no significant difference is visible in actions for reducing water usage ($p = .174$). Like previous comparison, no significant difference was found between companies operating in the commerce or in the manufacturing industry ($p = .834$). However, looking at figure 11 and comparing companies operating in the commerce with companies operating in services, it is noticeable that they differ regarding water reduction actions (Mcommerce = 3.21 vs. Mservices = 2.32, $p < .01$).

In order to examine whether the score on electricity reduction actions differ per industry, a second one-way analysis of variance was performed. These results can also be found in figure 11. Moreover, appendix F.2 shows that there is a significant effect of type of industry on the companies' actions for reducing electricity usage ($F($3,568) = 23.509, p < .001). To determine how these scores differ in the industries, a Post hoc Games-Howell test is examined. The results show that two industries significantly differ in their scores on reduction actions. First, it can be seen figure 11 that companies operating in the agroindustry have less electricity reduction actions compared to companies operating in the manufacturing industry (Magroindustry = 2.15 vs. Mmanufacturing = 2.92, p < .001). In addition, comparing the manufacturing industry with the service industry it can be noticed that, like previous comparison, companies operating in the manufacturing sector have more actions for reducing electricity usage compared to the service industry (Mmanufacturing = 2.92 vs. Mservices = 2.01, p < .001). However, other sectors did not show a significant difference in their actions for reducing electricity usage (agroindustry vs. commerce, p = .398; agroindustry vs. services, p = .958; commerce vs. manufacturing, p = .650; commerce vs. services, p = .055).

A third one-way analysis of variance showed that there is a significant effect of type of industry on the firms' actions to reduce fuel usage (F(3,568) = 7.341, p < .001). However, looking at the Post hoc test in appendix F.3, only companies operating in the manufacturing industry compared to companies operating in the services sector differ significantly in actions to reduce fuel usage (Mmanufacturing = 1.36 vs. Mservices = 0.90, p < .001), with the manufacturing industry having more fuel reduction actions. As mentioned, other industries did not show a significant difference (agroindustry vs. commerce, p = .963; agroindustry vs. manufacturing p = .373; agroindustry vs. services, p = .321; commerce vs. industry, p = .927; commerce vs. services, p = .300).

Lastly, a fourth one-way analysis of variance was performed in order to determine whether type of industry has an influence on the companies' actions to reduce wood and coal usage (appendix F.2). Results show that there is no significant effect of type of industry on the actions for reducing wood and coal usage (F(3,568) = 0.201, p = .895). These results show that the industry in which companies operate has no significant influence on the number of actions to reduce wood and coal usage.

6. Conclusion and Discussion

6.1 Introduction

The main purpose of this research is to examine to what extent companies in emerging markets, in particular Brazil, that adopt environmental management systems (e.g. ISO 14001 standards) or self-regulation mechanisms (Environmental Policy or Climate change policy), truly behave environmental responsible. Moreover, it was examined whether companies that have adopted these ISO 14001 standards for a longer period of time behave more environmental responsible. The research question of this thesis will be discussed in section 6.3. Additionally a discussion takes place, where it is argued what the results mean in relation to previous literature. Afterwards, the implications and the limitations of this research will be discussed. Subsequently, recommendations for future research will be given.

6.2 Conclusion

In this research, the actual environmental performance of companies operating in the Brazilian market was examined. This has been done by performing a secondary analysis. The data being used dates back from 2010 and was collected from the Análise Environmental Management yearbook (Análise Gestão Ambiental, 2011). The companies that took part in the survey of Análise Gestão Ambiental were selected according to their net revenue. Moreover, transnational companies that did not published a balance sheet in Brazil and companies that are part of corporate groups with a minimum net revenue of R$ 60 million a year, also took part in the survey (Análise Gestão Ambiental, 2011). The companies selected were from four different industry types, namely; agriculture, commerce, manufacturing, and service. 573 companies operating in the Brazilian market filled in the questions regarding their CSR initiatives. They were asked whether they adopted several self-regulation mechanisms and environmental management systems in order to improve their environmental performance. In this study, it was examined whether companies adopted ISO 14001 standards, an Environmental policy and/or a Climate change policy. Next, it was examined whether the adoption of these regulations and systems might have influenced their environmental performance regarding actions to reduce the usage of water, electricity, fuel and wood and coal. These reduction actions vary from having no actions at all to having implemented several reduction actions such as monitors with indicators; re-use targets; reduction targets; structured programs; employee awareness actions or no specific actions. The more reduction actions firms have, the better their environmental performance.

Based on previous studies of self-regulation mechanisms and environmental management systems, as described in chapter 2, one would expect that firms that adopt one of these mechanisms or systems would behave more environmental responsible in relation to water, electricity, fuel and wood and coal usage. When comparing firms that have such mechanisms and systems to firms that do not have them, it is found that there are indeed significant differences in their environmental performance. For instance it was found that companies that are more experienced with ISO 14001 standards, have significantly more actions to reduce water, electricity, fuel and wood and coal usage. Moreover, it was found that firms that did have an Environmental policy and Climate change policy have significantly more reduction actions. However, there were also non-significant differences that indicate that the adoption of corporate responsible mechanisms and environmental management systems in some situations do not have a significant relationship with the environmental behaviour of companies operating in the Brazilian market.

An additional analysis examined whether the type of industry has a possible influence on the relationship between the self-regulation mechanisms, environmental management systems, and their reduction actions. The analysis showed that however this result was significant, it did not change the results that were already founded in this study. Thus, by entering the type of industry as a control variable, previous founded significant results remain significant and non-significant results remain non-significant. Besides, with the help of an additional ANOVA analysis, some significant differences between the industries were found in relation to reduction actions. Therefore, one should be cautious when interpreting the conclusions, as the significant results regarding actions to reduce water, electricity, fuel and wood and coal usage might vary among industries. Taken the central research question, enough significant results are found in order to claim that firms that are more experienced with ISO 14001 standards, have an Environmental policy and/or have a Climate change policy did undertake more actions to reduce water, electricity and fuel usage. However, the results in relation to wood and coal usage were not significant.

6.2.1 Conclusion of the hypotheses

As discussed in the fifth chapter, some hypotheses stated in this research have been confirmed and some of them have been rejected. The findings from the regression analyses are addressed here. The results of the first hypothesis showed that there is indeed a positive relationship between the ISO 14001 standards and the companies' environmental behaviour in relation to actions for reducing water usage. This result was only significant when companies

had ISO 14001 standards for 2 or more years. In line with this statement, it was found that there is indeed a positive relationship between the ISO 14001 standards and the firms' environmental behaviour in relation to actions for reducing water, electricity and fuel usage, as long as they adopted these standards for 5 or more years. However, looking at the environmental performance regarding actions for reducing wood and coal usage, results were not significant. Therefore, it can be concluded that the ISO 14001 standards do not have an influence on the environmental behaviour in relation to actions for reducing wood and coal usage. Referring to the first hypothesis it can be concluded that companies with more experience with an environmental management system (ISO 14001 standards) have a higher environmental performance in relation to actions for reducing water, electricity and fuel usage.

The second hypothesis tested whether companies with self-regulation mechanisms, more specifically an Environmental policy, have a higher environmental performance in relation to water, electricity, fuel, and wood and coal usage. A regression analysis showed that the second hypothesis is accepted: there is indeed a positive relationship between the Environmental policy of companies operating in the Brazilian market and their environmental performance in relation to their actions of reducing water usage. Looking at their environmental performance in relation to electricity usage it is shown that, like water, an Environmental policy has a positive influence. Note that this only concerns the companies that have an Environmental policy integrated in other policies or have specific policies for the environment. This in contrary to the actions to reduce fuel, wood and coal usage. Having an Environmental policy does not have a significant influence on the firms' actions to reduce fuel, wood and coal usage. Referring to the second hypothesis it can, therefore, be concluded that an Environmental policy has a positive influence on their environmental performance, only in relation to actions for reducing water and electricity usage.

The third hypothesis examined whether a Climate change policy has a positive relationship with the firms' environmental performance in relation to water, electricity, fuel, and wood and coal usage. Here, it was found that firms that have one or are planning to implement one have significantly more actions for reducing water, electricity and fuel usage. Therefore, it can be concluded that a Climate change policy has a positive influence on the environmental performance in relation to actions to reduce in relation to water, electricity and fuel usage. This in contrary to the actions for reducing wood and coal usage; these results were not significant. In order to give a clear overview of the outcomes of the hypotheses,

figure 14 is provided. The figure shows that , it has to be taken into account that some of the hypotheses were not significant.

Figure 14: *Summary of the outcomes of the hypotheses*

Hypothesis	***P***	**Accepted/ rejected**	**Note**
H1a: ISO 14001 on water	.000	Accepted	If ≥ 2 years adopted
H1b: ISO 14001 on electricity	.000	Accepted	If ≥ 5 years adopted
H1c: ISO 14001 on fuel	.000	Accepted	If ≥ 5 years adopted
H1d: ISO 14001 on wood & coal	.128	Rejected	-
H2a: Environmental policy on water	.000	Accepted	If integrated, specific for environment or nonsystematized practices are adopted
H2b: Environmental policy on electricity	.000	Accepted	If integrated or adopted specific for environment
H2c: Environmental policy on fuel	.000	Rejected	-
H2d: Environmental policy on wood & coal	.342	Rejected	-
H3a: Climate change policy on water	.000	Accepted	-
H3b: Climate change policy on electricity	.000	Accepted	-
H3c: Climate change policy on fuel	.000	Accepted	-
H3d: Climate change policy on wood & coal	.078	Rejected	-

Lastly, some additional analyses were conducted. It was examined whether the type of industry possibly influenced the relationship between the self-regulation mechanisms and environmental management systems and their reduction actions. When entering 'type of industry' into the model, a significant regression equation was found. This indicates that type of industry does explain more variance in the actions for reducing water, electricity, fuel and wood and coal usage. Moreover, it was examined whether companies operating in different business sectors differ in their average of reduction actions. The ANOVA analyses found significant results in terms of water, electricity, and fuel reduction actions. In relation to actions for reducing water usage, it was found that companies operating in the manufacturing industry compared to companies that operate in the agroindustry have more water reductions actions. Besides, it was found that companies operating in the commerce had significantly more water reduction actions compared to companies operating in the service industry. Likewise the water reduction actions, it was found that companies operating in the manufacturing industry compared to companies that operate in the agroindustry have more electricity reduction actions. In addition, it was found that companies operating in the manufacturing industry have more actions for reducing electricity usage compared to the service industry. However, looking at the ANOVA results in relation to fuel, it was found that only companies operating in manufacturing industry sector compared to companies operating

in the services sector differ significantly in actions to reduce fuel usage, with the industry group having more fuel reduction actions. The last ANOVA results in relation to the wood and coal reduction actions showed that there is no significant effect.

6.2.2 Answering the research question

The question that this search aimed to answer was the following:

"*To what extent do companies that adopt environmental management systems or self-regulation mechanisms in emerging markets, and more particularly in Brazil, truly behave environmental responsible?"*

The results of the analyses show that companies who are having an environmental management system, undertake more actions to reduce water, electricity and fuel usage. This indicates that, companies who are claiming via ISO certifications to behave environmental responsible, truly act more responsible than companies who do not have certain certifications. When comparing firms that have such system to firms that do not have one, it is shown that there are indeed significant differences in their environmental performance. It was found that companies that are more experienced with ISO 14001 standards have significantly more actions to reduce water, electricity, fuel and wood and coal usage. This also concerns to firms that have self-regulation mechanisms in order to behave more socially responsible. Here, it was found that companies with an Environmental policy truly act more responsible than companies who do not have an Environmental policy. In line with the Environmental policy, it was found that a Climate change policy is also an influencer for behaving in a more environmental responsible way. Therefore, it can be concluded that self-regulation mechanisms and environmental management systems have a significant influence on the actual environmental performance of companies, in relation to actions for reducing water, electricity and fuel usage.

6.3 Discussion

In this section, the most remarkable results from the analysis will be discussed. An important first point worth discussing is the outcome of the first hypothesis: companies with more experience with an environmental management system (ISO 14001) have a higher environmental performance in relation to actions for reducing water, electricity, fuel, and wood and coal usage. This is indeed the case when firms' are adopting the ISO standards for a longer period of time. A possible explanation for this finding in present research could be found in previous research, for instance that of Marsh and Terrence (2012) or Rondinelli and Vastag (2000). They claim that every firm that adopts the ISO 14001 standards follow the same process structure: 1) continuous improvement; 2) environmental policy; 3) planning; 4) implementation and control checking and corrective action and 5) management review. The last step includes a process by which the senior management re-examine the suitability and effectiveness of the system at periods in time in order to ensure continuous improvement (Rondinelli & Vastag, 2000). This phase indicates that the firm should strive for continuous improvement. Given this information, the first hypothesis can be explained by saying that firms start having significantly more reduction actions when they are striving for continuous improvement for over a longer period of time. Another possible reason to explain the difference in the amount of reduction actions can be explained by the type of management systems. For instance, the EMAS requires active involvement of employees and their representatives (EMAS, 2008). Given the fact that managers are required to have active involvement of their employees and representatives, firms will have automatically more reduction actions. Another difference between EMAS and ISO 14001 is that they differ in continual improvement (EMAS, 2008). Where the first only requires annual improvement, the latter requires periodically improvement without a defined frequency. This difference is also a reasonable explanation for the difference in the amount of reduction actions. It could be that firms that are adopting an EMAS have to undertake more reduction action in order to meet the periodically required improvement. Given the differences in the requirements, it can be stated that the type of management system can influence the difference in the amount of reduction actions.

Another remarkable point that should be addressed in this discussion is the non-significant result of wood and coal usage. Actions to reduce wood and coal usage were in all the models not significant. These results can be explained by the small amount of firms that filled in to have certain actions to reduce wood and coal usage. Of the all the 573 respondents,

465 felt in the category of " not applicable to your activity". This small sample of 108 (572-465) could have influenced the results of reduction actions for wood and coal usage.

Another point that should be addressed in this discussion is the context in which the study has taken place. The importance of CSR in Brazil is rapidly disseminating in the private sector (Yamahaki & Ursini, 2010). This CSR movement, as explained in section 3.2.4, comes from a combination of factors: (1) healthy economy which has CSR made easier (2) huge divide between rich and poor and (3) the fact that companies want to distance themselves from the reputation of corruption (Oliveira, 2006). These contextual factors might positively influence the relationship between self-regulation mechanisms and environmental management systems and firms' actions to reduce water- electricity, fuel, and wood and coal usage.

A second third that is worth discussing is the possible influence of institutional pressures. This means that due to similar internal and external pressures and interactions among the firms, firms could be isomorphic to one another regarding their environmental performance (Oliver, 1988). As DiMaggio and Powell (1983) suggested this process can be facilitated by coercive, normative and mimetic mechanisms. For instance, in some circumstances organizational change is a direct response to government mandate (DiMaggio & Powell, 1983). An example of the coercive pillar is manufacturers who need to adopt new pollution control to conform to environmental regulations. Looking at the changes in the Brazilian environmental regulation, it can be seen that in 2010 the National Policy on Solid waste was introduced (Federal law. 20 305/2010). "*This law establishes the Brazilian Solid Waste Policy, providing its principles, objectives and instruments, as well as the guidelines relating to the integrated solid waste management and municipal plan, including hazardous waste, the responsibilities of the waste generators and the public authorities, and the relevant economic instruments"* (Pereira, p.2, 2010). The new waste policy in Brazil might have influenced the amount of reduction actions that firms' take to reduce waste. It is reasonable to say that firms comply to the new waste policy in order to reduce their risk of fines. Another incident that might have influenced the reduction actions of firms is the economic crisis in 2008. It can be noticed that GDP growth rate dropped from 1.8% to -4% in 2009 (Trading economics, 2016). Since taking actions costs money, this might have influenced the reduction actions of firms in 2010. As consequence, the environmental issues could have become less important since being profitable still becomes the main objective of companies (Oliveira, Serra & Salgado, 2010). On the other hand, the GDP growth rate increased from -4% in 2009 to 2.1% in 2010 (Trading economics, 2016). This could have led to an increase in the

reduction actions. Therefore, it is needed to take the economic trends into consideration when drawing conclusions.

Another factor that might have influenced the results is the pressure of 'accountability'. The results show that firms that are adopting the ISO 14001 standards or other self-regulation mechanisms are indeed behaving more accountable. However, this relationship for the ISO 14001 standards only exists when firms are more experienced with the ISO 14001 standards. This could be explained by saying that these older firms might have already created their own routines and, therefore, could behave more easily environmental responsible. Moreover, it could be explained by claiming that older experienced firms are more pressured to provide information to the public. This sort of additional stakeholder pressure might have influenced the results founded in this research. Moreover, as these large firms tend to be more visible, they are more likely to gain from enhanced legitimacy and reputation effects or may also suffer more damages to their reputation for inadequate participation in corporate social activities (Udayasankar, 2008). Given this information it might be expected that larger firms are more likely to behave socially responsible, and therefore have more reduction actions. Since the sample only consisted of large firms, the results of this study might be biased.

A fifth point that is addressed in this discussion is the finding that the type of industry has a significant effect on the amount of reduction actions. This finding tends to turn the attention away from recognizing that not all organizations are equally affected by institutional pressures (Han, 2000). The differences among the industries show that the degree to conform to mechanisms of institutions differ per industry. For instance, the clothing sector may conform more to the mimetic pressures due to uncertainty, in contrary to pharmaceutical industry in which there is less competition and firms are more willing to conform to institutions caused by regulative pressures. The results are to a certain extent consistent with the findings of earlier studies (e.g. Adams and Hardwick, 1998; Brammer & Millington 2008). They suggested that firms in environmentally damaging industries such as mining, and those in consumer oriented sectors such as retailing give significantly more heavily to charity that other firms, while firms in cleaner industries give significantly give less heavily. In relation to this research regarding reduction actions, it can be noticed that the firms in environmentally damaging industries undertake significantly more reduction actions in order to reduce waste and improve their environmental performance. McWilliams and Siegel (20001) also found significant results when investigating the relationship between the type of industry and the degree of CSR. In line with their results, it was founded that type of industry

might indeed influence the extent of CSR initiatives in relation to actions for reducing water, electricity, and fuel usage.

The last institutional explanation for the significant difference between the industries is the mimetic pillar. According to DiMaggio and Powell (1983), organizations model themselves on other organizations when organizational technologies are poorly understood, when goals are ambiguous or when the environment is uncertain. If enough of one type of social actors adopts a course of action, then other, similar social actors will imitate them (DiMaggio & Powell, 1983). Therefore, the level of uncertainty in their industry could explain the results. In this case, the most profitable organizations in the business sector will serve as models for the rest. By imitating other firms in their industry they could reduce the environmental uncertainty. Since the most profitable organizations have more money to invest in actions to reduce waste, it is expected that less profitable organizations will follow the most successful and profitable firms in order to reduce uncertainty. As a consequence, it can be that that specific industries have more reduction actions due to pressures from firms of their own industry.

6.4 Contributions and Implications

In the first chapter, the managerial and scientific contributions of this research were discussed. One of the managerial contributions of this study was that the results could give the government and policymakers of emerging markets valuable insights in the actual environmental performance of firms that are adopting environmental management systems or self-regulation mechanisms. As the results show, companies that have more experience with an environmental management system have a higher environmental performance. In addition, companies with self-regulation mechanisms have a higher environmental performance. The government and policymakers can use this information and decide whether the laws fully meet the environmental preservation needs or that adjustments are needed. For instance, policymakers could copy several requirements of the environmental management systems and set additional environmental laws, in order to improve the environmental performance. Moreover, since companies that are more experienced showed to have a higher environmental performance, governments might choose to invest more in the younger and new companies. By doing this, young companies might develop their routines sooner, which might lead companies behaving more environmentally responsible in the earlier stages.

Besides, the results show that the extent to what companies are experienced with ISO 14001 standards has an influence on the companies' environmental performance. This

relationship exists when firms are adopting the standards for more than 5 years. The information can give the developers of the international certifications insights in the companies behaviour. Developers can choose to adjust their policies or norms in order to push companies to behaving more environmental responsible in the early stages. For instance, developers of the ISO 14001 standards could require periodically improvement instead of annual improvement. This might force companies to improve their environmental performance earlier than 5 years.

Another managerial implication is that this study provides managers of businesses insights into the possibilities of adopting environmental certified management systems or self-regulation mechanisms. The information might be useful when managers face the dilemma of whether to adopt an environmental management system or self-regulation mechanism. Providing this information to managers might help organizations to increase efficiency of operations by eliminating waste from production and distribution processes and could increase the awareness of environmental impacts among all employees. In the end, this could lead to less waste and the avoidance of future environmental crises.

Next to this, this research has its scientific implications. This study increased the understanding in how companies truly behave environmental responsible by looking at their CSR initiatives. Moreover, this study has given valuable insights in the actual behaviour of companies operating in the emerging markets. The results have shown that companies in emerging markets indeed behave accountable. Therefore, it has filled in the gap between the existing literature of CSR, accountability and the emerging markets. Furthermore, it is shown that environmental management systems or self-regulation mechanisms have different influences on firm's actions for reducing waste. In addition, it was found that the time of the adoption process of the ISO 14001 standards has a significant influence on their environmental behaviour. Despite the fact that this study has its limitations, as will be discussed in the next subparagraph, this study still proves an indication of the influence of environmental management systems and self-regulation mechanisms on the environmental behaviour of companies.

6.5 Limitations of Research

This subparagraph reflects on the limitations of this study. These limitations can be divided into limitations in research design, methodological limitations and limitations that follow the sample composition.

The first limitation in research design is that the data date back from 2010, so the data used might be a little out-dated. At the moment, an increase in managers in emerging markets that belief that CSR leads to better productivity, efficiency and employee morale. This evidence suggests that emerging markets economies are rapidly become aware of CSR issues and are taking steps to behave more environmental responsible. This CSR movement may have influenced the results of this study. Secondly, secondary data has been used. The key problem of this method involves the recurrent question of validity (Babbie, 2013). Questions asked by the researcher come close to measuring in the interest of this study, however, questions that had been asked are asked just a little differently (Babbie, 2013). Therefore, the information lacks specificity or does not exactly address the question.

The above-mentioned limitations concern the set-up of this research. The upcoming limitations concern the methodological choices. As a quantitative approach has been chosen, reduction of data to numbers results in loss of information (Sudeshna & Shruti Datt, 2016). Moreover, untested variables may have influenced the results. Furthermore, companies might have given socially desirable answers regarding their CSR practices. This might have influenced the results. Besides, there is no information on the contextual factors to help interpret the results or to explain variations in environmental behaviour (Sudeshna & Shruti Datt, 2016). Lastly, the quantitative research method involves structured questionnaire with close-ended questions. This limits the outcomes of the study. Also, the respondents have limited options of responses, based on the selection made by the researcher.

Another limitation of this study is that it only focuses on one specific country. The sample consisted of 573 firms that are operating in the emerging market of Brazil. As discussed in the first chapter, previous studies have shown that different markets have different cultural- and social norms in relation to environmental issues and encounter different demands by governments and the population in contrast to other markets (Oliveira Serra & Salgado, 2010; Visser, 2006). Therefore, results may differ per country. In order to generalise the results in a more adequately way, this study should also be conducted in another country. Next to this, the distribution of the business sectors is divided unequally. The unequally distribution could have influenced the results, since some business sectors may have more reduction actions than others.

Lastly, only significantly large firms have filled in the questionnaire. Some studies have shown that the level or participation in social behaviour may differ between small and medium-sized and large firms (Langlois & Schlegelmich, 1990; Perrini et al., 2007; Udayasankar, 2007). Seen the smaller scale of operations, resource access constraints and lower visibility, it is expected that smaller firms are less likely to undertake socially responsible initiatives (Udayasankar, 2008; Perrini et al., 2007). The sample of relatively large firms could therefore possibly influenced the results.

6.6 Recommendations for future research

There are some points addressed in the discussion that have their implications for future research. Firstly, the data base date back to 2010. Since there are several institutional pressures that push firms to behaving more socially responsible, different results compared to a more recent database can be found. Therefore, a longitudinal study might be interesting to conduct. By conducting one, the difference can be investigated and trend could be determined. The second recommendation for future research would be to investigate the motivations for undertaking actions to reduce waste. Since this study has been quantitative, the reduction of data to numbers has resulted in loss of information. As the firms were only asked to fill in structured questionnaires with close-ended questions, the firms had limited options of responses, only based on the selection made by the researcher. Therefore, it is harder to draw conclusions from numerical data. Moreover, there is no information on the contextual factor that could help us interpret the results. Therefore, it might be interesting to conduct a qualitative research to determine the motivators of managers to undertake actions to reduce waste.

Next to this, it might be interesting to determine whether the influence of environmental management systems and self-regulation mechanisms differs per country or culture. Brazil is, in contrary to other countries in the emerging economy, a developed country in relation to CSR. These country specific characteristics might have an affect on the amount of reduction actions. Therefore, it might be interesting to conduct this study in another emerging market country. Another recommendation flows from the limitations of this research. Firms that participated in this study were only large firms. As some studies have shown, the level or participation in corporate social behaviour may differ between small and medium-sized and large firms (Langlois & Schlegelmich, 1990; Perrini et al., 2007; Udayasankar, 2007). Given the smaller scale of operations, resource access constraints and lower visibility, it is argued that smaller firms are less likely to participate in corporate social

behaviour (Udayasankar, 2008; Perrini et al., 2007). Therefore, it might be wise to examine whether firm size might influence the results.

The last recommendation for future research is to test other dimensions of environmental CSR actions. This study examined whether specific environmental management systems and self-regulation mechanisms had influence on the reduction actions. However, companies could also improve their environmental performance by undertaking other actions, not only the reduction actions proposed in this study. Therefore, it might be interesting to examine the relationship with other CSR initiatives. Moreover, it might be interesting to examine whether other environmental managing systems than the ISO 14001 standards and other self-regulation mechanisms show different results.

7. References

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Appendix A: Literature

A.1 Possible CSR programs (Perrini et al., 2007, p. 279)

Environmental management	Pollution reduction
	Noise reduction
	Energy reduction
	Water reduction
	Waste management
	Packaging recovery
	Alternative energy
	EMAS and ISO14001
Employment	Briefing with employees
	Corp. internal commun.
	Corp. activ. for emp. benefit
	Training activities
	Integrative medical care
	Flexible working time
Supply chain	Suppliers' selection
	Customers' selection
Local community	Corporate advertising
	Sponsorship
	Cause-related marketing
	Giving
Controlling and reporting	Ethical code
	Social report
	SA8000

A.2 Full overview of benefits of the implementation of self-regulation mechanisms (Campbell, Eden & Miller, 2012; Rangang et al., 2012)

Type of benefit	
Financial advantage	✓ Generates new business and market opportunities ✓ Reduces operating costs ✓ Promises long-term gains by sign. changing its business environment
Productivity	✓ Improved process control ✓ Reduction of resource use, waste and emissions ✓ Protects resources on which the company depends ✓ Promises sign. new operations or supply chain or manufacturing efficiency
Sales and marketing	✓ Improved product quality ✓ Increased demand and sales ✓ Markets to socially responsible consumers ✓ Ability to request premium prices ✓ Willingness of buyers and suppliers to transact with firm

Management	✓ Reflects preferences operating managers ✓ Fulfils senior management or chief executive's social mission
Public relations	✓ Improves company's social standing ✓ Improves company's brand reputation
Personnel and training	✓ Increases employee motivation
Peace of mind	✓ Improves company's environmental impact ✓ Creates important solutions to social or environmental problems

A.3 Full overview of benefits of the adaption of an registered EMS (Bansal & Hunter, 2003; Commission for Environmental Cooperation, 2005; Davies & Weber, 1998; Delmas, 2001; ISO, 1996; Marsh & Terrence, 2012; Wrap, 2015)

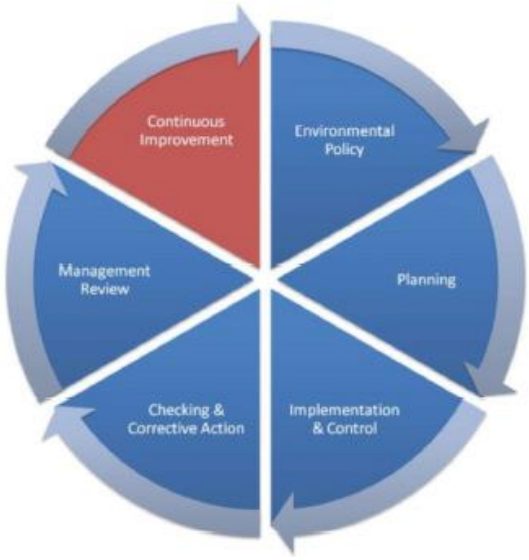
Type of benefit	
Financial advantage	✓ Superior economic performer ✓ Identification of opportunities to reduce waste such as raw material, utility and disposal costs ✓ Increased profits ✓ Reduced risk of fines for non-compliance with environmental legislation ✓ Lower insurance premiums as risks and liabilities are reduced ✓ More easily obtainable bank loans as result of lower risks, lower cost of capital ✓ Attracting shareholders and investors ✓ Improved international trade ✓ Barriers to imitation
Productivity	✓ Improved process control ✓ Reduces process waste and use of raw materials; efficiency ✓ Reduction of resource use, waste and emissions ✓ Involved employees can lead to increased operational efficiencies
Sales and marketing	✓ Improved product quality ✓ Increased demand and sales (e.g. achieved through promotion on the "greenness" of suppliers) ✓ Market access: EMS becomes pre-requisite of doing business ✓ Consumers willing to pay a price premium ✓ Gaining sustainable competitive advantage ✓ Reduction in customer complaints
Management	✓ Keeping ahead of environmental legislation ✓ Better relations with regulators ✓ Continual improvement and structured approach to environmental issues ✓ Clearly defined objectives and targets
Public relations	✓ Improved relations with local community and environmental groups ✓ Improved public image ✓ Corporation becomes more transparent in its operations, management and reporting
Personnel and training	✓ Improved working environment ✓ Reduced potential for environmental incidents ✓ Increased employee motivation, involvement and environmental awareness ✓ Increased confidence and credibility for staff and middle management in the

	discharge of their environmental responsibilities improve dealing with senior management and external parties
Peace of mind	✓ Conforming to legal requirements, regulatory compliance ✓ Avoiding penalties for pollution ✓ Avoiding bad publicity from pollution incidents ✓ Facilitate sustainable development ✓ Regulatory relief, less intensive and intrusive monitoring, fewer inspections

A.4 Summary of ISO 14000 series standards (ISO, 2002, p.

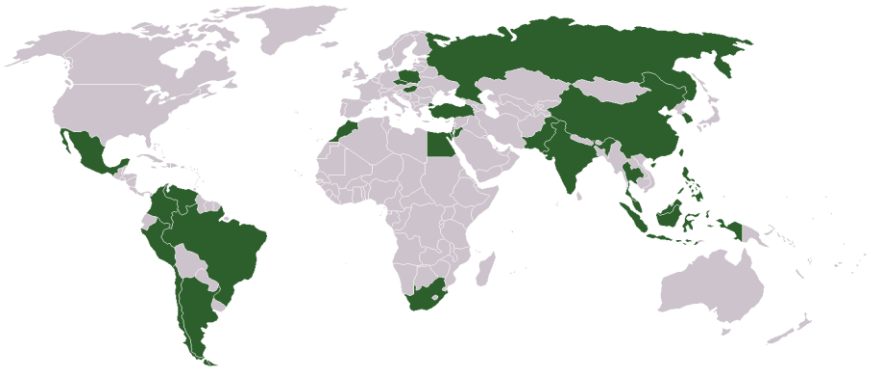
Standard No.	Title
14000	Guide to Environmental Management Principles, Systems, and Supporting Techniques
14001	Environmental Management Systems: Specification with Guidance for Use
14004	Guidelines on the Elements of an Environmental Management System
14010	Guidelines for Environmental Auditing: General Principles of Environmental Auditing
14011	Guidelines for Environmental Auditing: Audit Procedures—Part 1: Auditing of Environmental Management Systems
14012	Guidelines for Environmental Auditing: Qualification Criteria for Environmental Auditors
14013/15	Guidelines for Environmental Auditing: Audit Programmers, Reviews, and Assessments
14020/23	Environmental Labeling
14024	Environmental Labeling: Practitioner Programs—Guiding Principles, Practices, and Certification Procedures of Multiple Criteria Programs
14031/32	Guidelines on Environmental Performance Evaluation
14040/43	Life Cycle Assessment General Principles and Practices
14050	Glossary
14060	Guide for the Inclusion of Environmental Aspects in Product Standards

A.5 EMS process structure (Marsh & Terrence, 2012, p. 2)

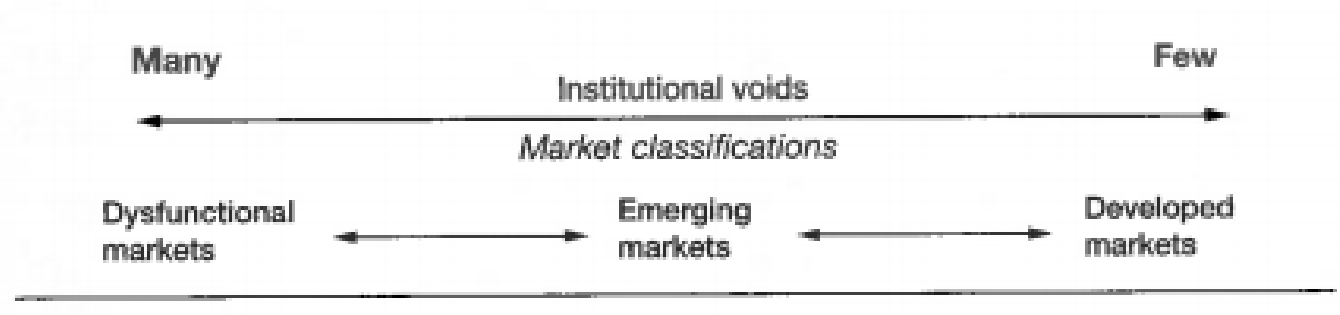


A.6 Comparison between steps required for registration ISO 14001 and EMAS (Daughtry, 2004, p. 17)

A.7 Emerging market economies of the world (www.lagodaxnian.wordpress.com)



A.8 Continuum of institutional voids and market definitions (Khanna &Palepu, 2010, p.25)



A.9 Comparing transaction costs in emerging and developed markets (2007) (Khanna &Palepu, 2010, p.18)

Country	Start-up procedures to register a business (number)	Time required to build a warehouse (days)	Time required to enforce a contract (days)	Time required to register property (days)	Time require to start busine (days)
Emerging markets					
Argentina	14	338	590	65	31
Brazil	18	411	616	45	152
China	13	336	406	29	35
Czech Republic	10	180	820	123	17
India	13	224	1420	62	33
Indonesia	12	196	570	42	105
Israel	5	235	890	144	34
Republic of Korea	10	34	230	11	17
Nigeria	9	350	457	82	34
Pakistan	11	223	880	50	24
Russia	8	704	281	52	29
Turkey	6	188	420	6	6
Developed markets					
Australia	2	221	262	5	2
Canada	2	75	570	17	3
Germany	9	100	394	40	18
Japan	8	177	316	14	23
Norway	6	252	310	3	10
United Kingdom	6	144	404	21	13
United States	6	40	300	12	6

A.10 Environmental legislation and the regulatory authorities in Brazil (Reuters, 2016)

- Federal Constitution 1988, which provides the main framework and provisions for environmental protection in Brazil (*Article 225*).
- Federal Law No. 6,938/1981, which established the National Environmental Policy.
- Federal Law No. 7,735/1989, which created the federal environmental protection agency (*Instituto Nacional do Meio Ambiente e dos Recursos Naturais Renováveis*) (IBAMA).
- Federal Law No. 9,605/1998 (Environmental Crimes Act), which addresses criminal and administrative breaches.
- Federal Law No. 9,985/2000, which established the National System for Conservation Units.
- Federal Law No. 11,516/2007, which created the federal agency responsible for the management of federal conservation units (*Instituto Chico Mendes de Conservação da Biodiversidade*) (ICMBio).
- Federal Decree No. 6,514/2008, which contains the implementing regulations for the Environmental Crimes Act, and specifically, administrative penalties.
- Federal Law No. 12,305/2010, which establishes the National Policy for Solid Waste.
- Federal Complementary Law No. 140/2011, which co-ordinates the constitutional jurisdiction for protecting the environment and natural resources.
- Federal Law No. 12,651/2012, which established the new Forest Code.

Appendix B: Dummy variable coding schemes

B.1 Dummy variable coding scheme ISO 14001 policy

ISO 14001	Dummy 1	Dummy 2	Dummy 3	Dummy 4	Dummy 5	Dummy 6	Dummy 7
Yes. Up to 2 years	1	0	0	0	0	0	0
Yes. From 2 to 5 years	0	1	0	0	0	0	0
Yes. From 5 to 10 years.	0	0	1	0	0	0	0
Yes. More than 10 years.	0	0	0	1	0	0	0
No. Plans to implement.	0	0	0	0	1	0	0
No. Process of obtaining.	0	0	0	0	0	1	0
Not considered as necessary.	0	0	0	0	0	0	0

B.2 Dummy variable coding scheme Environmental policy

Environmental policy	Dummy 1	Dummy 2	Dummy 3	Dummy 4
Yes. Integrated other policies.	1	0	0	0
Yes. Specific for environment.	0	1	0	0
No. Adopts nonsystematized practices.	0	0	1	0
No.	0	0	0	0

B.3 Dummy variable coding scheme Climate change policy

Climate change	Dummy 1	Dummy 2	Dummy 3
Yes.	1	0	0
Plans to implement.	0	1	0
No.	0	0	0

Appendix C: Descriptives

C.1 Water descriptives

Statistics

Water_sum

N	Valid	572
	Missing	1
Mean		3,0122
Median		3,0000
Mode		5,00
Std. Deviation		1,55962
Variance		2,432
Skewness		-,257
Std. Error of Skewness		,102
Kurtosis		-1,168
Std. Error of Kurtosis		,204
Minimum		,00
Maximum		5,00

Water_sum

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	.00	26	4.5	4.5	4.5
	1.00	111	19.4	19.4	24.0
	2.00	72	12.6	12.6	36.5
	3.00	114	19.9	19.9	56.5
	4.00	119	20.8	20.8	77.3
	5.00	130	22.7	22.7	100.0
	Total	572	99.8	100.0	
Missing	System	1	.2		
Total		573	100.0		

C.2 Electricity descriptives

Statistics

Electricity_sum

N	Valid	573
	Missing	0
Mean		2,5079
Median		3,0000
Mode		4,00
Std. Deviation		1,28140
Variance		1,642
Skewness		-,298
Std. Error of Skewness		,102
Kurtosis		-1,162
Std. Error of Kurtosis		,204
Minimum		,00
Maximum		4,00

Electricity_sum

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	,00	33	5,8	5,8	5,8
	1,00	123	21,5	21,5	27,2
	2,00	113	19,7	19,7	46,9
	3,00	128	22,3	22,3	69,3
	4,00	176	30,7	30,7	100,0
	Total	573	100,0	100,0	

C.3 Fuel descriptives

Statistics

Fuel_sum

N	Valid	573
	Missing	0
Mean		1,1745
Median		1,0000
Mode		,00
Std. Deviation		1,06809
Variance		1,141
Skewness		,434
Std. Error of Skewness		,102
Kurtosis		-1,072
Std. Error of Kurtosis		,204
Minimum		,00
Maximum		3,00

Fuel_sum

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	,00	194	33,9	33,9	33,9
	1,00	176	30,7	30,7	64,6
	2,00	112	19,5	19,5	84,1
	3,00	91	15,9	15,9	100,0
	Total	573	100,0	100,0	

C.4 Wood and coal descriptives

Statistics

Wood_sum

N	Valid	108
	Missing	465
Mean		1,4167
Median		1,0000
Mode		1,00
Std. Deviation		,98707
Variance		,974
Skewness		,207
Std. Error of Skewness		,233
Kurtosis		-,958
Std. Error of Kurtosis		,461
Minimum		,00
Maximum		3,00

Wood_sum

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	,00	20	3,5	18,5	18,5
	1,00	42	7,3	38,9	57,4
	2,00	27	4,7	25,0	82,4
	3,00	19	3,3	17,6	100,0
	Total	108	18,8	100,0	
Missing	99,00	465	81,2		
Total		573	100,0		

C.5 Frequency table ISO 14001 standards

ISO_Yes_2

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0	541	94,4	94,4	94,4
	1	31	5,4	5,4	99,8
	2	1	,2	,2	100,0
	Total	573	100,0	100,0	

ISO_Yes_2to5

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0	513	89,5	89,5	89,5
	1	60	10,5	10,5	100,0
	Total	573	100,0	100,0	

ISO_Yes_5to10

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0	422	73,6	73,6	73,6
	1	151	26,4	26,4	100,0
	Total	573	100,0	100,0	

ISO_Yes_more10

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0	526	91,8	91,8	91,8
	1	47	8,2	8,2	100,0
	Total	573	100,0	100,0	

ISO_No_plans

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0	457	79,8	79,8	79,8
	1	116	20,2	20,2	100,0
	Total	573	100,0	100,0	

ISO_No_process

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0	497	86,7	86,7	86,7
	1	76	13,3	13,3	100,0
	Total	573	100,0	100,0	

ISO_Not_considerd

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0	481	83,9	83,9	83,9
	1	92	16,1	16,1	100,0
	Total	573	100,0	100,0	

C.6 Frequency table Environmental policy

Env_Yes_Integrated

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0	205	35,8	35,8	35,8

	1	368	64,2	64,2	100,0
	Total	573	100,0	100,0	

Env_Yes_Specific

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0	444	77,5	77,5	77,5
	1	129	22,5	22,5	100,0
	Total	573	100,0	100,0	

Env_No_nonsystem

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0	503	87,8	87,8	87,8
	1	70	12,2	12,2	100,0
	Total	573	100,0	100,0	

Env_No

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0	567	98,9	98,9	98,8
	1	6	1,01	1,01	100,0
	Total	573	100,0	100,0	

C.7 Frequency table Climate change policy

Climate_change_Yes

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0	417	72,8	72,8	72,8
	1	156	27,2	27,2	100,0
	Total	573	100,0	100,0	

Climate_change_plansimplement

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0	459	80,1	80,1	80,1
	1	114	19,9	19,9	100,0
	Total	573	100,0	100,0	

Climate_change_No

	Frequency	Percent	Valid Percent	Cumulative Percent

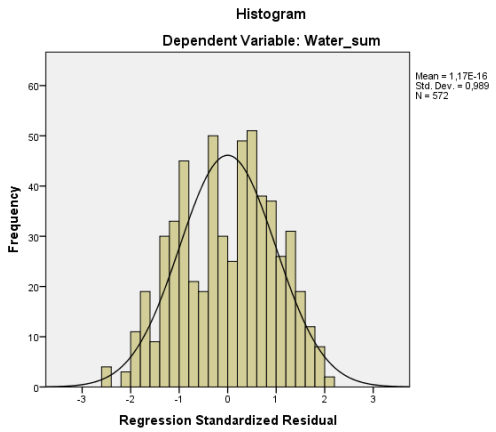
Valid	0	270	47,1	47,1	47,1
	1	303	52,9	52,9	100,0
	Total	573	100,0	100,0	

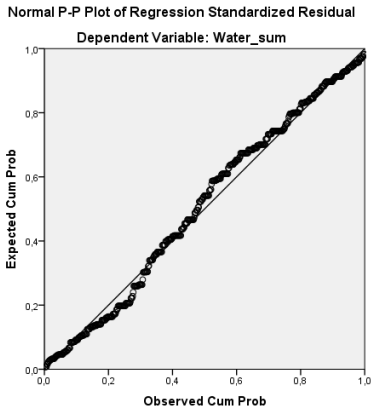
Appendix D: Assumptions of the linear regression analysis

D.1 Checking assumptions for dependent variable: water

Assumption: Normality

The shape of the distribution of the variables is not a strict assumptions, however it may have influence on the correlation between the variables. Therefore, we will first check whether the variables are normally distributed. This can be seen with the help the standardized Residual Plots namely, the histogram and the normal probability plot. The histogram show that the variables are classical-bell shaped, with most of the frequency counts clustered in the middle (NIST, 2012). The normal probability plot is the collection of points along the y-axis. Small departures from the straight line are common but it should not contain shaped curves (NIST, 2012). The normal probability in this study shows a straight line, which indicates that the assumption of normality was met.





Assumption variable types:

All predictor variables must be quantitative or categorical, and the outcome variable must be quantitative and continuous. This means that they should be measured at the interval level. This is the case for the outcome variable, since it is measured as a sum variable, ranging from 0-5. However, we see that the predictor variable is not metric and should be transformed into dummy variables. '*A dummy variable is a way of recoding a categorical variable with more than two categories into a series of variables all of which are dichotomous and can take on values of only 0 or 1*' (Field, p. 785, 2010). Appendix B show the transformed dummy variables. Here we see that the categories; (1) ISO 1400: Yes. For up to 2 years; (2) Yes. From 2 to 5 years; (3) Yes. From 5 to 10 years; (4) Yes. From more than 10 years; (5) No. It plans to implement it; (6) No. But is in process of obtaining it are coded as 1 and (7) No. Not considered as necessary at the moment as 0, which indicates that the last category was used as the reference category. Since Environmental policy is also a categorical variable, this variable also needs to be transformed into dummy variables. Here we see that the categories (1) Yes. Integrated to other policies; (2) Yes. Specific for environment; (3) No. It adopts no systematized practices are coded as 1 and (4) No as 0, which reflects that reference category is No. By including all three dummy variables at the same time, the baseline category is always zero, so this actually represents the difference in the change in water reduction actions if a firm has no environmental policy, compared to a firm who has. This difference is the difference between the two group means (Field, 2010). Climate change was also transformed into dummy variables, where (1) Yes and (2) Plans to implement were always compared to the firms that have (3) No Climate change policy. Now that all the predictor variables are transformed into dummy variables, we can state that the first assumption was met.

Assumption: Linearity

This means that the values of the outcome variable for each increment of the predictors lie along a straight line. As Field (2010) states, if this model turns out to be non-linear then it limits the generalizability of the findings. However, since the model only consists of predictor variables which are transformed into dummy variables, linearity does not exist. Therefore, we are allowed to ignore or reject the assumption of linearity.

Assumption: No multicollinearity

This assumption state that there should be no perfect linear relationship between two or more of the predictors (Field, 2010). One way of identifying multicollinearity is to look at the VIF or the tolerance statistic. If the average VIF is greater than 1 or the tolerance statistic is below 0.2, then multicollinearity may be biasing the regression model (Field, 2010). If we look at table below, we see that none of the tolerance statistics are below 0.2, which indicates that there is no strong correlation between two or more predictions in the model and, therefore, we can state that no multicollinearity exists in the model. We can conclude that the assumption of no multicollinearity was met.

Excluded Variables[a]

Model		Beta In	t	Sig.	Partial Correlation	Collinearity Statistics Tolerance
1	Env_Yes_Integrated	,005[b]	,132	,895	,006	,937
	Env_Yes_Specific	,098[b]	2,560	,011	,107	,983
	Env_No_nonsystem	-,118[b]	-2,839	,005	-,119	,826
	Climate_change_Yes	,222[b]	5,738	,000	,235	,918
	Climate_change_plansimplement	,023[b]	,602	,547	,025	,990
2	Climate_change_Yes	,209[c]	5,473	,000	,225	,910
	Climate_change_plansimplement	,018[c]	,472	,637	,020	,987

a. Dependent Variable: Water_sum

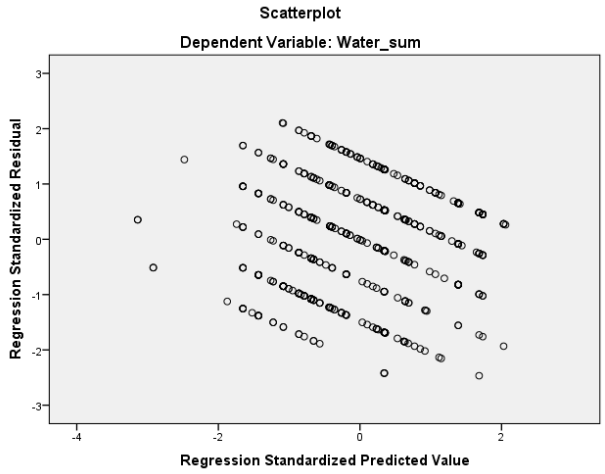
b. Predictors in the Model: (Constant), ISO_No_process, ISO_Yes_2, ISO_Yes_more10, ISO_Yes_2to5, ISO_No_plans, ISO_Yes_5to10

c. Predictors in the Model: (Constant), ISO_No_process, ISO_Yes_2, ISO_Yes_more10, ISO_Yes_2to5, ISO_No_plans, ISO_Yes_5to10, Env_Yes_Specific, Env_No_nonsystem, Env_Yes_Integrated

Assumption: Homoscedasticity

This assumption state that at each level of the predictor variables, the variance of the residual terms should be constant, which means that the residuals at each level of the predictors should

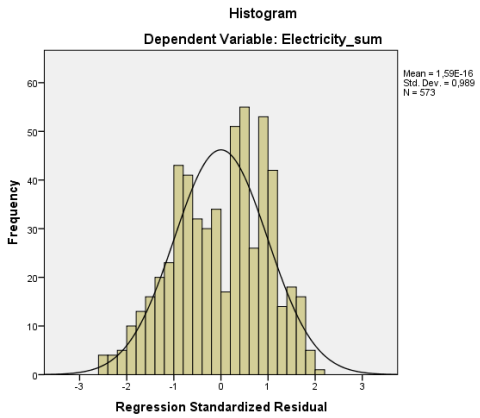
have the same variance (Field, 2010). In order to check this assumption, a scatterplot was executed. This graph plots values of one variable against the corresponding value of another variable, which identifies quickly and easily any violation. If the assumption was met, the scatterplot takes the shape of a rectangular and scores will be concentrated in the centre. In other words, heteroscedasticity is shown by a cluster of points that is wider as the values for the predicted variable gets lager (Field, 2010). As the scatterplot shows, there is homoscedasticity so we can conclude that this assumption was met.

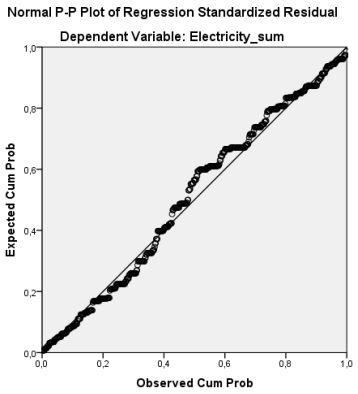


D.2 Checking assumptions for dependent variable: electricity

Assumption: Normality

The histogram show that the variables are classical-bell shaped, with most of the frequency counts clustered in the middle. Moreover, the normal probability plot shows a straight line which indicates that the assumption of normality was met.





Assumption variable types:

The outcome variable is metric, ranging from 0-4. The predictor variables are not metric and therefore transformed into dummy variables. The four predictor variables, ISO 14001 policy, Environmental policy and Climate change policy were transformed into dummies in the same way as they were transformed in the previous analysis (see Appendix B). All the predictor variables are transformed into dummy variables, we can state that the first strict assumption was met.

Assumption: Linearity

As already was mentioned, this model only consists of predictor variables which are transformed into dummy variables. Therefore, linearity does not exist. We are allowed to ignore or reject the assumption of linearity and continue our analysis.

Assumption: No multicollinearity

The table below shows us that none of the tolerance statistics are below 0.2. Therefore, it can be stated that no multicollinearity exists in the model.

Excluded Variables[a]

Model		Beta In	t	Sig.	Partial Correlation	Collinearity Statistics Tolerance
1	Env_Yes_Integrated	,018[b]	,441	,659	,019	,936
	Env_Yes_Specific	,100[b]	2,580	,010	,108	,982

	Env_No_nonsystem	-,148[b]	-3,518	,000	-,146	,823
	Climate_change_Yes	,269[b]	6,959	,000	,281	,918
	Climate_change_plansimplement	-,014[b]	-,365	,715	-,015	,990
2	Climate_change_Yes	,255[c]	6,662	,000	,271	,909
	Climate_change_plansimplement	-,017[c]	-,458	,647	-,019	,987

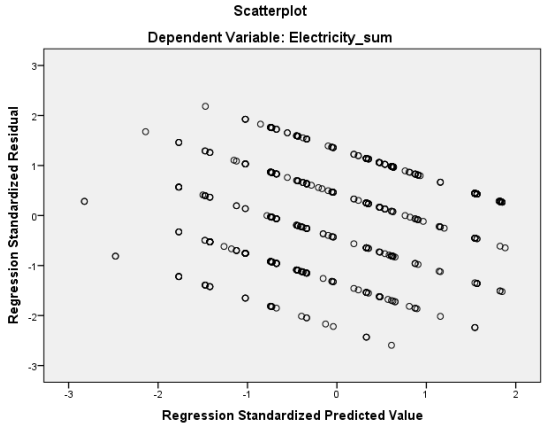
a. Dependent Variable: Electricity_sum

b. Predictors in the Model: (Constant), ISO_No_process, ISO_Yes_2, ISO_Yes_more10, ISO_Yes_2to5, ISO_No_plans, ISO_Yes_5to10

c. Predictors in the Model: (Constant), ISO_No_process, ISO_Yes_2, ISO_Yes_more10, ISO_Yes_2to5, ISO_No_plans, ISO_Yes_5to10, Env_Yes_Specific, Env_No_nonsystem, Env_Yes_Integrated

Assumption: Homoscedasticity

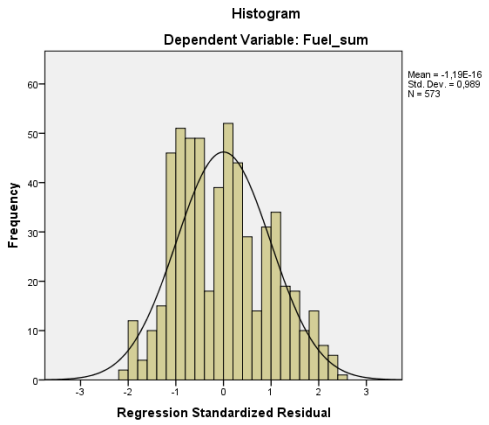
In order to remark homoscedasticity, a scatterplot was performed. This graph below shows the shape of a rectangular. Thus, there is no heteroscecasticity and ,therefore, conclude that this assumption was met.

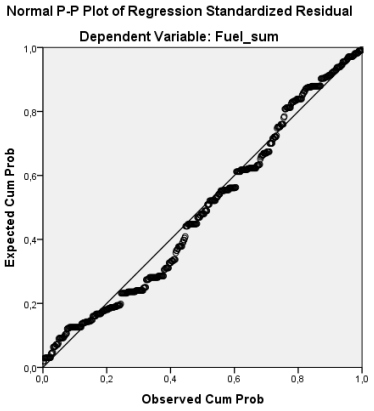


D.3 Checking assumptions for dependent variable: fuel

Assumption: Normality

One more time the histogram and the normal probability plot shows that the assumption of normality was met.





Assumption variable types:

The fuel variable is metric, ranging from 0-3. The independent variables are not metric and therefore transformed into dummy variables. This was done in the same manner as in the previous analysis (appendix A). Now that they are transformed into dummy variables, we can state that this assumption was also met.

Assumption: Linearity

Linearity in the regression analysis with dummy variables does not exist. Therefore, we ignore the assumption of linearity and continue the regression analysis.

Assumption: No multicollinearity

None of the tolerance statistics are below 0.2, as can be seen in the table below. So, we now conclude that no multicollinearity exists in the model.

Excluded Variables[a]

Model		Beta In	t	Sig.	Partial Correlation	Collinearity Statistics Tolerance
1	Env_Yes_Integrated	-,031[b]	-,742	,458	-,031	,936
	Env_Yes_Specific	,096[b]	2,382	,018	,100	,982
	Env_No_nonsystem	-,080[b]	-1,800	,072	-,076	,823
	Climate_change_Yes	,265[b]	6,535	,000	,265	,918
	Climate_change_plansimplement	,046[b]	1,130	,259	,047	,990
2	Climate_change_Yes	,257[c]	6,315	,000	,257	,909
	Climate_change_plansimplement	,045[c]	1,109	,268	,047	,987

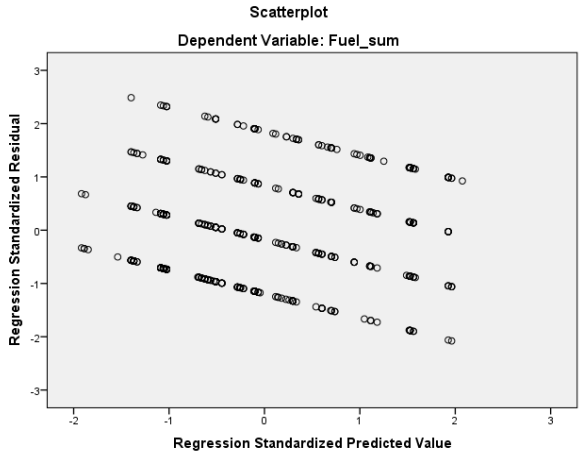
a. Dependent Variable: Fuel_sum

b. Predictors in the Model: (Constant), ISO_No_process, ISO_Yes_2, ISO_Yes_more10, ISO_Yes_2to5, ISO_No_plans, ISO_Yes_5to10

c. Predictors in the Model: (Constant), ISO_No_process, ISO_Yes_2, ISO_Yes_more10, ISO_Yes_2to5, ISO_No_plans, ISO_Yes_5to10, Env_Yes_Specific, Env_No_nonsystem, Env_Yes_Integrated

Assumption: Homoscedasticity

The scatterplot was shows, again, the shape of a rectangular Therefore, we conclude that this assumption was met.

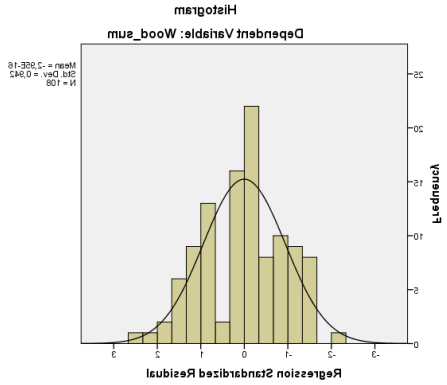


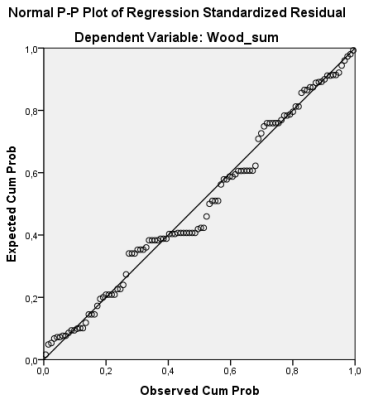
D.4 Checking assumptions for dependent variable: wood and coal

Assumption: Normality

Firstly, we will investigate whether the variables are normally distributed. As already was mentioned, this can be seen with the help of the standardized Residual Plots. We see a straight

line in the normal probability plot and a classical-bell shaped histogram which indicates that the assumption was met.





Assumption variable types:

Since the wood variable was transformed into a sum variable we can now interpret the variable as a metric variable. Likewise previous analyses, the independent variables were transformed into dummy variables, so we can now continue our analysis.

Assumption: Linearity

Since linearity does not exist in a Regression Analysis with dummy variables, we can continue ignore the assumption and continue the analysis.

Assumption: No multicollinearity

By identifying multicollinearity we look at the VIF or the tolerance statistic. None of the tolerance statistics are below 0.2 or VIF is greater than 1, so there no strong correlation between the predictors. Therefore we can continue to the last assumption

Excluded Variables[a]

Model		Beta In	t	Sig.	Partial Correlation	Collinearity Statistics Tolerance
1	Env_Yes_Integrated	,029[b]	,276	,783	,028	,847

	Env_Yes_Specific	-,036[b]	-,367	,715	-,037	,920
	Env_No_nonsystem	,017[b]	,167	,868	,017	,894
	Climate_change_Yes	,208[b]	2,027	,045	,199	,830
	Climate_change_plansimplement	,125[b]	1,276	,205	,127	,938
2	Climate_change_Yes	,211[c]	2,014	,047	,200	,818
	Climate_change_plansimplement	,125[c]	1,261	,210	,127	,930

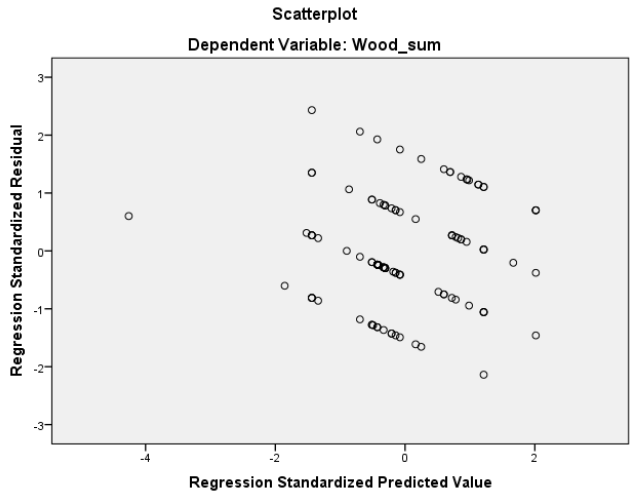
a. Dependent Variable: Wood_sum

b. Predictors in the Model: (Constant), ISO_No_process, ISO_Yes_2, ISO_Yes_2to5, ISO_Yes_more10, ISO_Yes_5to10, ISO_No_plans

c. Predictors in the Model: (Constant), ISO_No_process, ISO_Yes_2, ISO_Yes_2to5, ISO_Yes_more10, ISO_Yes_5to10, ISO_No_plans, Env_Yes_Specific, Env_No_nonsystem, Env_Yes_Integrated

Assumption: Homoscedasticity

To check for homoscedasticity we executed a scatterplot. We see that the scatterplot takes the shape of a rectangular and scores are concentrated in the centre. We can now proceed to the regression analysis.



Appendix E: Results of companies' environmental performance

E.1 Results of companies' water reduction actions

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	,427[a]	,182	,174	1,41785	,182	20,983	6	565	,000
2	,461[b]	,212	,200	1,39526	,030	7,149	3	562	,000
3	,509[c]	,259	,244	1,35579	,047	17,597	2	560	,000

a. Predictors: (Constant), ISO_No_process, ISO_Yes_2, ISO_Yes_more10, ISO_Yes_2to5, ISO_No_plans, ISO_Yes_5to10

b. Predictors: (Constant), ISO_No_process, ISO_Yes_2, ISO_Yes_more10, ISO_Yes_2to5, ISO_No_plans, ISO_Yes_5to10, Env_Yes_Specific, Env_No_nonsystem, Env_Yes_Integrated

c. Predictors: (Constant), ISO_No_process, ISO_Yes_2, ISO_Yes_more10, ISO_Yes_2to5, ISO_No_plans, ISO_Yes_5to10, Env_Yes_Specific, Env_No_nonsystem, Env_Yes_Integrated, Climate_change_plansimplement, Climate_change_Yes

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	253,093	6	42,182	20,983	,000[b]
	Residual	1135,822	565	2,010		
	Total	1388,914	571			
2	Regression	294,846	9	32,761	16,828	,000[c]
	Residual	1094,069	562	1,947		
	Total	1388,914	571			
3	Regression	359,537	11	32,685	17,781	,000[d]
	Residual	1029,378	560	1,838		
	Total	1388,914	571			

a. Dependent Variable: Water_sum

b. Predictors: (Constant), ISO_No_process, ISO_Yes_2, ISO_Yes_more10, ISO_Yes_2to5, ISO_No_plans, ISO_Yes_5to10

c. Predictors: (Constant), ISO_No_process, ISO_Yes_2, ISO_Yes_more10, ISO_Yes_2to5, ISO_No_plans, ISO_Yes_5to10, Env_Yes_Specific, Env_No_nonsystem, Env_Yes_Integrated

d. Predictors: (Constant), ISO_No_process, ISO_Yes_2, ISO_Yes_more10, ISO_Yes_2to5, ISO_No_plans, ISO_Yes_5to10, Env_Yes_Specific, Env_No_nonsystem, Env_Yes_Integrated, Climate_change_plansimplement, Climate_change_Yes

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	2,359	,138		17,132	,000

	ISO_Yes_2	,582	,269	,090	2,161	,031
	ISO_Yes_2to5	,830	,225	,163	3,689	,000
	ISO_Yes_5to10	1,377	,178	,389	7,749	,000
	ISO_Yes_more10	1,750	,247	,308	7,087	,000
	ISO_No_plans	-,092	,187	-,024	-,493	,622
	ISO_No_process	,335	,211	,073	1,589	,113
2	(Constant)	,817	,576		1,417	,157
	ISO_Yes_2	,429	,272	,066	1,579	,115
	ISO_Yes_2to5	,582	,231	,114	2,522	,012
	ISO_Yes_5to10	1,123	,187	,318	6,020	,000
	ISO_Yes_more10	1,484	,252	,262	5,892	,000
	ISO_No_plans	-,164	,184	-,042	-,889	,374
	ISO_No_process	,147	,213	,032	,688	,492
	Env_Yes_Integrated	1,727	,581	,531	2,976	,003
	Env_Yes_Specific	2,001	,590	,537	3,395	,001
	Env_No_nonsystem	1,182	,596	,247	1,984	,048
3	(Constant)	,695	,560		1,240	,215
	ISO_Yes_2	,348	,264	,054	1,315	,189
	ISO_Yes_2to5	,534	,224	,105	2,382	,018
	ISO_Yes_5to10	,959	,183	,271	5,227	,000
	ISO_Yes_more10	1,232	,249	,217	4,954	,000
	ISO_No_plans	-,172	,180	-,044	-,958	,338
	ISO_No_process	,140	,207	,030	,675	,500
	Env_Yes_Integrated	1,630	,565	,501	2,885	,004
	Env_Yes_Specific	1,865	,574	,500	3,249	,001
	Env_No_nonsystem	1,175	,580	,245	2,027	,043
	Climate_change_Yes	,827	,140	,236	5,912	,000
	Climate_change_plansimplement	,337	,150	,086	2,242	,025

a. Dependent Variable: Water_sum

E.2 Results of companies' electricity reduction actions

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change

1	,398[a]	,158	,149	1,18200	,158	17,708	6	566	,000
2	,437[b]	,191	,178	1,16164	,033	7,671	3	563	,000
3	,504[c]	,254	,239	1,11776	,063	23,537	2	561	,000

a. Predictors: (Constant), ISO_No_process, ISO_Yes_2, ISO_Yes_more10, ISO_Yes_2to5, ISO_No_plans, ISO_Yes_5to10

b. Predictors: (Constant), ISO_No_process, ISO_Yes_2, ISO_Yes_more10, ISO_Yes_2to5, ISO_No_plans, ISO_Yes_5to10, Env_Yes_Specific, Env_No_nonsystem, Env_Yes_Integrated

c. Predictors: (Constant), ISO_No_process, ISO_Yes_2, ISO_Yes_more10, ISO_Yes_2to5, ISO_No_plans, ISO_Yes_5to10, Env_Yes_Specific, Env_No_nonsystem, Env_Yes_Integrated, Climate_change_plansimplement, Climate_change_Yes

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	148,442	6	24,740	17,708	,000[b]
	Residual	790,773	566	1,397		
	Total	939,215	572			
2	Regression	179,496	9	19,944	14,780	,000[c]
	Residual	759,719	563	1,349		
	Total	939,215	572			
3	Regression	238,309	11	21,664	17,340	,000[d]
	Residual	700,906	561	1,249		
	Total	939,215	572			

a. Dependent Variable: Electricity_sum

b. Predictors: (Constant), ISO_No_process, ISO_Yes_2, ISO_Yes_more10, ISO_Yes_2to5, ISO_No_plans, ISO_Yes_5to10

c. Predictors: (Constant), ISO_No_process, ISO_Yes_2, ISO_Yes_more10, ISO_Yes_2to5, ISO_No_plans, ISO_Yes_5to10, Env_Yes_Specific, Env_No_nonsystem, Env_Yes_Integrated

d. Predictors: (Constant), ISO_No_process, ISO_Yes_2, ISO_Yes_more10, ISO_Yes_2to5, ISO_No_plans, ISO_Yes_5to10, Env_Yes_Specific, Env_No_nonsystem, Env_Yes_Integrated, Climate_change_plansimplement, Climate_change_Yes

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	2,078	,114		18,188	,000

	ISO_Yes_2	,451	,224	,085	2,011	,045
	ISO_Yes_2to5	,491	,187	,117	2,618	,009
	ISO_Yes_5to10	1,041	,148	,358	7,048	,000
	ISO_Yes_more10	1,160	,206	,249	5,644	,000
	ISO_No_plans	-,170	,155	-,053	-1,093	,275
	ISO_No_process	,135	,175	,036	,768	,443
2	(Constant)	1,030	,480		2,147	,032
	ISO_Yes_2	,289	,226	,054	1,280	,201
	ISO_Yes_2to5	,255	,192	,061	1,330	,184
	ISO_Yes_5to10	,801	,155	,276	5,162	,000
	ISO_Yes_more10	,910	,210	,195	4,341	,000
	ISO_No_plans	-,234	,153	-,073	-1,529	,127
	ISO_No_process	-,042	,177	-,011	-,237	,813
	Env_Yes_Integrated	1,234	,483	,462	2,553	,011
	Env_Yes_Specific	1,452	,491	,474	2,959	,003
	Env_No_nonsystem	,675	,496	,173	1,361	,174
3	(Constant)	,908	,462		1,967	,050
	ISO_Yes_2	,220	,218	,041	1,011	,312
	ISO_Yes_2to5	,211	,185	,051	1,145	,253
	ISO_Yes_5to10	,645	,151	,222	4,271	,000
	ISO_Yes_more10	,664	,205	,142	3,240	,001
	ISO_No_plans	-,230	,148	-,072	-1,558	,120
	ISO_No_process	-,042	,171	-,011	-,244	,807
	Env_Yes_Integrated	1,168	,466	,437	2,506	,012
	Env_Yes_Specific	1,348	,473	,440	2,848	,005
	Env_No_nonsystem	,693	,478	,177	1,451	,147
	Climate_change_Yes	,789	,115	,274	6,844	,000
	Climate_change_plansimplement	,198	,123	,062	1,602	,110

a. Dependent Variable: Electricity_sum

E.3 Results of companies' fuel reduction actions

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	,285[a]	,081	,071	1,02928	,081	8,325	6	566	,000

2	,308[b]	,095	,081	1,02409	,014	2,918	3	563	,034
3	,413[c]	,170	,154	,98233	,075	25,444	2	561	,000

a. Predictors: (Constant), ISO_No_process, ISO_Yes_2, ISO_Yes_more10, ISO_Yes_2to5, ISO_No_plans, ISO_Yes_5to10

b. Predictors: (Constant), ISO_No_process, ISO_Yes_2, ISO_Yes_more10, ISO_Yes_2to5, ISO_No_plans, ISO_Yes_5to10, Env_Yes_Specific, Env_No_nonsystem, Env_Yes_Integrated

c. Predictors: (Constant), ISO_No_process, ISO_Yes_2, ISO_Yes_more10, ISO_Yes_2to5, ISO_No_plans, ISO_Yes_5to10, Env_Yes_Specific, Env_No_nonsystem, Env_Yes_Integrated, Climate_change_plansimplement, Climate_change_Yes

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	52,918	6	8,820	8,325	,000[b]
	Residual	599,630	566	1,059		
	Total	652,548	572			
2	Regression	62,099	9	6,900	6,579	,000[c]
	Residual	590,449	563	1,049		
	Total	652,548	572			
3	Regression	111,204	11	10,109	10,476	,000[d]
	Residual	541,344	561	,965		
	Total	652,548	572			

a. Dependent Variable: Fuel_sum

b. Predictors: (Constant), ISO_No_process, ISO_Yes_2, ISO_Yes_more10, ISO_Yes_2to5, ISO_No_plans, ISO_Yes_5to10

c. Predictors: (Constant), ISO_No_process, ISO_Yes_2, ISO_Yes_more10, ISO_Yes_2to5, ISO_No_plans, ISO_Yes_5to10, Env_Yes_Specific, Env_No_nonsystem, Env_Yes_Integrated

d. Predictors: (Constant), ISO_No_process, ISO_Yes_2, ISO_Yes_more10, ISO_Yes_2to5, ISO_No_plans, ISO_Yes_5to10, Env_Yes_Specific, Env_No_nonsystem, Env_Yes_Integrated, Climate_change_plansimplement, Climate_change_Yes

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	,845	,099		8,493	,000
	ISO_Yes_2	,401	,195	,090	2,055	,040
	ISO_Yes_2to5	,399	,163	,114	2,442	,015

	ISO_Yes_5to10	,679	,129	,280	5,280	,000
	ISO_Yes_more10	,771	,179	,198	4,309	,000
	ISO_No_plans	,042	,135	,016	,314	,754
	ISO_No_process	,106	,153	,034	,695	,487
2	(Constant)	,442	,423		1,044	,297
	ISO_Yes_2	,341	,199	,077	1,710	,088
	ISO_Yes_2to5	,292	,169	,084	1,724	,085
	ISO_Yes_5to10	,570	,137	,235	4,168	,000
	ISO_Yes_more10	,654	,185	,168	3,540	,000
	ISO_No_plans	,005	,135	,002	,035	,972
	ISO_No_process	,029	,156	,009	,187	,852
	Env_Yes_Integrated	,458	,426	,206	1,074	,283
	Env_Yes_Specific	,670	,433	,262	1,548	,122
	Env_No_nonsystem	,239	,437	,073	,547	,584
3	(Constant)	,338	,406		,833	,405
	ISO_Yes_2	,268	,191	,060	1,398	,163
	ISO_Yes_2to5	,251	,162	,072	1,548	,122
	ISO_Yes_5to10	,429	,133	,177	3,232	,001
	ISO_Yes_more10	,441	,180	,113	2,446	,015
	ISO_No_plans	-,005	,130	-,002	-,042	,967
	ISO_No_process	,022	,150	,007	,146	,884
	Env_Yes_Integrated	,361	,409	,162	,882	,378
	Env_Yes_Specific	,540	,416	,211	1,298	,195
	Env_No_nonsystem	,217	,420	,067	,517	,606
	Climate_change_Yes	,714	,101	,298	7,039	,000
	Climate_change_plansimplement	,349	,108	,131	3,217	,001

a. Dependent Variable: Fuel_sum

E.4 Results of companies' wood and coal reduction actions

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change

1	,303[a]	,092	,038	,96816	,092	1,703	6	101	,128
2	,308[b]	,095	,012	,98125	,003	,107	3	98	,956
3	,407[c]	,165	,070	,95202	,071	4,055	2	96	,020

a. Predictors: (Constant), ISO_No_process, ISO_Yes_2, ISO_Yes_2to5, ISO_Yes_more10, ISO_Yes_5to10, ISO_No_plans

b. Predictors: (Constant), ISO_No_process, ISO_Yes_2, ISO_Yes_2to5, ISO_Yes_more10, ISO_Yes_5to10, ISO_No_plans, Env_Yes_Specific, Env_No_nonsystem, Env_Yes_Integrated

c. Predictors: (Constant), ISO_No_process, ISO_Yes_2, ISO_Yes_2to5, ISO_Yes_more10, ISO_Yes_5to10, ISO_No_plans, Env_Yes_Specific, Env_No_nonsystem, Env_Yes_Integrated, Climate_change_plansimplement, Climate_change_Yes

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	9,580	6	1,597	1,703	,128[b]
	Residual	94,670	101	,937		
	Total	104,250	107			
2	Regression	9,890	9	1,099	1,141	,342[c]
	Residual	94,360	98	,963		
	Total	104,250	107			
3	Regression	17,241	11	1,567	1,729	,078[d]
	Residual	87,009	96	,906		
	Total	104,250	107			

a. Dependent Variable: Wood_sum

b. Predictors: (Constant), ISO_No_process, ISO_Yes_2, ISO_Yes_2to5, ISO_Yes_more10, ISO_Yes_5to10, ISO_No_plans

c. Predictors: (Constant), ISO_No_process, ISO_Yes_2, ISO_Yes_2to5, ISO_Yes_more10, ISO_Yes_5to10, ISO_No_plans, Env_Yes_Specific, Env_No_nonsystem, Env_Yes_Integrated

d. Predictors: (Constant), ISO_No_process, ISO_Yes_2, ISO_Yes_2to5, ISO_Yes_more10, ISO_Yes_5to10, ISO_No_plans, Env_Yes_Specific, Env_No_nonsystem, Env_Yes_Integrated, Climate_change_plansimplement, Climate_change_Yes

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	1,338	,235		5,683	,000
	ISO_Yes_2	-,005	,607	-,001	-,008	,994

	ISO_Yes_2to5	-,005	,460	-,001	-,010	,992
	ISO_Yes_5to10	,430	,312	,170	1,378	,171
	ISO_Yes_more10	,662	,399	,186	1,657	,101
	ISO_No_plans	,056	,290	,026	,193	,848
	ISO_No_process	-,358	,306	-,147	-1,170	,245
2	(Constant)	,920	1,025		,897	,372
	ISO_Yes_2	-,014	,621	-,002	-,023	,982
	ISO_Yes_2to5	,036	,479	,008	,075	,940
	ISO_Yes_5to10	,431	,325	,170	1,327	,188
	ISO_Yes_more10	,664	,412	,187	1,612	,110
	ISO_No_plans	,080	,297	,038	,270	,788
	ISO_No_process	-,359	,313	-,147	-1,147	,254
	Env_Yes_Integrated	,428	1,003	,200	,426	,671
	Env_Yes_Specific	,327	1,017	,124	,322	,748
	Env_No_nonsystem	,443	1,021	,151	,434	,666
3	(Constant)	,939	,995		,944	,347
	ISO_Yes_2	-,179	,618	-,030	-,290	,772
	ISO_Yes_2to5	-,041	,467	-,010	-,088	,930
	ISO_Yes_5to10	,208	,326	,082	,637	,526
	ISO_Yes_more10	,388	,414	,109	,937	,351
	ISO_No_plans	,061	,288	,028	,210	,834
	ISO_No_process	-,427	,305	-,175	-1,399	,165
	Env_Yes_Integrated	,235	,975	,110	,241	,810
	Env_Yes_Specific	,099	,990	,038	,100	,920
	Env_No_nonsystem	,293	,993	,100	,295	,768
	Climate_change_Yes	,594	,234	,273	2,536	,013
	Climate_change_plansimplement	,507	,256	,200	1,982	,050

a. Dependent Variable: Wood_sum

Appendix F: Results from additional information from data analysis

F.1 Type of industry as control variable

F.1.1. Water reduction actions

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	,426[a]	,181	,172	1,41794	,181	20,798	6	564	,000
2	,460[b]	,212	,199	1,39496	,031	7,247	3	561	,000
3	,508[c]	,258	,243	1,35583	,046	17,423	2	559	,000
4	,529[d]	,279	,264	1,33724	,021	16,647	1	558	,000

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
4	Regression	387,029	12	32,252	18,036	,000[e]
	Residual	997,829	558	1,788		
	Total	1384,858	570			

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
4	(Constant)	1,663	,601		2,768	,006
	ISO_Yes_2	,419	,262	,065	1,600	,110
	ISO_Yes_2to5	,524	,222	,103	2,364	,018
	ISO_Yes_5to10	,941	,181	,266	5,183	,000
	ISO_Yes_more10	1,225	,246	,216	4,985	,000
	ISO_No_plans	-,286	,179	-,074	-1,594	,112
	ISO_No_process	,086	,205	,019	,422	,673
	Env_Yes_Integrated	1,488	,559	,458	2,663	,008
	Env_Yes_Specific	1,736	,567	,466	3,060	,002
	Env_No_nonsystem	1,032	,573	,216	1,803	,072
	Climate_change_Yes	,781	,138	,223	5,641	,000
	Climate_change_plansimplement	,305	,148	,078	2,053	,041
	Industry_split	-,255	,062	-,150	-4,080	,000

a. Dependent Variable: Water_sum

F.1.2. Electricity reduction actions

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	,397[a]	,157	,148	1,18217	,157	17,571	6	565	,000
2	,437[b]	,191	,178	1,16144	,034	7,783	3	562	,000
3	,503[c]	,253	,239	1,11782	,062	23,357	2	560	,000
4	,511[d]	,261	,245	1,11287	,008	5,988	1	559	,015

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
4	Regression	244,621	12	20,385	16,460	,000[e]
	Residual	692,316	559	1,238		
	Total	936,937	571			

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
4	(Constant)	1,394	,500		2,788	,005
	ISO_Yes_2	,251	,218	,047	1,153	,249
	ISO_Yes_2to5	,201	,184	,048	1,092	,275
	ISO_Yes_5to10	,631	,151	,217	4,183	,000
	ISO_Yes_more10	,656	,204	,141	3,207	,001
	ISO_No_plans	-,292	,149	-,092	-1,959	,051
	ISO_No_process	-,074	,170	-,019	-,431	,666
	Env_Yes_Integrated	1,100	,465	,412	2,366	,018
	Env_Yes_Specific	1,286	,472	,420	2,724	,007
	Env_No_nonsystem	,624	,476	,160	1,309	,191
	Climate_change_Yes	,765	,115	,266	6,645	,000
	Climate_change_plansimplement	,182	,123	,057	1,475	,141
	Industry_split	-,127	,052	-,091	-2,447	,015

a. Dependent Variable: Electricity_sum

F.1.3 Fuel reduction actions

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	,285[a]	,081	,071	1,03017	,081	8,310	6	565	,000
2	,308[b]	,095	,081	1,02499	,014	2,908	3	562	,034
3	,413[c]	,171	,154	,98312	,075	25,445	2	560	,000
4	,422[d]	,178	,161	,97937	,008	5,299	1	559	,022

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
4	Regression	116,348	12	9,696	10,108	,000[e]
	Residual	536,170	559	,959		
	Total	652,517	571			

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
4	(Constant)	,734	,440		1,668	,096
	ISO_Yes_2	,305	,192	,069	1,593	,112
	ISO_Yes_2to5	,256	,162	,073	1,578	,115
	ISO_Yes_5to10	,430	,133	,178	3,242	,001
	ISO_Yes_more10	,446	,180	,115	2,481	,013
	ISO_No_plans	-,045	,131	-,017	-,347	,729
	ISO_No_process	,008	,150	,003	,056	,955
	Env_Yes_Integrated	,295	,409	,133	,721	,471
	Env_Yes_Specific	,481	,415	,188	1,159	,247
	Env_No_nonsystem	,159	,419	,049	,379	,705
	Climate_change_Yes	,697	,101	,291	6,874	,000
	Climate_change_plansimplement	,339	,108	,127	3,130	,002
	Industry_split	-,105	,046	-,090	-2,302	,022

a. Dependent Variable: Fuel_sum

F.1.4. Wood and coal reduction actions

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	,303[a]	,092	,038	,96816	,092	1,703	6	101	,128
2	,308[b]	,095	,012	,98125	,003	,107	3	98	,956
3	,407[c]	,165	,070	,95202	,071	4,055	2	96	,020
4	,407[d]	,165	,060	,95702	,000	,001	1	95	,976

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
4	Regression	17,242	12	1,437	1,569	,114[e]
	Residual	87,008	95	,916		
	Total	104,250	107			

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
4	(Constant)	,946	1,022		,925	,357
	ISO_Yes_2	-,178	,624	-,030	-,285	,776
	ISO_Yes_2to5	-,041	,470	-,009	-,086	,931
	ISO_Yes_5to10	,209	,329	,082	,634	,528
	ISO_Yes_more10	,390	,421	,110	,927	,356
	ISO_No_plans	,060	,291	,028	,205	,838
	ISO_No_process	-,428	,308	-,175	-1,391	,167
	Env_Yes_Integrated	,235	,981	,110	,239	,811
	Env_Yes_Specific	,099	,995	,037	,099	,921
	Env_No_nonsystem	,293	,998	,100	,294	,770
	Climate_change_Yes	,594	,235	,273	2,523	,013
	Climate_change_plansimplement	,508	,258	,201	1,967	,052
	Industry_split	-,003	,090	-,003	-,030	,976

a. Dependent Variable: Wood_sum

F.2 Checking the assumptions of the ANOVA

In order to check if the Analysis of Variance test is an appropriate data analysis for this study, four assumptions have to be checked.

Assumption: Dependent variable are continuous

As mentioned before, the companies' environmental behaviour was measured with the help of sum variables. This means that every dependent variable is measured in ratio level. Thus, we can conclude that this assumption was met.

Assumption: Independent variable should consist of two or more categorical independent groups

As can be seen in the operationalization scheme of the dummy variable coding schemes we can state that each independent variable consist of two or more categorical groups. Therefore, we can continue to the next assumption.

Assumption: Normally distributed

First of all, the variables have to be normally distributed. As already was checked in Appendix C, we see that all the variables are normally distributed, so we are allowed to continue to the next assumption.

Assumption: Categories of independent variables have to be fixed

Secondly, the categories of the independent variables have to be fixed. As already as explained, we saw that all the independent variable categories were mutually exclusive and fixed. Therefore, we are allowed to continue to the next assumption of the ANOVA**.**

Assumption: Equal variances across different groups

This assumption can be checked by looking at the Levene's test, which has to be non-significant to show that the variances across the groups are not significantly different. The Levene's test of water reduction actions shows that it is not significant across the groups ($F(3,567) = 1.332$, $p = .263$). The Levene's test of electricity reduction actions and wood reduction actions shows that it is also not significant across the groups (($F(3,568) = 1.332$, $p = .542$; ($F(3,104)= 0.612$, $p = .609$)). However, the Levene's test of fuel reduction actions shows not to be significant ($F(3,568) = 6.766$, $p < .001$). Thus, we can conclude that the assumption for water, electricity and wood is met. We can now proceed our ANOVA analysis.

Test of Homogeneity of Variances

	Levene Statistic	df1	df2	Sig.
Water_sum	1,332	3	567	,263
Electricity_sum	,718	3	568	,542
Fuel_sum	6,766	3	568	,000
Wood_sum	,612	3	104	,609

F.3 Comparing business sectors in their environmental performance: ANOVA

Report

Industry_split		Water_sum	Fuel_sum	Electricity_sum	Wood_sum
1	Mean	2,7846	1,1385	2,1538	1,3256
	N	65	65	65	43
	Std. Deviation	1,52574	,96626	1,26529	1,01702
2	Mean	3,2121	1,2424	2,6061	1,5000
	N	33	33	33	4
	Std. Deviation	1,65374	1,03169	1,19738	1,29099
3	Mean	3,5159	1,3604	2,9187	1,4706
	N	283	283	283	51
	Std. Deviation	1,41757	1,12552	1,22204	,92418
4	Mean	2,3158	,9005	2,0105	1,5000
	N	190	191	191	10
	Std. Deviation	1,47833	,96548	1,17871	1,17851
Total	Mean	3,0158	1,1748	2,5105	1,4167
	N	571	572	572	108
	Std. Deviation	1,55871	1,06900	1,28096	,98707

ANOVA Table

	Sum of Squares	df	Mean Square	F	Sig.

Water_sum * Industry_split	Between Groups	(Combined)	168,627	3	56,209	26,204	**,000**
	Within Groups		1216,231	567	2,145		
	Total		1384,858	570			
Fuel_sum * Industry_split	Between Groups	(Combined)	24,356	3	8,119	7,341	**,000**
	Within Groups		628,161	568	1,106		
	Total		652,517	571			
Electricity_sum * Industry_split	Between Groups	(Combined)	103,487	3	34,496	23,509	**,000**
	Within Groups		833,450	568	1,467		
	Total		936,937	571			
Wood_sum * Industry_split	Between Groups	(Combined)	,602	3	,201	,201	**,895**
	Within Groups		103,648	104	,997		
	Total		104,250	107			

Multiple Comparisons

Dependent Variable: Water_sum

Hochberg

(I) Industry_split	(J) Industry_split	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
1	2	-,42751	,31305	,678	-1,2539	,3989
	3	-,73129*	,20144	,002	-1,2631	-,1995
	4	,46883	,21045	,147	-,0867	1,0244
2	1	,42751	,31305	,678	-,3989	1,2539
	3	-,30378	,26941	,835	-1,0150	,4074
	4	,89633*	,27621	,007	,1672	1,6255
3	1	,73129*	,20144	,002	,1995	1,2631
	2	,30378	,26941	,835	-,4074	1,0150
	4	1,20011*	,13737	,000	,8375	1,5627
4	1	-,46883	,21045	,147	-1,0244	,0867
	2	-,89633*	,27621	,007	-1,6255	-,1672
	3	-1,20011*	,13737	,000	-1,5627	-,8375

Multiple Comparisons

Dependent Variable: Electricity_sum

Hochberg

(I) Industry_split	(J) Industry_split	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
1	2	-,45221	,25892	,398	-1,1357	,2313
	3	-,76488*	,16661	,000	-1,2047	-,3251
	4	,14337	,17395	,958	-,3158	,6026
2	1	,45221	,25892	,398	-,2313	1,1357
	3	-,31267	,22282	,650	-,9009	,2756
	4	,59559	,22836	,055	-,0072	1,1984
3	1	,76488*	,16661	,000	,3251	1,2047
	2	,31267	,22282	,650	-,2756	,9009
	4	,90826*	,11343	,000	,6088	1,2077
4	1	-,14337	,17395	,958	-,6026	,3158
	2	-,59559	,22836	,055	-1,1984	,0072
	3	-,90826*	,11343	,000	-1,2077	-,6088

Multiple Comparisons

Dependent Variable: Fuel_sum

Games-Howell

(I) Industry_split	(J) Industry_split	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
1	2	-,10396	,21591	,963	-,6743	,4664
	3	-,22196	,13726	,373	-,5802	,1362
	4	,23794	,13872	,321	-,1239	,5998
2	1	,10396	,21591	,963	-,4664	,6743
	3	-,11800	,19165	,927	-,6310	,3950
	4	,34190	,19270	,300	-,1734	,8572
3	1	,22196	,13726	,373	-,1362	,5802
	2	,11800	,19165	,927	-,3950	,6310
	4	,45990*	,09673	,000	,2105	,7093
4	1	-,23794	,13872	,321	-,5998	,1239
	2	-,34190	,19270	,300	-,8572	,1734
	3	-,45990*	,09673	,000	-,7093	-,2105

Appendix G: Research integrity form – Master thesis

Name: *Irene de Jong*	Student number: *s4164490*
RU e-mail address: *irenede.jong@student.ru.nl*	Master specialisation: *International Management (Business Administration)*

Thesis title:	Corporate Social Responsibility: The accountability of companies operating in emerging economies.

Brief description of the study:

This study aims to gain more insights in the environmental performance of companies operating in emerging markets. More specifically, this study examined to what extent companies that adopt environmental management systems (e.g. ISO 14001 standards) or self-regulation mechanisms (e.g. Environmental policy or Climate change policy) in emerging markets, in particular Brazil, truly behave in an environmental responsible way. This study examined whether companies that are more experienced with an environmental management system have a higher environmental performance. This was done by examining whether these companies are taking actions in order to reduce their usage of water, electricity, fuel, wood, and coal.

The data was obtained from an in-depth survey originated from the Análise environmental Management yearbook. The results show that companies that are more experienced with ISO 14001 standards significantly have more actions to reduce water, electricity and fuel usage. This also concerns to firms that have self-regulation mechanisms in. Here, it was found that companies with an Environmental policy truly act more responsible than companies who do not have an Environmental policy. Next to this, , it was found that a Climate change policy is also an influencer for behaving in a more environmental responsible way. The significant results show that self-regulation mechanisms and environmental management systems have a significant influence on the actual environmental performance of companies, in relation to actions for reducing water, electricity, and fuel usage. However, no significant effects were found in relation to wood and coal usage.

It is my responsibility to follow the university's code of academic integrity and any relevant academic or professional guidelines in the conduct of my study. This includes:

- Providing original work or proper use of references;
- Providing appropriate information to all involved in my study;
- Requesting informed consent form participants;
- Transparency in the way data is processed and represented;
- Ensuring confidentiality the storage and use of data;

If there is any significant change in the question, design or conduct over the course or the research, I will complete another Research Integrity Form.

Breaches of the code of conduct with respect to academic integrity (as described/ referred to in the thesis handbook) should and will be forwarded to the examination board. Acting contrary to the code of conduct can result in declaring the thesis invalid

Student's Signature:  Date: March, 2017

To be signed by supervisor

I have instructed the student about ethical issues related to their specific study. I hereby declare that I will challenge him / her on ethical aspects through their investigation and to act on any violations that I may encounter.

Supervisor's Signature: _____ Date: _____