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Master thesis
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**The influence of regulatory pressure and financial
and economic green interests on the adoption of
sustainable process technologies in Dutch
manufacturing companies**

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Abstract

The study examines the influence of regulatory pressure and financial and economic green interests on the adoption of sustainable process technologies. A specific measurement for the regulatory pressure is the Wet Milieubeheer. The specific influence of the Wet Milieubeheer has not been studied yet. This research shows that regulatory pressure is very important for the adoption of sustainable process technologies. The Wet Milieubeheer turns out to be a good example of regulatory pressure. Most companies are aware of the obligations resulting from this regulation and also want to fulfill these obligations for several reasons. Financial and economic green interest do not have a significant effect on the adoption of sustainable process technologies. The most common reasons for investing in sustainable process technologies are saving costs or a better competitive position. Financial and economic green interest partially affect the influence of awareness of laws and regulation on the adoption of sustainable technology, but do not affect the influence of policy enforcement on the adoption of sustainable process technologies.

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Chapter 1 – Problem statement and core concepts

1.1 Introduction

Environmental problems are nowadays more important than ever. On 12 December 2015, at the Paris Climate Conference, 195 countries agreed and adopted on the first binding global climate deal: the Paris Agreement. The main aim of the Paris Agreement is reducing emissions and it has a long-term goal of keeping the increase in global average temperature to well below 2 degrees Celsius (United Nations, 2015). Since then, politicians in the Netherlands have been working on implementing a new climate agreement, where the emission of greenhouse gasses should be almost zero by 2050 (Klimaatberaad, 2018). The need of sustainable developments becomes more important, but how to realize these developments remains a challenge for both firms and governments.

Sustainable development is the development that meets the needs of the present generation without compromising the ability of future generations to meet their own needs (WCED, 1987). Sustainable development can be seen as a process of change in which the exploitation of resources, the direction of investments, the orientation of technological development, and institutional change are made consistent with the future as well as present needs. Sustainable development consists of three dimensions: environmental integrity, economic prosperity and social equity (WCED, 1987). Firms have to interconnect all three dimensions to achieve corporate sustainable development (Bansal, 2005). Sustainable development consists of a larger number of activities, with sustainable processes, products or business models as a result (Schiederig, Tietze, & Herstatt, 2012). The concept of sustainable development practices relates to procedures, policies and techniques used by firms to monitor and control the effects of their processes on the environment (Montabon, Sroufe & Narasimhan, 2007). Sustainable technologies are important for sustainable development, as these technologies can reduce negative effects on the environment by reducing or preventing pollution, reduce resource consumption, or use less polluting or energy-intensive materials (Fu, 2019; Fu, Kok, Dankbaar, Ligthart & Van Riel, 2018). Since the adoption of sustainable technologies can have a great impact on the reduction of energy consumption and pollution emissions, I will focus on the adoption of sustainable process technologies by firms, more specifically manufacturing firms. According to Liu, Kasturiratne and Moizer (2012) manufacturing firms are “*business firms that uses components, parts or raw materials to make a finished good, where these finished goods can be sold directly to consumers or to other manufacturing businesses that use them for making a different product.*” Manufacturing firms

are responsible for a significantly large consumption of resources (**Figure 1**). The introduction of sustainable process technologies in the manufacturing industry could have a great effect on the reduction of resource consumption.

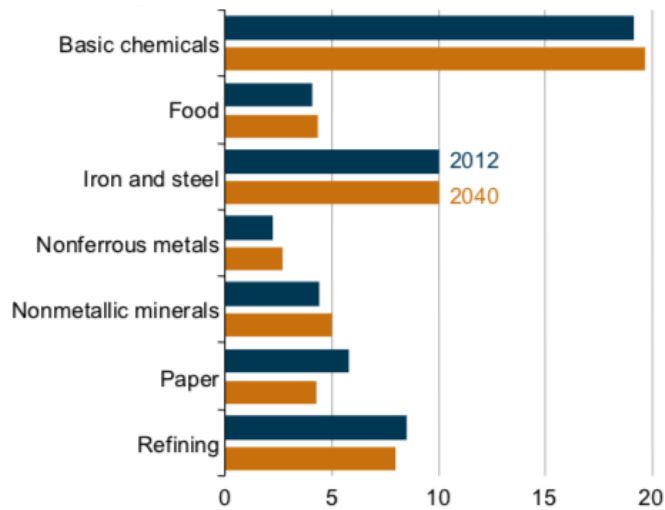


Figure 1: Energy consumption of manufacturing firms in OECD countries (US EIA, 2016)

Energy and environmental policies have a significant influence on the trends in industrial sector industry, including the manufacturing industry, of energy consumption in the OECD countries in Europe (US EIA, 2016). According to Fu (2019), environmental regulations are the main driving force for sustainable process technology adoption by organization. Adoption is the activity that occurs from the first awareness of a need to implement a technology to the final completing of the technology, and all actions or activities in-between the first and final activities (Rogers, 2003). The adoption process of sustainable process technologies can be divided into three main phases: the discovery, the development, and the deployment phase (Hollen, Van den Bosch, & Volberda, 2013). However, Rogers (2003) identifies five stages in the innovation-decision process towards adoption: knowledge, persuasion, decision, implementation and confirmation.

Fu (2019) found that the adoption rate of sustainable process technologies was low, so the question remains how effective these regulatory pressures are. Are environmental regulations insufficiently enforced? Or do companies have other reasons to not adapt sustainable process technologies? Adoption of sustainable process technologies can take a lot of time and can be expensive for firms. Financial capability is an important factor to cope with institutional pressure (Fu, 2019). Economic and financial green interests may conflict with enforceable regulations by institutions. Also, financial and economic green interests may have a positive influence on the adoption of sustainable process technologies, as it heightens the

investment in Research and Development (R&D) in green technologies (Eyraud, Clements, & Wane, 2012).

An important example to illustrate the dilemma between the institutional pressure and financial and economic (green) interests is the Dutch Environmental Management Law ('Wet Milieubeheer'). This law came into force at the 1st of September 1980. As a part of this law, the Environmental Management Activities Decree ('Activiteitenbesluit Milieubeheer') came into force at the 1st of January 2008. According article 2.15 of the Activiteitenbesluit Milieubeheer a company has to invest in and carry out an energy-saving measure or technology if it can be paid back within five years. The energy-saving obligation only applies to business activities that use more than 50,000 kWh of electricity or more than 25,000 m³ of natural gas (article 2.15 sub 5, Activiteitenbesluit Milieubeheer). Carrying out these mandatory energy saving measures can be accompanied by high costs for firms. And since public supervisors and enforces better check on compliance with environmental legislation, firms can face a conflict between the legal pressure and the adoption of sustainable process technologies. Also, the influence of financial and economic green interests is examined. The energy-saving obligation, the Wet Milieubeheer, the Activiteitenbesluit Milieubeheer and financial and economic green interests are further elaborated in Chapter 2.

Several theories emphasize or explain organizational behavior in adopting sustainable technologies. Focusing on the regulatory pressures for manufacturing firms to adopt sustainable process technologies, the organization institutional theory is important (DiMaggio & Powell, 1983). The institutional theory consists of three elements: regulatory pressure, normative pressure and cognitive pressure (Scott, 2013). A firm's behavior for adoption of sustainable technologies can be explained by the Technology Acceptance Model (Davis, Bagozzi, & Warshaw, 1989). Lastly the natural-resource-based view, an expansion of the resource-based view, is important. This theory mentions that businesses will be constrained by and dependent upon ecosystems (Hart, 1995, p.991).

1.2 Problem and research question

In this thesis the influence of regulatory pressure on the adoption of sustainable process technologies is examined. The direct influence of financial and economic green interests on the adoption of sustainable process technologies is also investigated. So, the aim of this thesis is to understand firm's behavior in the adoption of sustainable technologies when a firm faces regulatory pressure and has financial and economic green interests that it must take into account to make a decision for adoption. Therefore, the research statement of this thesis is:

How do manufacturing firms deal with regulatory pressure – especially in the case of the Wet Milieubeheer – with the adoption of sustainable process technologies, and what is the influence of financial and economic green interest of firms on the relationship of awareness and enforcement on the adoption of sustainable process technologies?

To answer this question, my thesis is structured as follows. Chapter 2 consists of a theoretical framework, in which the adoption of sustainable process technologies, the regulatory pressure from the Wet Milieubeheer, and the financial and economic green interests are explained. Chapter 3 describes the problem with regulatory pressure, divided into policy awareness and policy enforcement of the Wet Milieubeheer, and financial and economic green interests of firm. Several hypotheses and a conceptual model are derived from these problems. Chapter 4 consists of an elaboration of the methodology of this thesis. The method will be a mixed-method: both a quantitative and a qualitative study are conducted. Quantitative research for research into the strength and direction of the different relationships, and qualitative research for research into the content of these relationships, how companies experience the regulatory pressure and how this is converted into actions by companies. Chapter 4 also addresses the reliability, quality, validity and research ethics of this thesis research. Chapter 5 concludes the results of my quantitative and qualitative research analysis. In this chapter I conclude if the hypotheses are validated or not. Lastly, Chapter 6 consists of a conclusion and a discussion of this research. I finish my thesis with recommendations for the companies.

For my research I use the Strategy as Practice approach. Strategy as Practice is concerned with strategy as activity in organizations, rather than strategy as the property of organizations. It is used to describe what firms do to gain insight into their behavior. The Strategy as Practice approach concerns both the fate of organizations as wholes and the practical performance of people with organizations (Whittington, 2009).

1.3 Practical and theoretical relevance

Firms have to comply with regulations imposed by the government or other regulatory institutions. Fu (2019) already mentioned two important factors that are important for institutional pressure: financial capability and information uncertainty. Financial capabilities are important for firms to meet regulations, especially regulations in the field of sustainable process technologies. To date there is no literature that describes the conflicting demands of complying with regulations and the survival of the company when the financial resources are

scarce. This thesis contributes to the literature by describing how companies deal with regulatory pressure while they also have important financial interests.

Another theoretical contribution is the examination of the specific influence of the Wet Milieubeheer on the adoption of sustainable process technologies. Fu already researched the effect of regulatory pressure on the adoption of technical sustainable practices, but she did not specifically focus on the Wet Milieubeheer as a part of the regulatory pressure. Furthermore, I research the influence of financial and economic green interests on the relationship of policy awareness and policy enforcement on the adoption of sustainable process technologies.

The practical relevance of this research is described by the struggle between the obligatory sustainable innovation and economic and financial interest that firms face. On one side there is a social and regulatory pressure for firms to be more sustainable in their production processes. On the other side, firms have also other interests, that are more economic or financial in nature. Some companies might have 'green' financial and economic interests, and also this might affect the adoption of sustainable process technologies. This thesis will provide some insights in this dilemma and some recommendations how firms can deal with this dilemma. Besides, also the specific example of the Wet Milieubeheer is of practical relevance for companies, since most manufacturing companies have to fulfill the obligations of the Wet Milieubeheer. And from the 1st of July 2019 companies will also be better supervised on this.

Chapter 2 – Theoretical framework

In this chapter I further elaborate on the core concepts of my problem statement. Important concepts are sustainable process technology, adoption, regulatory pressure, and specifically the Wet Milieubeheer, and economic and financial (green) interests.

2.1 Sustainable process technology

2.1.1 Sustainable development

Sustainable development focuses on meeting the needs of the present without disturbing the needs of the future generations (WCED, 1987). Innovation could support these needs by developing new products and processes. OECD's definition of innovation is *“the implementation of a new or significantly improved product, or process, a new marketing method, or a new organizational method in business practices, workplace organization or external relations”* (OECD, 2009, p.2). For firms, there is a growing importance of sustainable development and innovation, as economic growth and innovation are dependent on each other. But together they can also cause environmental damage. The social and institutional pressure on firms to reduce environmental damage is rising (Bocken, Allwood, Wiley, & King, 2011). To succeed in the ecosystem, firms have to take into account social and environmental issues in the development of new products and processes. Eco-innovation could help firms to focus more on sustainable development, because it represents innovation that results in a reduction of environmental impact (OECD, 2009). In 2007, the European Commission linked eco-innovation to sustainability and mentioned that *“eco-innovation is any form of innovation aiming at significant and demonstrable progress towards the goals of sustainable development, through reducing impacts on the environment or achieving a more efficient and responsible use of naturel resources, including energy”* (EC, 2007, p.7). Kemp & Pearson (2008) defined eco-innovation as:

“the production, application or exploitation of a good, service, production process, organizational structure, or management or business method that is novel to the firm or use and which results, throughout its life cycle, in a reduction of environmental risk, pollution and the negative impacts of resource use compared to relevant alternatives” (Kemp & Pearson, 2008, p.7).

Eco-innovation is a means for a firm to be more sustainable, but it is not the same as sustainable innovation. Sustainable innovation is a process where sustainability motives (environmental, social, and financial) are incorporated into systems of firms, starting from idea generation through to R&D and commercialization (Boons, Montalvo, Quist, & Wagner, 2013). Sustainable innovation covers more than eco-innovation, because it also takes into account social goals and has a clearer link with sustainable development, as well for the short- and the long-term objectives of sustainability (Boons et al., 2013). Sustainable development is a comprehensive concept, allowing companies to develop sustainably in a lot of different ways, for instance innovating more radically or just incremental or focusing on more sustainable products or more sustainable processes. In this thesis the focus is on sustainable process technologies, because these technologies help firms to be more sustainable in the production process: use of less material, less pollution and emissions and less energy consumption. Eco-innovation is considered as a part of sustainable process technologies.

2.1.2 Sustainable process technologies

Before firms can apply the latest process technologies, they need to invest in new process technologies. Technological process innovation implies that a firm goes beyond new idea generation and begins to adopt the resulting new technological process element(s) in the firm (Knight, 1967, p.479). Process technologies are the systems of process equipment, material inputs, work or information flow and so on, used by firms to create a product or service (Utterback & Abernathy, 1975).

Eco-innovations are defined as production technologies that are able to reduce negative effects on the environment by bringing down or preventing pollution, reducing the resource consumption, or using less polluting or energy-intensive material (Schiederig et al., 2012, p.184). This definition is in line with the definitions of sustainable innovation and eco-innovation, because it can either be sustainable innovation or an eco-innovation. Sustainable process technologies can be divided into end-of-pipe technologies and cleaner production technologies (Fu, 2019). This split-up clarifies the difference in integration of the (new) process technology in the production process. End-of-pipe technologies do not involve changes in the production process, but in this situation devices or other equipment are added at the end of the production process with the aim to transform primary emissions into substances easier to handle (Del Rio González, 2005). Cleaner production technologies involve substituting or modifying the existing production process, through which cleaner production can lead to both reduction of pollution and the reduction of energy and resource usage (Fronzel, Horbach, & Rennings,

2007; Del Rio González, 2005). In applying cleaner technology, firms are integrating environmental strategies and practices into their own management systems (processes) (OECD, 2009). Cleaner technology and end-of-pipe technology lead both to either reduction of pollution, or a reduction of energy and resource usage, or both (Fronzel et al., 2007).

The United Nations Environment Programme (UNEP) provided a classification of sustainable process technologies in 1999. UNEP determined eight different categories of clean production. Fu (2019) further elaborated on this classification and created a framework for the classification of sustainable process technologies, which can be seen in **Figure 2**. As can be seen in Figure 2, cleaner technology is a broad concept and that manifests itself in a lot of opportunities for companies to produce more sustainably. Also important is the distinction between cost-increasing sustainable technology and cost-decreasing sustainable technology. Some clean technologies have a cost-saving potential by increasing the efficiency of energy or material use, while other technologies involve higher costs for the reduction of emissions (Fu, 2019). End-of-pipe technologies are often perceived as costly and ineffective by firms and therefore, firms are massively adopting cleaner technology instead of end-of-pipe technology (OECD, 2009). Seen this trend and the number of options cleaner technology provides, it is interesting to focus on cleaner technology. The distinction between cost-increasing and cost-decreasing cleaner technologies is important in the context of the financial and economic (green) interests of firms, which will be discussed later in this chapter.

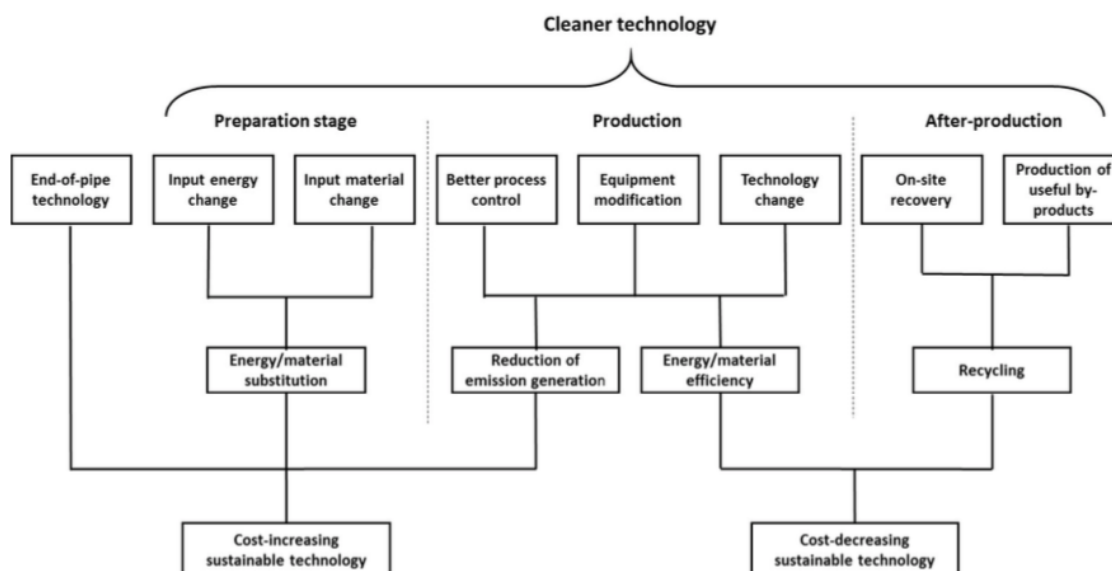


Figure 2: Classification of sustainable process technologies (Fu, 2019, p.67)

2.2 Adoption behavior

As already mentioned, adoption is the activity that occurs from the first awareness of a need to implement a technology to the final completing of the technology, and all actions or activities in-between the first and final activities (Rogers, 2003). In the literature, two main opposite approaches explain a firms' motivation for adoption. The first approach stems from economic literature and builds on the rational actor model. According this approach, a firm is motivated to adoption by a desire for technical or efficiency gains and economic performance (Teece, 1980). The other approach represents a more sociological perspective, with more emphasis on the desire to be legitimate as a firm (Abrahamson, 1991). The basis of the second approach is the institutional theory. The institutional theory states that in an elaborated institutional environment, organizations need legitimacy to survive by conforming to prevailing norms, rules, traditions and social pressures (Meyer & Rowan, 1977). Not only economic and financial considerations explain the adoption of new technologies by firms, the institutional pressure is also important. Institutional theory suggests that organizations or firms adopt technology because of external legitimacy of their behavior. So, firms do not only have economic considerations by adopting a technology, but also social considerations (Kennedy & Fiss, 2009).

In the literature, three types of institutional pressure are recognized: coercive, mimetic, and normative. DiMaggio & Powell (1983) define these type of pressures as follows. Coercive pressure stems from political influence and can be formal or informal. In the environmental regulation context, coercive pressure is mainly caused by governmental actions (Wang, Wang, & Wang, 2018). Mimetic pressure appears when a firm is facing uncertainty and therefore imitates another firm that is successful (DiMaggio & Powell, 1983). Normative pressure stems from collective expectations, norms, and standards within a particular organization (DiMaggio & Powell, 1983). Together or alone, these pressures can push organizations to adopt certain routines and processes.

The adoption of sustainable process technologies is only complete when the process is in operation in the firm. The implementation of process technologies consists of three phases: the discovery phase, the development phase, and the deployment phase (Hollen et al., 2013) (**Figure 3**). The discovery phase refers to the discovery, including research, of new technological process elements by creating new technological knowledge. In the first phase, R&D are really important, because it advances the discovery of new process technologies. The development phase is the phase that the technology has to be developed from laboratory scale

and tested towards industrial scale. In the deployment phase the technology becomes operational in the firm's full-scale production system. The time it takes before a new technology is in operation, will depend on the knowledge and experience of the firm, complexity of the technology and the costs concerned with the adoption (Hollen et al., 2013).

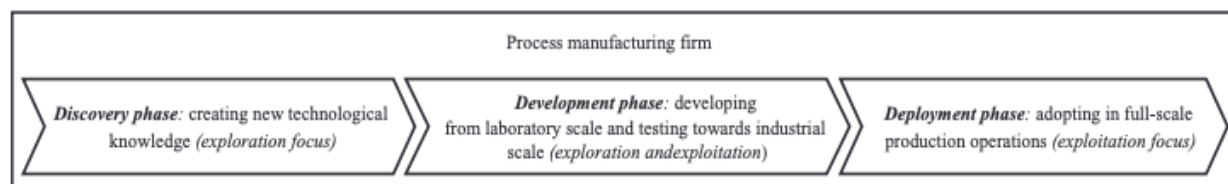


Figure 3: The adoption of process technologies (Hollen et al., 2013, p.36)

2.3 Regulatory pressure

Regulatory pressure can be linked to the coercive pressure, as regulatory pressure is also a result of governmental action. Earlier literature showed that the adoption of environmental innovation was an action to comply with the law and other regulations (Bossle, de Barcellos, Vieira, & Sauvée, 2016). Although even over the years other factors may play a role in the adoption of eco-innovation, regulatory pressure is still a dominant driver, and is known as the regulatory push/pull effect (Horbach et al., 2012; Rennings, 2000). Regulatory pressure stems from environmental regulation, that we understand as government legislation as well as standards and industry commitments that contribute to reducing the impact on the environment and the reduction of resource consumption (Rennings & Rammer, 2011). Environmental regulation can stimulate, or even oblige to investment activities which go beyond the implementation of environmental technologies by the company itself, to comply with the imposed standards by the government. The conformation of firms to environmental regulation depends partially on the firm's awareness of the regulation (Fu, 2019, p.96), and can be called 'policy awareness'. Policy awareness is the extent of an organizations' recognition of environmental regulations. The conformation with the regulation also depends on the policy instruments that can be imposed to firms, such as fines or subsidies, which can also motivate firms to comply with the regulation. Policy enforcement is the degree to which means of various policy instruments can increase organizations' benefits of complying and cost of noncomplying (Fu, 2019, p.96). Sometimes firms may be not able to recognize environmental measures and their cost saving potential in terms of resources or energy. In this case environmental regulation is needed to support firms in detecting measures which can save costs or resources and adopt these measures (Horbach, 2008).

In chapter 1, the Wet Milieubeheer was shortly mentioned. The associated decree, the Activiteitenbesluit, obliges firms by article 2.15, to implement sustainable process technologies when the investment can be paid back within five years. The obligation of article 2.15 exists since 2008. There are currently nineteen recognized measures lists, all applicable to a different industry sector. Seven of these lists exist since December 2015, five since July 2017 and seven of them since January 2018 (CE Delft, 2018). The Measures Lists determine the energy-saving measures that a firm, to which the Activiteitenbesluit applies, has to implement. The energy-saving measures mentioned in the Measures Lists could be recouped by firms within five years. It turned out that this obligation was not or not properly complied by firms (Sandee, 2018). Due to difficulties in enforcement and control of the Wet Milieubeheer in practice, the enforcement of the obligations in article 2.15 by the Dutch Government was also very minimal. That is one of the reasons why the government published a new obligation in October 2018. The other reason is the SER energy agreement (CE Delft, 2018). As of the first of July 2019, all firms that must comply with the obligations of article 2.15, have to inform the competent authority by submitting a report about the taken energy-saving measures, based on the recognized Measures Lists (Wiebes, 2018). From the first of July 2019 it is up to the companies to prove if they implement all obliged measures that can be recouped within five years. In this way, it will become easier for the competent authority to enforce the obligation, because firms have to make clear which measures they have taken. By all the reports of the firms, the authority has enough information to check whether the obligation has been met. The authority will be able to focus on companies who lag behind in taking energy-saving measures. The aim is that by the end of 2020 all companies fulfill the obligation of energy-saving from the Wet Milieubeheer (SER, 2018). So, it is clear that the enforcement of the Wet Milieubeheer has taken a long time, but the awareness of the Wet Milieubeheer at companies has been able to grow for years.

Legislative demands by the government, such as the obligation to firms to invest in energy-saving measures, can be an important driver to firms to implement eco-design efficiency measures (Buzuku, Farfan, Kässi, & Kraslawski, 2018; Bey, Hauschild, McAloone, 2013). As well regulatory demands as being on the forefront of future regulatory demands are important drivers to firms for environmental investments or adoption of sustainable process technologies. Companies do not want to risk the implications of not fulfilling the obligations required by regulation. This means that the ‘Wet Milieubeheer’ can be an important driver in the Netherlands for companies to invest in sustainable process technologies and energy-saving measures (specific to the Wet Milieubeheer).

2.4 Financial and economic green interests

Financial and economic drivers can be seen as an opportunity or as a constraint to a firm, dependent on the availability of financial resources within the firm and the feasibility of economic advantage. A firm has two sources for financing innovation, and thus financing sustainable process technologies. These sources are internal sources, which basically originate from retained profits or new equity, and external sources, which include bank loans or other debt contracts (Hottenrott & Peters, 2012). When firms have no internal sources available, they can use external sources to finance innovation. Unfortunately to firms, this is not always possible, and when it is possible, external fundraising for innovation is more expensive than for other types of investment. Banks and other debt holders prefer physical and re-deployable assets as security for their loans, because these can be liquidated when the firm goes bankrupt (Hottenrott & Peters, 2012; Williamson, 1988). Former research indicated that firms first and foremost use internal sources to finance innovation (Czarnitzki & Hottenrott, 2011). However, internal funds are naturally limited. Financial incentives are not mentioned often for CO₂ reduction and energy saving innovations, because these investments are quite capital-intensive (Veugelers, 2012). This means that firms have to make decisions in what kind of innovations they want to invest. Important to financial and economic green interests are the availability of resources and the interest of firms to fund eco-innovation. Financial and economic green interests for investing in sustainable process technologies could be: (global) economic growth, technology advances, increasing demand of populations for a cleaner investment and increasing prices of fossil fuels (Eyraud, Clements, & Wane, 2013, p.855). To adopt new sustainable technologies, R&D is important. Most R&D departments of companies focus on improving energy efficiency of existing processes and not on new technology exploitation. On top of that, companies do not spend much on R&D (Eyraud et al., 2013, p.864).

According to Carreira & Silva (2010, p.732) financial constraints are defined as: ‘the inability of a firm or a group of firms to raise the necessary amounts to finance their optimal path of growth.’ Three expressions of financing constraints are possible: (1) no financing source, (2) delay in obtaining finance, and (3) too high interest rates of the financing (Savignac, 2008). A firm faces financial constraints in the adoption of sustainable process technologies when these projects were delayed, abandoned, or not started because of one of the three possible constraints mentioned above. The decision to innovate and the likelihood to face financial constraints are simultaneous questions and therefore can affect each other (Savignac, 2008). Financial constraints, or constraints in general, will reduce the number of options available for solving an innovation problem, the number of alternatives a firm can take, and the number of

ideas generated and implemented by a firm (Gibbert, Hoegl, & Valikangas, 2014). So, constraints are forestallers or delayers rather than enablers of innovation. Financial opportunities can have a positive effect on eco-innovation, and therefore also on the adoption of sustainable technologies (Rohdin, Thollander, & Solding, 2007). If a firm has many financial resources available, then it is able to invest more in sustainable technologies. The most important barrier for firms to not invest in energy-saving measures is the existence of other investment opportunities (De Groot, Verhoef, & Nijkamp, 2001). These investments might not be concerned with sustainability. When firms have enough financial resources available, they are not forced to choose one particular innovation to invest in. Besides, they are able to invest in more sustainable technologies and/or energy-saving measures.

Chapter 3 – Hypotheses and conceptual model

In this chapter, further elaboration of the theoretical framework takes place. Different theories and perspectives, together with the research question, will be translated in hypotheses and a conceptual model. First the direct influences of regulatory pressure: policy awareness and policy enforcement on sustainable technology adoption are addressed, also specifically for the Wet Milieubeheer in the qualitative analysis. Second, the direct influences of financial and economic green interests on the adoption of sustainable process technologies are discussed. Lastly, the influences of regulatory pressure, as policy awareness and policy enforcement, on sustainable process technology adoption, moderated by financial and economic green interests are discussed.

3.1 Regulatory pressure and sustainable technology adoption

Literature identifies regulation as the most important driver of eco-innovation (Kammerer, 2009; Bey, Hauschild, McAloone, 2013). Environmental regulations translate the demand for a greener and sustainable environment into specific policies and guidelines to firms to make clear what is required. The Wet Milieubeheer is a great example of regulatory pressure of environmental laws and regulations. The Activiteitenbesluit Wet Milieubeheer describes the guidelines for sustainable measures which firms have to comply with. In chapter 2 is described that regulatory pressure can be divided in policy awareness and policy enforcement. A firm that is not aware of institutional expectations, including legislative demands, limits an organizations' confirmation towards the regulation (Oliver, 1999). Policy enforcement, by fines and taxes, can increase a firms' motivation to behave more sustainable. Fu (2019) has found that both policy awareness and policy enforcement have a positive effect on the firms' sustainable technology adoption. She found that the effect of policy awareness was stronger than the effect of policy enforcement. It is really interesting to see if these effects are also applicable to the Wet Milieubeheer, because strict enforcement of this law has actually started about a year ago, in the form of an information obligation, while the law has been in force since September 1980. Based on the relationships that Fu has found, I propose that:

Hypothesis 1a: Policy awareness of environmental laws and regulations, among which the Wet Milieubeheer, is positively related with the adoption of sustainable process technologies.

Hypothesis 1b: Policy enforcement of environmental laws and regulations, among which the Wet Milieubeheer, is positively related with the adoption of sustainable process technologies.

3.2 Financial and economic green interests and sustainable technology adoption

The decision to adopt sustainable process technologies can be influenced by the financial and economic green interests and the availability of financial resources of a firm. Former research states that financing constraints can affect the level of R&D investments (Hall, Moncada-Paternò-Castello, Montresor, & Vezzani, 2015), the level of innovativeness of firms (Savignac, 2008; Scarpellini, Marín-Vinuesa, Portillo-Tarragona, & Moneva, 2018), or the number of options available for solving innovation problems (Gibbert, Hoegl, & Valikangas, 2014). To successfully introduce a new technology, financial resources are important to firms (Coad, Pellegrino, & Savona, 2016). One of the main reasons to firms to not adopt certain sustainable process technologies is the existence of other investment opportunities (De Groot, et al., 2001). If firms are interested in green-innovation, they will devote more money for green innovation. Therefore, financial and economic green interests will have a positive effect on the adoption of sustainable process technologies. When firms are interested in financing green innovation, they will rather opt for adoption of sustainable process technologies than other investments and will invest in more sustainable technologies and/or energy-saving measures. Based on this, I propose that:

Hypothesis 2: Financial and economic green interests have a positive effect on the adoption of sustainable process technologies.

3.3 The moderating effects of financial and economic green interests

According to the literature it is clear that regulatory pressure is an important driver for innovation or adoption of sustainable process technologies. An important barrier for a firm not to innovate or adopt sustainable technologies is the unavailability of financial resources (Gibbert et al., 2014; Savignac, 2008). It is interesting to research how firms deal with regulatory pressure, specifically the Wet Milieubeheer, and on the other side their financial and economic green interest in making innovation and adoption decisions. It can be justified well that financial and economic green interests strengthen the positive relationship between policy awareness and the adoption of sustainable process technologies. The moderating effect of financial and economic green interest on the relationship of policy enforcement and the adoption of sustainable process technologies remains unclear. Because of the positive effect of policy awareness on adoption of sustainable process technologies is bigger than the effect of

policy enforcement (Fu, 2019), and financial and economic green interests mean that a company already has already made money available to invest in sustainable technologies it is hard to say that financial and economic green interests again strengthen the effect of policy enforcement on the adoption of sustainable process technologies. Therefore, I propose the following:

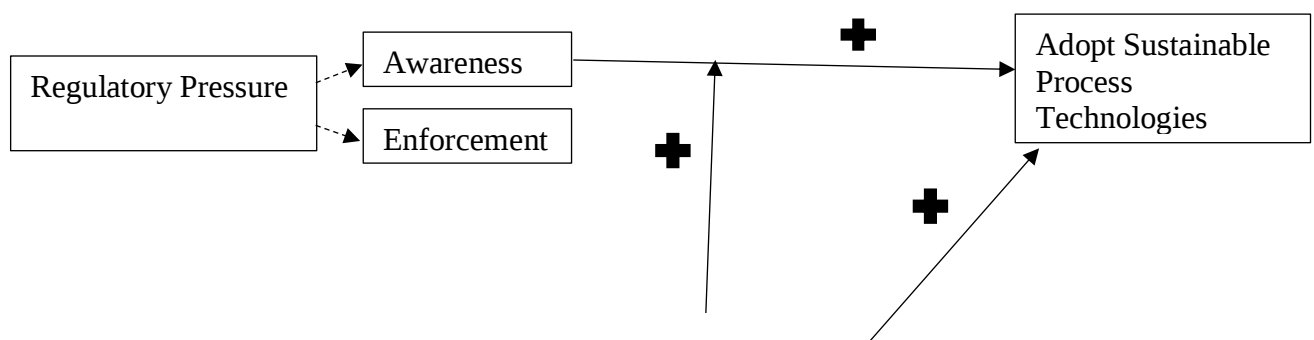
Hypotheses 3a: Financial and economic green interests strengthen the relationship of policy awareness on the adoption of sustainable process technologies.

Hypothesis 3b: Financial and economic green interests have no effect on the relationship of policy enforcement on the adoption of sustainable process technologies.

3.4 Conceptual model

Two conceptual models have been made, based on the difference in enforcement of the Wet Milieubeheer and other environmental laws and regulations. In the first phase, there were no clear measures that firms had to implement to be more energy efficient and work in a more sustainable, or ‘greener’ way. The Wet Milieubeheer had not been enforced by means of fines or other punitive measures. Since several years, the Dutch government made it increasingly clear how firms had to comply with the provisions of the Wet Milieubeheer by publishing several measures lists. These Measures Lists make clear which energy saving measures firms have to take to comply with article 2.15 of the Wet Milieubeheer. By the first of July 2019, firms have to inform the Dutch government how they meet the requirements of article 2.15 and which measures they have taken prescribed by the measures lists. The enforcement of the Wet Milieubeheer becomes much more effective, because the government can see directly whether a company has taken all prescribed measures or not. If measures have not been implemented by a company, the competent authority can take action. This is why the policy enforcement is expected to have a positive effect on the adoption of sustainable technologies. Phase 2 in **Figure 3** is the research model in this study.

Phase 1: No enforcement of the Wet Milieubeheer and other regulation environmental laws and regulations



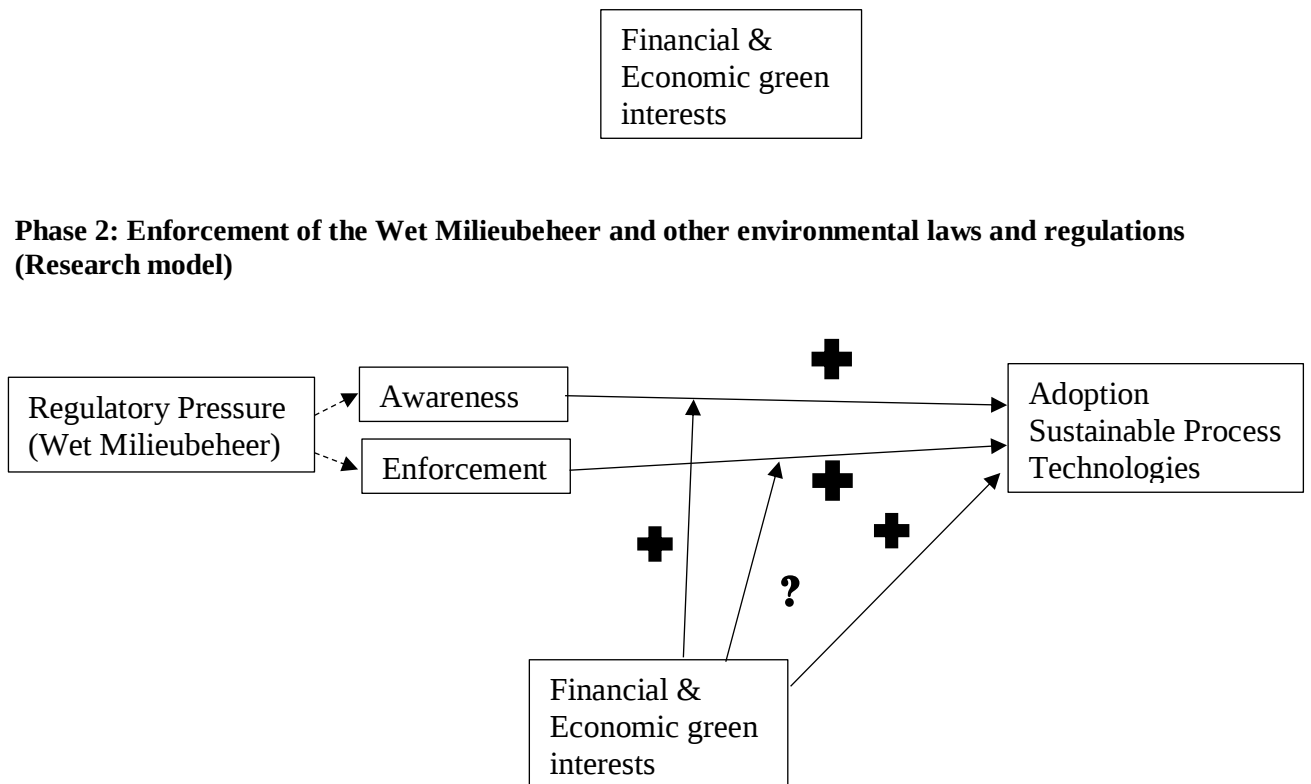


Figure 4: Conceptual Model (phase 2 is research model)

Chapter 4 – Methodology

This chapter elaborates on the research methods used in this thesis and why these methods are used. For the quantitative research, the constructs and items are discussed. The reliability, validity and quality of this research are also discussed in this chapter.

4.1 Mixed-method study

To answer the research question in this thesis, a mixed-method study will be carried out. This is a research methodology for conducting research that involved collecting, analyzing and integrating quantitative and qualitative research (Fielding & Fielding, 1986). A mixed-method study is appropriate, because the integration of both types of research provides a better understanding of the relationships than just a quantitative or a qualitative research study. By just doing only a quantitative research or a qualitative research, I will not be able to answer my research question. The combination of both is really important for the kind of research question that has to be answered. The advantage of a mixed-method study is the possibility of triangulation, which means that several methods and data sources can be used to examine the phenomenon in the research question (Creswell, 1999). The research question or phenomenon can be better answered respectively researched, due to using different methods and techniques. For this thesis the sequential explanatory design is used. This design involves first the collection and analysis of quantitative data and after this the collection and design of qualitative data is conducted.

4.1.1 Quantitative research

The quantitative research is necessary for research into the strength and direction of the mentioned relationships in chapter 3 and visualized in the conceptual model. To conduct the quantitative research in this thesis, a database will be used. This database is based on a self-reporting questionnaire performed by Fu in 2017 for her PhD thesis. The questionnaire got 861 valid responses from Chinese and Dutch manufacturing companies. The sample characteristics of the survey are summarized in **Table 1**. In the sample, companies active in the industry Machinery is over-representative. According to the characteristic Size, the companies with 100 to 249 employees are over-representative.

The database contains a number of indicators that can be used for research into the relationships between regulatory awareness, regulatory enforcement, economic relative advantage and the adoption of sustainable process technologies. In **Table 2** the items and

descriptive statistics of the dependent variable, the adoption of sustainable process technologies, are outlined. The dependent variable is measured by twelve items, categorized in four different categories of technology types. In the questionnaire, firms could indicate for twelve sustainable process technologies on a scale from 1 to 5, if (1) they had no plan to adopt the technology, (2) they are preparing for decision-making, (3) they are in the process of implementation, (4) they are utilizing the technology or (5) the technology was not relevant for the company. The twelve sustainable process technologies in the questionnaire can be subdivided into four types: CO2/emission reduction, energy/material substitution, energy/material efficiency, and recycling. In **Table 2** all possible sustainable process technologies are scaled as 'adopted' or 'not adopted', where answer categories 1, 2 and 5 are indicated as not adopted, and answer categories 3 and 4 are indicated as adopted. The answer of a firm that a sustainable process technology was not applicable to the firm (answer 5), is also indicated as not adopted. The reason to do this, is because the mentioned sustainable process technologies are very common and not specific, and therefore applicable for most of the firms. So, in conducted analyses, the adoption of a technology equals 1, and not adopted equals 0.

In **Table 3** the items and descriptive statistics of the independent constructs are included. These constructs are: policy awareness, policy enforcement and economic relative advantage. For the items of the constructs, firms could give a score on a Likert-scale ranging from 1 to 7, where a score of 1 means 'not at all' or 'never' and a score of 7 means 'strongly agree', 'extensive' or 'very frequently'. All scores in between did not have an explanation. This increases the validity and reliability, because there are no predetermined interpretations of the numbers between 1 and 7.

With the chosen constructs and items from the database, the hypotheses formulated in Chapter 3, can be tested by performing a regression analysis. A regression analysis is used to understand the relationship of the independent variables with the dependent variable and the strength of this relationship (Hair, Black, Babin, & Anderson, 2014, p.165). The hypotheses that are formulated are tested by a regression analysis tested with a sample of 861 companies. Another important aspect in the regression analysis are the moderating effects of financial and economic interests on the relationship of policy awareness on the adoption of sustainable technologies, and on the relationship of policy enforcement on the adoption of sustainable process technologies. A moderator affects the direction and/or strength of the relation between an independent variable and a dependent variable (Baron & Kenny, 1986). To make the moderators, the variables used – policy awareness and financial and economic interests, and regulatory enforcement and financial and economic interests – are centered and then multiplied

by each other. In this way two moderator variables are created, namely iCOawPRec and iCOenPRec. These moderator variables can have a strengthening or weakening effect on the relationship between policy awareness and the adoption of sustainable process technologies, and policy enforcement on the adoption of sustainable process technologies.

Table 1 Sample Characteristics (N=861)

	Percentage
Country	
Netherlands	24.6%
China	75.4%
Industry	
Iron & Steel	9.4%
Pulp, paper & print	5.2%
Chemical & pharmaceutical	7.3%
Machinery	27.1%
Food & beverage	8.9%
Non-metallic minerals	5.8%
Petroleum refineries	3.5%
Non-ferrous metal	4.2%
Other manufacturing	28.6%
Firm Size	
0-19	5.8%
20-49	15.2%
50-99	18.7%
100-249	22.2%
250-499	12.3%
500-999	9.1%
1000 or more	16.7%

Table 2 Dependent variable items and descriptive (N=861)**Adoption sustainable process technologies (Cronbach's Alpha=0.836)****Technology**

type	Item	Not adopted	Adopted
CO2/ emission reduction	<i>End-of-pipe technology to remove CO2 emission or air pollutants at the last stage of production</i>	61,6%	38,4%
	<i>End-of-pipe technology to remove water or soil pollutants at the last stage of production</i>	52,7%	47,3%
	<i>Modification of the production equipment, working procedures, machine instructions etc. to reduce only emission generation</i>	43,7%	56,3%
Energy/ material substitution	<i>Fuel substitutions from coal or oil to natural gas or biomass</i>	64,4%	35,6%
	<i>Transition from producing gray electricity to green electricity based on solar, wind or water</i>	63,3%	36,7%
	<i>Replacement of hazardous or non-renewable inputs by less hazardous or renewable materials</i>	55,1%	44,9%
Energy/ material efficiency	<i>Replacement of materials by recycled materials</i>	42%	48%
	<i>Modification of the production equipment, working procedures, machine instructions etc. to increase the efficiency of material use (e.g. less material, minimize waste)</i>	31,9%	68,1%
	<i>Modification of the production equipment, working procedures, machine instructions etc. to increase the efficiency of energy use</i>	33,9%	66,1%
Recycling	<i>Reuse of the waste materials in the same process or for another useful application within the firm</i>	45,8%	54,2%
	<i>Transformation of previously discarded waste into material that can be reused or recycled for another application outside the firm</i>	44,7%	55,3%
	<i>Use of recycled water or use water-saving technology</i>	43,1%	56,9%

Variable and items	Mean	SD	Loading
<i>Coercive pressure – policy awareness</i>			
National environmental regulations	5.08	1.58	.821
National energy conservation and emission reduction regulations	4.92	1.71	.850
Regional (provincial and municipal) resource saving and conservation regulations	4.95	1.70	.830
<i>Coercive pressure – policy enforcement</i>			
Current subsidy schemes for sustainable technology alleviate the financial burden when investing in these technologies	4.40	1.74	.524
On average the environmental taxation and/or polluting discharge fees are higher than the cost of pollution treatment	4.36	1.66	.511
We got on site environmental inspection or environmental audits by public authorities	4.52	1.74	.396
<i>Relative economic advantage</i>			
Sustainable technology always improves the economic performance of our firm	4.85	1.63	.731
Sustainable technology always improves the reputation of our firm	5.31	1.46	.757
Sustainable technology always improves our product quality	4.64	1.68	.794
Sustainable technology has reduced safety-related incidences compared to the technologies we used before	4.55	1.72	.813

Table 3 Independent variables items and descriptive

4.1.2 Qualitative research

The qualitative research is used for research into the relationships of the measured constructs, which means a deepening of the relationships that have been found through quantitative research. The qualitative research includes research in the behavior of firms, how they deal with regulatory pressure when having financial constraints or opportunities, and how they convert the regulatory pressure to invest in energy-saving measures or into other activities. The qualitative research will be conducted through in-dept interviews with firms that are obliged by the Activiteitenbesluit to take energy saving measures. The energy saving measures that companies have to take can be different for each industry, because there are seventeen Measures

Lists, each for a different industry. The interviews are theoretically guided and open operated. Three key topics will be addressed in the interview script. First the adoption of sustainable process technologies. Second, the regulatory pressure in relation to the adoption, and third the financial and economic interests for companies to adopt sustainable process technologies. A full interview script is included in **Annex 1**. The interviews are conducted in collaboration with another master's student, because we have a big overlap in subjects. In total we have conducted ten interviews with companies active in different sectors of the manufacturing industry. I was able to also use two of a bachelor's student interviews transcripts for my qualitative analysis. This makes a total of twelve interview transcripts. In this way different perspectives or insights towards sustainable processes became visible and measurable.

The conducted interviews are coded with the following system. All relevant quotes in the interviews are highlighted and then copied to an excel file. In this excel file the quotes are per industry ID scored from 1 to 3, with score 1 being most relevant and a score of 3 being least relevant. A third column is used for open coding, to make clear the content of the quote in particular. The quotes that scored a '1', and so are most relevant for the analysis of the hypotheses, are included in **Annex 2**, and are sorted by construct.

4.2 Reliability, validity, quality and ethics

4.2.1 Reliability, validity and quality

To increase the validity of the research, more items are used to measure the construct adoption of sustainable technologies. As well a quantitative and as a qualitative research, through a survey and in-depth interviews, will be conducted to measure the adoption of sustainable technologies. Both types of researches are complementary to each other, because the direction and strength of the relationships become visible through quantitative research, but with the qualitative research these relationships can be better explained. Using both types of researches is a cross-validation, and this contributes to the reliability and validity of the research. The cross-validation also benefits the quality of this research. Furthermore, the theoretical guidance and the open operation of the qualitative interviews contribute to the reliability and validity. In this way, there is enough space for the interviewee to come up with a company's specific interests and measures.

4.2.2 Ethics

In the conducted research, the privacy and anonymity of the firms and individuals interviewed are respected. This means that the responses are not traceable to interviewed firms and/or individuals. As the researcher, I will be transparent about the research I conduct and questions I ask in the interviews. Furthermore, this research contributes to the society as a whole by giving more insights into the behavior of firms towards sustainability and regulation and how the government can act more effectively in enforcing the Wet Milieubeheer and other laws and regulations. Lastly, the agreements and appointments made with companies will be honored, for example anonymity and sharing the final results.

Chapter 5 - Research results

5.1 Quantitative analysis and results

The database used for the quantitative research is constructed by self-reporting questionnaires completed by Chinese and Dutch manufacturing companies. The total response on the questionnaire was 861. 158 valid responses came from Dutch manufacturing firms. The responses of the Chinese manufacturing companies serve as a control variable in the regression analysis.

5.1.1 Assumptions Regression analysis

According to Hair et al. (2014) there are several assumptions to be met before conducting a regression analysis. The following assumptions are discussed and checked: sample size, constant variance of the error terms, linearity, multicollinearity, and independence of error terms. In conclusion, all assumptions are met, and no clear deviations were visible. A full elaboration of the assumptions is included in **Annex 3**.

5.1.2 Scaling of the independent constructs

The used items to measure the independent variables (constructs) in the conducted analysis are based on Fu's conducted factor analysis. Since these items load best on the variables, this regression analysis is conducted with the same items. The items used for each construct are included in **Table 3** in Chapter 4. Policy awareness and policy enforcement are both measured by three items, and economic relative advantage is measured by four items.

The values of all constructs for the score on mean are above average, because all scores are higher than 4. This means that in general, companies were above average aware of environmental laws and regulation (policy awareness). The pressure to comply with laws and regulation (policy enforcement) is also above average felt by companies, but this average was slightly lower than the mean of policy awareness. Lastly, the construct economic relative advantage is above average important to firms when implementing new sustainable technologies, because its mean score tends to a 5.

The constructs policy awareness and economic relative advantage have both a good reliability, since the Cronbach's Alpha is above 0.70. The Cronbach's Alpha of the construct policy enforcement does not have the desirable value, but it is acceptable. Furthermore, deleting an item of the construct policy enforcement does not have a great effect on the value of Cronbach's Alpha, since the Cronbach's Alpha will only increase to 0.672.

Table 4 Independent constructs descriptive and reliability (N=861)

Construct	Mean	SD	Variance	Cronbach's Alpha	Number of items
Policy awareness	4.985	1.540	0.008	0.917	3
Policy enforcement	4.426	1.325	0.007	0.664	3
Economic relative advantage	4.836	1.355	0.115	0.852	4

5.1.3 Adoption of sustainable process technologies

In **Table 2** the adoption rate of each item of the dependent variable are visible. The adoption rates of the items show that especially the measures about energy and material efficiency are used in manufacturing companies. Second most adopted items are the measures about recycling. Next come the measures with regard to CO2 emission or reduction and lastly the measures towards energy or material substitution. The results of the adoption rates of the particular measures make clear that efficiency is particular important in manufacturing companies.

5.1.4 Results of the Regression analysis

The regression analysis is hierarchically structured and consists of four models. The adjusted R^2 value for Model 1 is 14.7%, for Model 2 20.6%, for Model 3 31.2% and for Model 4 31.4% (**Table 5**). The R^2 increased substantially after including the independent variables policy awareness and policy enforcement. The first model of the regression analysis contains the control variables, the second model consists of the control variables and the independent variable Economic relative advantage. The third model includes the control variables, Economic relative advantage and the independent variables of coercive pressure: policy awareness and policy enforcement. The fourth model consists of the control variables, the independent variables Economic relative advantage, policy awareness and policy enforcement and the moderation variables: Policy awareness*economic relative advantage and policy enforcement*economic relative advantage. All models in the regression analysis are significant. Because of the high explanatory power of Model 3 and Model 4, these models are used for the validation or rejection of the research hypotheses. All of the results of the regression analysis are included in **Table 5**.

Table 5 Standardized coefficients of the hierarchical regression analysis

Variable	Model 1	Model 2	Model 3	Model 4
China	.112**	.028	-.037	-.036
Industry		.		
Iron and Steel	.016	.017	.011	.009
Pulp, paper, print	.060	.051	.040	.040
Chemical pharmaceutical	.055	.051	.044	.045
Food and beverage	.020	.032	.022	.025
Non-metallic minerals	.008	.014	-.002	-.001
Petroleum refineries	-.033	-.025	-.016	-.020
Non-ferrous metal	-.018	-.013	-.023	-.024
Other	.002	.008	-.010	-.010
Machinery	Ref.	Ref.	Ref.	Ref.
Firm Size				
Size 75	.108**	.103**	.052	.054
Size 175	.172***	.145***	.090*	.092*
Size 375	.183***	.146***	.083*	.084*
Size 750	.319***	.274***	.205***	.202***
Size 1000+	.307***	.254***	.165***	.164***
Size_25	Ref.	Ref.	Ref.	Ref.
Economic relative advantage		.271***	.039	.045
Policy awareness			.301***	.309***
Policy enforcement			.218***	.214***
Policy awareness*economic advantage				.032
Policy enforcement*economic advantage				.012
<u>Model Statistics</u>				
Adjusted R2	.147	.206	.312	.314
F change	11.621	63.444	67.422	.818
df 1	14	1	2	2
df 2	846	845	843	841
Sig. F Change	.000	.000	.000	.442
Sig.	.000	.000	.000	.000
Durbin-Watson Statistic				2.048

* $p < 0.05$. ** $p < 0.01$. *** $p < 0.001$

Interaction variables are centered

Direct effects

In chapter 3 the following hypotheses were proposed as direct effects:

Hypothesis 1a: Policy awareness of environmental laws and regulations, among which the Wet Milieubeheer, is positively related with the adoption of sustainable process technologies.

Hypothesis 1b: Policy enforcement of environmental laws and regulations, among which the Wet Milieubeheer, is positively related with the adoption of sustainable process technologies.

Hypothesis 2: Financial and economic green interests have a positive effect on the adoption of sustainable process technologies.

In the main-effects only model 3 of the regression analysis, policy awareness has a significant effect on the adoption of sustainable process technologies with a Beta coefficient of .301 ($p=.000$). This means that hypothesis 1a is supported in the regression analysis. Hypothesis 1b is also supported, because the effect of policy enforcement on the adoption of sustainable process technologies has a significant effect with a Beta coefficient of .218 ($p=.000$). The effect of policy enforcement on the adoption of sustainable process technologies is weaker than the effect of policy awareness. In full model 4 the moderator variables are added. The addition of these variables has a small, negligible effect for the direct effects of policy awareness and policy enforcement. The effect of policy awareness increased from .301 to .309 ($p=.000$). The effect of policy enforcement decreased from .218 to .214 ($p=.000$). In conclusion, policy awareness and policy enforcement both have a significant effect on the adoption of sustainable process technologies. This means that hypotheses 1a and 1b are both supported in the regression analysis.

Economic relative advantage does not have a significant effect on the adoption of sustainable process technologies in model 3 and 4 of the regression analysis. In model 3 the economic relative advantage only has a non-significant Beta coefficient of .039 ($p=.309$) and in model 4 a non-significant Beta coefficient of .045 ($p=.247$). Interesting is that in model 2 of the regression analysis, there is a clear significant direct effect of economic relative advantage on the adoption of sustainable process technologies with a Beta coefficient of .271 ($p=.000$). But, when looking at the results of model 3 and model 4 of the regression analysis, this significant effect has vanished. This means that by adding the other independent variables and the moderator variables, the effect of economic relative advantage is overruled.

Based on the conducted hierarchical structured regression analysis, hypothesis 1a is accepted, because policy awareness positively influences the adoption of sustainable process technologies. Hypothesis 1b is also accepted, as policy enforcement also has a significant positive influence on the adoption of sustainable process technologies. Hypothesis 2 is rejected, because economic relative advantage does not have a positive effect on the adoption of sustainable process technologies, but this effect is not significant. An interesting observation is the effect of economic relative advantage. Without the independent variable policy awareness and policy enforcement in the regression model (Model 2), economic relative advantage has a direct significant effect on the adoption of sustainable process technologies. Apparently, there is a big overlap between the effect of policy awareness and policy enforcement, and the effect of economic relative advantage. It is possible that in the eyes of many companies, policy awareness and policy enforcement are closely linked to economic relative advantage.

Indirect effects (moderation variables)

In chapter 3 the following hypotheses were proposed for indirect effects:

Hypotheses 3a: Financial and economic green interests strengthen the relationship of policy awareness on the adoption of sustainable process technologies.

Hypothesis 3b: Financial and economic green interests have no effect on the relationship of policy enforcement on the adoption of sustainable process technologies.

Hypotheses 3a is rejected, because in the regression analysis this moderation variable did not have a significant effect on the adoption of sustainable technologies. The effect of economic relative advantage via the effect of policy awareness on the adoption of sustainable technologies has a positive, non-significant Beta coefficient of .032 ($p=.332$). Hypothesis 3b is accepted, because financial and economic green interests did indeed have no effect on the relationship of policy enforcement on the adoption of sustainable process technologies. The effect of economic relative advantage via the effect of policy enforcement on the adoption of sustainable technologies has a positive, non-significant Beta coefficient of 0.012 ($p=.714$). This means that economic relative advantage does not strengthen the influence of policy awareness or policy enforcement on the adoption of sustainable technologies. So therefore, hypothesis 3a is rejected. Hypothesis 3b is accepted, because economic relative advantage does indeed have no effect on the relationship between policy enforcement and the adoption of sustainable technologies.

Control variables

The control variables are Country, Industry and Size. Country and Industry sector have no significant effect on the adoption of sustainable process technologies. It does not matter for the adoption of sustainable process technologies if the company is located in China or in the Netherlands, since the Beta coefficient of being located in China is $-.036$ and not significant ($p=.296$). Furthermore, being active in a certain industry sector has also no influence on the adoption of sustainable process technologies. All mentioned industry sectors show no significant effects on the adoption of sustainable process technologies.

Size does have an influence on the adoption of sustainable process technologies. The reference category of this control variable is Size_25. Companies with over 750 employees, but less than 1000 (Size_750) have the biggest influence on the adoption of sustainable process technologies with a Beta coefficient of $.202$ ($p=.000$). Second comes the companies with over 1000 employees (Size_1000+), with a Beta coefficient of $.164$ ($p=.000$). Size_175 and Size_375 respectively have a Beta coefficient of $.092$ ($p=.018$) and $.084$ ($p=.020$). If the company is large, the effect on the adoption of sustainable process technologies increases, since the reference category is a small company (Size_25).

In conclusion, policy awareness and policy enforcement seem to have a great influence on the adoption of sustainable process technologies, as was already expected by theory. Unfortunately, economic relative advantage does not, while this effect was found in the discussed theory. The examined moderation effects also have no significant influence on the adoption of sustainable process technologies. This means that economic relative advantage does not strengthen the effect of policy awareness and policy enforcement on the adoption of sustainable process technologies. The control variables of Size, included in the regression analysis, did have significant effects on the adoption of sustainable process technologies. This means that size influences the adoption of sustainable process technologies in the way that the bigger the company, the more likely it is to invest in sustainable process technologies.

5.2 Qualitative analysis and results

5.2.1 Sample

The qualitative analysis is conducted through in-dept interviews. In total, twelve interview scripts have been analyzed in the manner described in section 4.1.2. The results of the qualitative analysis are discussed for each hypothesis. The interviews are conducted with Dutch manufacturing companies from different industry sectors. Characteristics of the sample are

summarized in **Table 6**. Most of the companies are operating in several countries in Europe, Asia and North-America.

5.2.2 Descriptive of the constructs

The most relevant quotes are tabulated for each construct: adoption sustainable process technologies, policy awareness, policy enforcement, and financial and economic green interests. Because the raw data are in Dutch, the tabulated relevant quotes are also in Dutch. If quotes are very important, then the quote is translated and paraphrased into English in the paragraph where the hypotheses are validated.

Table 6 Sample Overview qualitative analysis

ID	Industry	Region	NACE Code
PA1	Paper	Gelderland	C17
ME1	Metal	Gelderland	C24
FO1	Food	Gelderland	C10
MA1	Machinery	Gelderland	C28
FO2	Food	Gelderland	C10
MA2	Machinery	Gelderland	C28
WO1	Wood	Gelderland	C16
TE1	Other, Textiles	Gelderland	C13
EL1	Other, Electronics	Noord-Brabant	C26
PV1	Other, PVC	België	C22
MO1*	Other, Motors	Noord-Brabant	C29
NM1*	Non-metallic minerals	Gelderland	C23

* *externally obtained*

Adoption sustainable process technologies

The most relevant quotes about adoption of sustainable process technologies are included in **Table 7**. The column ‘Construct / open coding’ describes what kind of technology has been applied by the company.

Table 7 Quotes about the adoption of sustainable process technologies

ID	Quote	Construct / Open coding
WO1	“Die echte droogovens die we hebben, die stoken we op eigen product. Op dit moment zijn we ook aan het nadenken om zonne-energie te plaatsen op de daken, maar het heeft uiteindelijk ook allemaal te maken, heel simpel met een kostencomponent.”	Adoption sustainable process technologies (energy efficiency)
MA1	“Zoals we hebben hier een bak water van 1000 kuub, en daar pompen we constant warmte in omdat we onze pompen moeten testen. En die warmte winnen we weer terug, in de winter gebruiken we die warmte om de hal te verwarmen.”	Adoption sustainable process technologies (energy efficiency)
MA2	“Proberen wij bijvoorbeeld vet uit afvalwater te halen, daar maken wij biodiesel van, dat bedrijf daar eigen energie van kan maken, terugwinnen van stikstof in de vorm van kunstmest, terugwinnen van fosfaat, terugwinnen van organisch stof, terugwinnen van cellulose, van zeg maar je WC-papier, cellulose, wat je als grondstof voor papierindustrie kunt gebruiken.”	Adoption sustainable process technologies (energy efficiency)
FO1	“Daarnaast in ons oude gebouw, de stroomconsumptie is in verhouding erg naar beneden gegaan toen we een het nieuw gebouw hebben betreden. En dat komt niet alleen door beter logistiek maar ook doordat de machines die vroeger zeg maar allemaal ster driehoek waren aangedreven. En heb je een keer die piekspanning elke keer als de machine aangaat. Die zijn allemaal vervangen door dan wel softstarter, door dan wel frequentieregelaar. En dus die pieken haal je allemaal weg.”	Adoption sustainable process technologies (energy efficiency)
PV1	“Daarnaast is ook sustainable product, het energieproces. We geven alle jaren om onze uitstoot en energie en hoe we dat kunnen verminderen. Daarnaast ook het gebruik van renewable energy, dus he. Daar starten we mee, we gaan kijken waar we dat kunnen gaan gebruiken.”	Adoption sustainable process technologies (use of renewable energy / energy efficiency)
EL1	“Hebben we dus een warmteterugwinningsinstallatie daar neergezet. Want die oven, ja die warmte blijft niet alleen in de oven maar die gaat er ook uit. Dat betekent je hebt er ook warmteverlies. Nou wat is nou mooier als dat je die warmte kan gebruiken in de winter om die ruimte op te warmen.”	Adoption sustainable process technologies (energy efficiency)
FO2	“We hebben sowieso alles naar LED-verlichting gedaan, we hebben wat efficiënter gebruik van warmtewisselaars, bij rookgassen hebben wij een condensor gezet dat wij de rookgastemperatuur nog een keer gebruiken, frequentieregelaars, andere compressoren ook frequentie-geregeld, dus allemaal dat soort kleinere dingen allemaal.”	Adoption sustainable process technologies (end-of-pipe technology, energy efficiency)

Policy awareness (among which Wet Milieubeheer)

The Wet Milieubeheer is an explicit example to measure both dimensions of the regulatory pressure: policy awareness and policy enforcement. If a quote describes the policy awareness from the Wet Milieubeheer, then this is explicitly mentioned in the column that includes the open coding. In this way, the case of the Wet Milieubeheer and the influence of it on the

adoption of sustainable process technologies becomes clearer. The most relevant quotes for the construct policy awareness are tabulated in **Table 8**.

Table 8 Quotes about policy awareness (among which the Wet Milieubeheer)

ID	Quote	Construct / Open coding
MA1	“Ja maar daar ligt de regeldruk gewoon hoger dan dat wij het zelf voor zouden kunnen blijven. De regelgeving vanuit Nederland en vanuit Europa die is dusdanig hoog dat je ehm, dat je nouja die dwang die heb je gewoon. Dus hier zou je ook kunnen zeggen van ja we zijn goed bezig, maar ja we moeten. We hebben geen keuze.”	Policy awareness: high pressure
WO1	“Ehm ja dat voel je omdat je er gewoon heel simpel je wordt door de overheid straks verplicht om bepaalde dingen te doen. Ehm en ik ken niet alle details, maar we hebben vorig jaar iemand voor onze productiebedrijven in dienst genomen om al die regelgeving, met name vanuit de provincie toentertijd om te zorgen dat we daar een goed plan voor hebben.”	Policy awareness
MA2	“Kijk, je moet nou als je bedrijf nou zo veel kuub gas en zo veel elektriciteit, dan moet je een audit laten doen. Nou ja, we zeggen van ja wat wil je hier dan nog besparen.”	Policy awareness (Wet Milieubeheer)
TE1	“Voldoen aan wet- en regelgeving is nooit een probleem, of wel een probleem om te doen, maar het is geen issue. In Nederland heb je sinds 2015 de European Energy Directive wat vertaald is naar nationale wetgeving, ik denk dat we een van de eerste bedrijven waren die dat opgevolgd heeft. Sterker nog zodanig vroeg dat het bevoegde gezag niet wisten wat ze met ons rapport moesten doen.”	Policy awareness (European Energy Directive)
EL1	“We zijn bedrijven die voldoen aan het activiteitenbesluit. Van daaruit zitten we dat de laatste jaren steeds meer druk. Als je kijkt naar energiebesparende maatregelen. Erkende maatregelen die dan binnen de vijf jaar terugverdient, ja daar moeten we aan voldoen. Dus we hebben die screening ook wel gemaakt.”	Policy awareness (Wet Milieubeheer)
PA1	Hoe hoog ervaart uw bedrijf de druk op een 10-punt schaal? “Zegmaar 10 jaar geleden een 3, vorig jaar een 5 en dit jaar een zeven. Dus het wordt steeds meer, en steeds strenger en je merkt er steeds meer van. Met name op energiegebied maar ook op gebied van verantwoording afleggen over milieubelasting en milieujaarverslag, wat ik net vertelde met die bolletjestabel, dat zijn echt wel dingen die wat ons betreft inhakken.”	Policy awareness: pressure experience
FO2	“Daarom is het, als je het over normen hebt, is het niet zo zeer van dat we het wenselijk vinden om bepaalde dingen te veranderen maar worden we er gewoon toe verplicht. Dus bij voorbeeld als er een nieuw proces of een nieuwe apparaat ontwikkeld wordt en het verdient zich geen eh in drie of vijf jaar terug, dan zijn wij eigenlijk haast gedwongen om dat te gaan doen, of wij dat willen of niet.”	Policy awareness (Wet Milieubeheer)

Policy enforcement (among which Wet Milieubeheer)

The case of the Wet Milieubeheer is also important for policy enforcement, because the enforcement of this regulation becomes stricter as of the 1st of July 2019. If a quote is specifically about the Wet Milieubeheer, then this is mentioned in the last column of **Table 9**.

Table 9 Quotes about policy enforcement (among which the Wet Milieubeheer)

ID	Quote	Construct / open coding
MA1	“Ja als je kijkt inderdaad naar wat wij moeten dan is het op dit moment zo dat vanaf midden dit jaar, de wetgeving bedrijven die meer dan 50.000 Kwh energie en 25.000 kuub gas, en dat zijn wij, verbruiken, hebben een verplichting om alles wat dat vermindert met een financiële terugverdientijd van vijf jaar, zijn verplicht die acties te nemen. He dus bijvoorbeeld met zo’n ledverlichting dan krijgen we dus ook mee wat de terugverdientijden zijn en daarmee is in ieder geval het besluit wat je minimaal moet doen is dan al gemaakt. Maar van ons is dat een uitdaging, want sommige panden van ons hier op terrein die staan hier als sinds 1904, dus toen speelde dit iets minder.”	Policy enforcement (Wet Milieubeheer)
PA1	“We hebben nu het convenant MEE [meerjaarsplan energie efficiency], daar doen we aan mee. Dat betekent dus dat je elk jaar zoveel energie moet besparen. En we hebben dus het Addendum MEE, nog weer een extra verplichting die we opgelegd hebben gekregen vanuit de overheid om nog weer extra energie te besparen. En dat is een maatregel die moet voor 2020 effectueert zijn.”	Policy enforcement: extra obligations
FO1	“Ik merk eigenlijk van hoe beter je je aan de regels houdt, hoe minder vaak je ze ziet. In de standaard controles die we hebben afgesproken, dat is meer over het milieu inderdaad, aanleveren van de gegevens, dan praat je hier over... enkele, misschien een keer per het kwartaal.”	Policy enforcement: environment checks
ME1	“Ja, maar het is wel zo, je valt gauw tussen wal en schip als je een klein bedrijf bent. Dus in die zin is de focus niet echt op het kleine bedrijf. Eeh, ik krijg daar binnenkort nog wat informatie over. Maar je moet dus eh, ehm, eh de, omgevingsdienst die gaat controleren wat je de afgelopen 10 jaar gedaan hebt, aan investeringen gedaan hebt met betrekking tot duurzaamheid.”	Policy enforcement
FO2	“Gaan we alle besparingen door, en wat heb je daaraan gedaan en dan moeten we ook een datum geven, of een tijd, dat we zeggen van 2019 willen we dat, moet dat en dat gedaan zijn, 2020, 21, en dan kijken wij ook terug van is dat dan gedaan. Zo niet, waarom niet? Dus, die hele, hoe moet je dat zeggen, terugkoppeling zit er wel in, ja!”	Policy enforcement (Wet Milieubeheer)
MA2	“Zodra je wettelijk, zodra je vanuit de wetgeving iets moet doen, dan doe je dat.” Ja oké, daar wordt geen boete geriskeerd? “Nee, nee, dat past niet bij onze bedrijfsfilosofie, totaal niet. Heel veel andere bedrijven zullen dat wel doen, dus zien we heel veel grote voorbeelden van.”	Policy enforcement
PV1	“Ehm dat zijn geen echte investeringen die je dan moest doen. Maar ehm, ja ik denk dat dat allemaal wel meevalt in hoeverre wij verplicht worden.”	Policy enforcement

TE1	“En ze vragen keurig inderdaad van ‘joh, waarom heb je die maatregel niet gedaan?’. Nou omdat die uiteindelijk als je hem in detail doorrekende, ja die maatregel verdiende zich toch niet terug. Ehm, maar bijvoorbeeld er stond in ons rapport dat LED-verlichting meer dan vijf jaar terugverdientijd had, maar hebben we gerekend, van ja dat kunnen we wel binnen vijf jaar krijgen. En dat komt dan op onze investeringslijst te staan. Dat gaan we wel doen, dus dan wisselen we ze om.”	Policy enforcement (Wet Milieubeheer)
EL1	“Je hebt controles vanuit de certificaten die wij hebben. Maar goed, dat is onze eigen keuze. Je hebt een certificaat, dan krijg je daar ook een toetsing op. En je hebt vanuit provincie en gemeente je controles. De controles die we de laatste jaren gehad hebben, is een op energiebesparende maatregelen doen de ODBN: omgevingsdienst Brabant Noord, hier in opdracht van de gemeente. Die hebben wij gehad, daar kom je redelijk makkelijk, want je data heb je beschikbaar.”	Policy enforcement: extra requirements
EL1	“Wettelijk druk moet gewoon. Als wij aan kunnen tonen dat de Nederlandse wetgeving vereist dat bepaalde zaken moeten doen, ja goed, dan heb je natuurlijk een hele andere insteek. Een van de zaken vanuit de CSR roadmap is compliance, op alle vlakken. Dat staat boven aan, compliance aan wet en regelgeving staat bovenaan, dus.”	Policy enforcement and green interests

Financial and economic green interests

The last construct of my conceptual model is the financial and economic green interests. The quotes that describe this construct best are tabulated in **Table 10**. Most quotes are not specifically about ‘green’ interests, but rather describe pure economic or financial interests of the company to invest in sustainable process technologies. This distinction is shown in the column ‘Construct / open coding’.

Table 10 Quotes about Financial and economic (green) interests

ID	Quote	Construct / Open coding
MO1	“En dus is er eigenlijk niet zo’n klimaat om business cases te ondersteunen en daarnaar te kijken. En dat is eigenlijk wel heel belangrijk, dus als jij praat over met verschillende mensen over mensen van waarom investeren ze, dan uiteindelijk investeert iedereen om er iets voor terug te krijgen.”	Financial and economic interests and the adoption of sustainable process technologies
PA1	“Amerikanen gebruiken iets van 2 of 3 jaar, wij hanteren iets van 4 jaar, en vanuit de wetgeving hanteren ze iets van 5 of 6 jaar, dus er zitten wel verschillen in zegmaar. Maar dan houden we wel onze eigen criteria aan.”	Financial interests and the adoption of sustainable process technologies
FO1	“Nou wij willen er naartoe eigenlijk dat we zo min mogelijk energie gebruiken. Aan de ene kant is dat natuurlijk gedreven door kostenplaatje. Aan de andere kant is dat ook gedreven door dat je milieuverantwoordelijk wilt produceren.”	Adoption sustainable process technologies and economic green interests

EL1	“Als je <i>niet</i> werkt aan duurzaamheid, wat dat dan voor economische impact heeft. Dat is eigenlijk gigantisch. Als je daar niks aan doet, als je zegt van, ik ben alleen maar geïnteresseerd in zo efficiënt mogelijk, en zo goedkoop mogelijk in de markt, en duurzaamheid interesseert me niets, ik doe daar niks aan, even los even van de druk, maar als beursgenoteerd kom je daar niet meer mee weg. En dan heb je het over een economisch motief, nou dat is het.”	Economic green interests and adoption of sustainable process technologies
NM1	“Ik denk dat je je als bedrijf ook echt moet onderscheiden, maar budget is wel echt een ding. Want wij hebben de ruimte om echt tegen iemand te zeggen van jij gaat dat doen. Dan denk je daar wel een beetje over na. Je zou iets heel graag willen, maar het kan niet altijd. Je merkt dat als je echt pas iemand ervoor aanstelt om naar die mogelijkheden te kijken, dat je dan stappen maakt.”	Economic green interests
TE1	“Is het verplicht, dan doen we het. Is het niet verplicht, nou dan wordt het gerant ten opzichte van de bedrijven en andere initiatieven. Dan kan het nog steeds een goede terugverdiendtijd hebben, maar als het geld er niet is, dan moet het maar volgend jaar of het jaar erop. Dan valt het niet van het lijst je af, maar wordt het doorgeschoven.”	Financial and economic green interests and adoption of sustainable process technologies
PV1	“Maar ja, dat zijn ook andere investeringen, maar die investering als je die doet, die moet wel gedragen worden. Ja maar ook die return on investment is zeker wel belangrijk ja, anders wordt het onmogelijk.”	Consideration of financial interests and adoption sustainable process technologies
PV1	“Ik denk dat financieel, sustainable zijn, heeft dan ook een voordeel, want ik denk dat onze fabricage voorbeeld. Daar wordt materiaal gemaakt voor ons productieproces, wij hopen dus altijd minder afval te krijgen bij externe suppliers en bedrijven verantwoordelijk te houden. Dus dat is een financieel voordeel.”	Economic green interests and adoption sustainable process technologies
MA2	“En van de grote uitdagingen is duurzaamheid financieel haalbaar maken, dat lukt bijna niet. Dat kun je alleen maar op doen, op het moment dat je daadwerkelijk de kosten van de vervuiling daadwerkelijk ook gaat doorbelasten. En dan kun je businesscases uitrekenen. Is de enigste manier waarop je dat kunt. De CO2 moet je gewoon gaan beprijzen. Dat gebeurt nu heel beperkt maar dat zullen ze veel meer moeten doen.”	Consideration of financial interests and adoption sustainable process technologies
WO1	Dus als je kijkt naar eh afweging van financiële belangen en duurzaamheid, hoe gaat die afweging? “Gaaf hand in hand met elkaar, ehm en kom ik weer terug op dat familieaspect. Heel simpel als het bedrijfseconomisch niet rendabel is, gaan we het niet doen, tenzij we denken dat het op lange termijn toch rendabel te maken is.”	Consideration financial interests and adoption sustainable process technologies
FO2	“Ja, dat mag wel wat geld kosten maar niet dat dat nou een heel substantieel deel is. Wij hebben ook gewoon met ons concurrenten te maken, en onze concurrenten zitten niet alleen in Nederland waar duurzaamheid heel hoog in vaandel staat maar in andere delen is dat nog helemaal geen item. Dus dan moet je, je moet wel je concurrentiepositie in oog houden.”	Financial and economic interests
ME1	“Denken in kosten en voordeel, dan ga je die verduurzaming meenemen in je oriëntatie.”	Consideration of financial interests and

		adoption sustainable process technologies
FO1	“Ja die zijn zeker denk ik wel van belang, in zo’n geheel project. Omdat het denk ik vaak niet alleen door duurzaamheid gedreven wordt maar ook vanuit andere aspecten. Kijken natuurlijk weer onderaan de streep, wat kun je daaraan overhouden. Wil niet altijd zeggen dat het geen geld mag kosten. Er kan een goede reden zijn dat het best geld mag kosten hier om betere positie in de markt te kunnen krijgen. Maar dat ligt vaak bij ons wel mat moeilijk omdat het geen consumentenproduct is.”	Consideration of financial and economic interests and adoption sustainable process technologies
MA1	“We hebben een streven om bij alle pompen een zo hoog mogelijk rendement te ontwerpen, zodat je zo min mogelijk energieverlies hebt, maar dat is natuurlijk ook commercieel. Dus ja dat is ook in de strijd om je orders te krijgen en de beste te blijven in de markt.”	Economic interests
FO1	“Nu is dat denk ik meer ontstaan vanuit ja kijk eens naar andere technieken en het is dus heel interessant dat je, ik denk dat er vestigingen zijn die heel snel zeg maar, nou dan praat ik best wel hoge bedragen, die denk ik wel 25% kunnen besparen op hun lozingskosten om gebruik te maken van CO2, dus het is eigenlijk een gecombineerde samenwerking, aan de ene kant is het kosten gedreven, maar aan de andere kant zijn de milieueffecten natuurlijk een stuk kleiner, dus het is vaak een synergie tussen die twee.”	Adoption sustainable process technologies and financial interests

5.2.3 Qualitative validation of the hypotheses

Hypothesis 1a: Policy awareness of environmental laws and regulations, among which the Wet Milieubeheer, is positively related with the adoption of sustainable process technologies

The interviews show that policy awareness has a great effect on the adoption of sustainable process technologies. Respondents in the interviews describe the effect of laws and regulations on the adoption of sustainable process technologies in different ways. The influence of the Wet Milieubeheer on the adoption of sustainable process technologies is great, the following quotes makes this influence clear:

‘We are companies that have to comply with the Activiteitenbesluit. This pressure increased the past recent years. If you look at energy saving measures, recognized measures that are paid back within five years, we have to comply with that. So, we have made a screening of those measures’ and ‘Because I think they have set up a standard document form the industry with best practices. I believe that it is a book of about 15 pages, and it contains all the possible energy savings, and all possibilities are in it.’

The ‘book’ that is being discussed is the recognized List of Measures included in the Activiteitenbesluit of the Wet Milieubeheer. When sustainable technologies are considered, this List of Measures is often included in the consideration. Companies act accordingly the Wet Milieubeheer and take, where possible, energy savings measures that can be paid back within a period of five years.

But, also the awareness of other laws and regulations are important for the adoption of sustainable process technologies. Most initiatives for the adoption of sustainable process technologies come from a legal requirement: *‘A lot of our sustainable initiatives come primarily because they are accompanied by a legal requirement.’* The force of policy awareness is not always experienced as positive by companies. Some companies experience the awareness as ‘we do not have a choice’ and see regulations as something at which they cannot stay ahead of: *‘The regulatory pressure is simply higher than we could stay ahead of. The regulations from the Netherlands and from Europe are so high that you, well, you simply have that compulsion. We do not have a choice.’*

Laws and regulations appear to be important for the adoption of sustainable process technologies or energy savings measures. This accounts for various sectors in the manufacturing industry. If no regulation existed on this area, then a lot of companies would not make any investments in the adoption of different technologies. So, hypothesis 1a is validated in this analysis. Policy awareness, among which the Wet Milieubeheer, have a positive effect on the adoption of sustainable process technologies.

Hypothesis 1b: Policy enforcement of environmental laws and regulations, among which the Wet Milieubeheer is positively related with the adoption of sustainable process technologies

Not only the awareness of laws and regulations are important in the adoption of sustainable process technologies, but also the enforcement of it. In the interviews it turned out that the enforcement of laws and regulations might be more important than the awareness of it, because most companies are checked for compliance with laws and regulations. The enforcement of laws and regulations causes some sort of threat to make more investments in energy savings measures or sustainable technologies than other investments. The Wet Milieubeheer again is really important for the influence of policy enforcement of the adoption of sustainable process technologies. Companies are controlled on the recognized Measures List and have to review the possible measures and set up reports:

'Each year, we have to submit an environmental report. And they also came to check on that. Every year, they come along, and then they walk around with an iPad and they just fill in everything. So, handing in reports and checks, quite a bit of work has to be done.'

'It is becoming more and more strict and you have to notice more and more of it. In particular in the energy field but also in the area of accounting for environmental impact and annual environmental report, that are really things that, in our opinion, have a big impact.'

The respondents in the interviews made also clear that how better companies stick to the rules in former supervisions or certificates and licenses, the less enforcement they experience in their company. Also, when you have all the information available, the supervisions are not that bad and are easily traversed. A great example from one company: *'I actually notice that the better you stick to the rules, the less often you see them. In the standard supervisions that we have agreed, that is more about the environment indeed, then there are about a few, perhaps once a quarter.'* In the end, there are also companies that do not experience a lot of pressure from the government to invest in sustainable process technologies and one thinks that the regulatory pressure should be higher.

So, it is not all about the awareness of laws and regulations, the enforcement of it might even have a greater effect. If companies do not comply with certain requirements or do not take prescribed measures, they have to explain why not. In the specific case of the Wet Milieubeheer, if companies say that a certain measure does not have a payback period of five years, they have to substantiate this with a good report. It is striking that some companies feel no or little legal pressure. A possible explanation could be that these companies are extremely aware of laws and regulation and fully aware of changes in these regulations, and therefore experience less enforcement of environmental laws and regulations, among which the Wet Milieubeheer. After analyzing all interviews, the policy enforcement, specifically the Wet Milieubeheer, has a positive influence on the adoption of sustainable process technologies. This was also proposed in hypothesis 1b, and by this qualitative analysis, this hypothesis is also validated.

Hypothesis 2: Financial and economic green interests have a positive effect on the adoption of sustainable process technologies.

In the quantitative analysis, only the economic interests are taken into account in determining the influence on the adoption of sustainable process technologies. So, the influence of financial interests on the adoption of sustainable process technologies is only measured in the qualitative

analysis. The analysis of the interviews shows that financial interests are very decisive in the adoption of sustainable process technologies. If financial or economic benefits can be achieved through sustainable process technologies or energy savings measures, then these technologies or measures are often adopted by companies. Most companies seem not to have specific ‘green’ interests or motivations to adopt sustainable process technologies. Financial and economic reasons to adopt sustainable technologies are related to saving costs or improving competitiveness. This is best shown by the following statements: *‘Eventually, everything has to do with the revenue model, payback periods et cetera. Everything is settled on payback times.’* And: *‘Price, profit, these are really important. Bringing down the cost price of paper, that is one of the most important drivers, and fulfilling laws and regulations.’*

The interviews also show that investments are not made when the payback period is (too) long. Companies have to take into account their competitors and their competitive position:

‘We also have to deal with competitors. Our competitors are not only based in the Netherlands, where sustainability is important. In other parts of the world, sustainability is not even an item at all. So, you have to keep an eye on your competitive position’.

If they do not care about the competitive position, they might lose ground to their competitors. Companies must have a good story when they are asking more money for their product than their competitors. And sometimes, this story is not even sufficient to convince customers. So, in the end, profit and the availability of capital are considered as important to companies. There are some small differences between companies that are related to the industry or the ownership of the company. If the company is owned by an American parent company, then it turned out that finances are even more important: *‘With the arrival of the American owner, the financial story is also becoming increasingly important, because it is also listed on the stock exchange ... So, finances are really important’.* But eventually, also other companies think that their investments have to be economical viable in the long term.

Specific financial and economic green interests are not often suggested in the interviews. Most companies consider adoption of sustainable process technologies when the investments can be paid back within 2 to 3 years, when product quality or safety increases or when the competitive position increases. Also, if the customer is likely to pay more, companies are more likely to invest in sustainable process technologies. But there are some companies that see sustainability as a chance to distinguish themselves from other companies and that being

sustainable can also have a financial advantage: *‘I think that financial, being sustainable, has also an advantage...’*. Another company thinks about the economic impact on the company when you are not sustainable:

‘If you do not work on sustainability, what kind of economic impact that can have. That is massive. If you do not do anything and you say I am only interested in efficiency and cheap, and I do not care for sustainability, as a listed company you cannot get away with that. So, that is our economic interest’

These quotes show the importance of the payback period and the return on investment. Also, other economic and/or financial interests are important, such as the available capital and the competitive position of the company. If there is no legal obligation to invest in (sustainable) technologies, the retained payback period is shortened to 2 or 3 years, instead of 5 years. Another important finding is that some investments are not made when the company has no financial or economic incentives to do that. For these kinds of investments, the legal pressure is decisive. If the payback period of investments is too long, companies will not make these investments, because this affects their competitive position and business as a whole. So, it seems, just as in the quantitative analysis, that the financial and green interests are less important than policy awareness and policy enforcement to adopt sustainable process technologies. Most companies invest in sustainable technologies when they can save money with it or can derive other economic benefits from it. This is not done from the companies’ own ‘green’ financial and economic interests. This means that, after this analysis, hypothesis 2 is not validated. The only two examples in which green interests play a role in the adoption of sustainable process technologies are not representative for all interviewed companies.

Hypothesis 3a: Financial and economic green interests strengthen the relationship of policy awareness on the adoption of sustainable process technologies

In the quantitative analysis, this hypothesis is rejected. It turned out that this moderation effect was not significant. But, in the specific cases I analyzed, some other results were found. In some manners, the financial and economic interests strengthen the influence of policy awareness on the adoption of sustainable process technologies. Within the laws and regulations, companies are searching for the best financial and economic options:

'Based on laws and regulations we are trying to make the best choices. Of course, not to add as many costs as possible, but jut continue to work well within that legislation. We are doing that, and we see that the legislation becomes stricter and we know that the legislation will be renewed in 2025 or 2030.'

Companies might struggle with the awareness of obliged investments that they have to do and how to fit this into the finances of the company, especially when the competitors do not have to make those investments:

'Since 2013/2015 there is an acceleration of legislation. Some rules are well intended, but difficult to implement. Then you get a friction from what we as minimums need to do versus what neighbor countries have to do, and with that also your competitive position.'

So, there is some friction between what companies in the Netherlands have to do and what competitors outside the Netherlands have to do. This influences the competitive position of the Dutch companies, and some companies struggle with that.

If companies have the financial ability to invest in sustainable process technologies and they notice a legal obligation to do so, then they will first invest in these legal requirements and then look for other initiatives, that even might have had a preference in the first place. This is best described by the following quote: *'There is a lot of pressure on costs. If we have to, we do it, if can postpone it, then we must have a really good business case. And if there is a business case, we will invest money in it.'* So, companies still make that investment, but it becomes easier when there are also financial and economic benefits, especially financial.

Unfortunately, most companies did not have financial and economic green interests that strengthen the relationship of policy awareness on the adoption of sustainable process technologies. But financial and economic opportunities do affect the relationship between policy awareness and the adoption of sustainable process technologies. Companies first fulfill the obliged sustainable measures and hereinafter look for other possible investments in sustainable process technologies. In conclusion, hypothesis 3a is validated in this analysis. Financial and economic interests strengthen the positive relation between policy awareness and the adoption of sustainable process technologies.

Hypothesis 3b: Financial and economic interests have no effect on the relationship of policy enforcement on the adoption of sustainable process technologies

If the adoption of sustainable process technologies is enforced by laws and regulations, companies are less focused on the financial interests and tend to make the investments regardless of the financial and/or economic implications to the firm. As one company in the interview said: *'Ultimately you meet the legal obligations. And then it may be that you may have a measure that will help you reach the goal very quickly, but that is very expensive, or that you do ten smaller things to meet in another way that goal'*. Another good expression is: *'As soon as you are legally obliged to do something, we will do that. No fine is risked'*. These quotes show the enforcement of environmental laws and regulations in a good way.

In some circumstances, the pressure to invest in sustainable technologies is experienced as high and not always as effective. The investments that have to be made by companies can affect also economic interests, such as the competitive position of the company:

'Making it mandatory that you have to invest is a bit a weird pressure, because this also affect your competitive position. The pressure of mandatory investments, completely taken away from the context of international competition, is really high and on a scale of 1 to 10, scaled to a 10.'

But in the end, most companies do not want to risk a fine for not fulfilling laws and regulations, because the risks of missing compliancy with laws and regulations can have a big influence on the business process and the reputation of the company.

Companies feel the threat of enforcement of laws and regulations and therefore do a lot to comply with laws and regulations. Companies do not want to risk the adverse consequences of not complying with laws and regulations and therefore will always make an effort to be compliant with laws and regulations. Financial and economic interests play not a big role when there is a threat of enforcement of laws and regulations, because companies focus on the compliancy instead of other interests that they consider as important. So, in these specific cases the enforcement of laws and regulation stimulates companies in the compliancy with environmental laws and regulations, and therefore the adoption of sustainable process technologies. Especially financial interests seem not to have a great influence on this relation, because companies think 'when we have to, we do it'. This is mainly because the risks of not being compliant with laws and regulations are too high:

'As a company, some risks are just not acceptable. If laws and regulation oblige companies to do something, then we have to do that as a company, otherwise we get a fine. If that fine is just 10 euros, it is still manageable, but if that fine is 10,000 euros, it becomes a lot different. And

if there is a chance that you have to stop your business process, you don't want to have that risk at all.'

In conclusion, hypothesis 3b is validated, since financial and economic green interests do not have an effect on the influence of policy enforcement on the adoption of sustainable process technologies.

5.3 Conclusion quantitative and qualitative analyses

This section includes the conclusion of both analyses that I have conducted, starting with the quantitative analysis, conducted by a regression analysis. Afterwards the results of the qualitative analysis are discussed. The differences between the two analyses are also described.

Quantitative analysis

Policy awareness and policy enforcement seem to have a great influence on the adoption of sustainable process technologies, as was already expected by theory. To companies, both awareness and enforcement of laws and regulations are important for the adoption of sustainable process technologies. Unfortunately, economic relative advantage does not, while this effect was found in the theory discussed. Firms are not influenced by better economic relative advantage for the adoption of sustainable process technologies. Although, an interesting finding is that economic relative advantage did have a significant effect on the adoption of sustainable process technologies until the variables policy awareness and policy enforcement were added in the regression model. The examined moderation effects also have no significant influence on the adoption of sustainable process technologies. This means that economic relative advantage does not strengthen the effect of policy awareness and policy enforcement on the adoption of sustainable process technologies. That these effects are not significant is realistic due to the fact that economic relative advantage does not have a direct significant effect as an independent variable on its own.

In figure 3, the Conceptual model is presented again. The results of the quantitative analysis are indicated by solid lines. A green solid line indicates that the relationship is quantitatively validated, a red solid line indicates that the relationship is not quantitatively validated, because the hypothesis is rejected.

Qualitative analysis

Hypotheses 1a and 1b are both supported as well with the qualitative analysis. For companies, being aware of environmental laws and regulations and the requirements these laws prescribe, cause a positive effect in the adoption of sustainable process technologies. The enforcement of these laws and regulations ensure that companies are more active in reporting the sustainable technologies that they have adopted or the energy saving measures they have taken. An interesting observation is that the effect of policy enforcement is stronger than the effect of policy awareness on the adoption of sustainable process technologies. This differs from the quantitative analysis, where policy awareness has a stronger effect.

Hypothesis 2 was already not supported in the quantitative analysis, and after the qualitative analysis this hypothesis was also not validated. Finances are important for making the decision to invest in sustainable process technologies or not. Companies consider the payback periods or return on investment of each investment in sustainable process technologies. The competitive position is also really important to companies in deciding to make sustainable related investments or not. Unfortunately, did not have financial and economic green interest to adopt sustainable process technologies. They especially consider the payback period and the competitive position important. These are pure financial and economic interests and cannot be seen as green financial and economic interests. But it is worth the mentioning that companies will invest in sustainable process technologies is these investments if the return on investment is reasonable, even if these investments are not legally obliged.

The results of the qualitative analysis for hypothesis 2 are also reflected in the results of hypotheses 3a and 3b. For companies, the trade-off between financial and economic interests and fulfilling laws and regulations is not easy. But eventually, every company chooses to be compliant with laws and regulations, regardless of the costs and the influence on their competitive position in the market. For the awareness of laws and regulations, companies first make a list of investments or measures that are required by laws and regulations. If these are fulfilled, then other investments or measures are considered. So, financial and economic green interests indeed can have a strengthening effect on the relationship of policy awareness on the adoption of sustainable process technologies. Especially in the way of making a trade-off between (more expensive) legally required investments and (less expensive) other investments. For policy enforcement, companies already feel a threat by the enforcement of laws and regulations. Financial and economic interests do not strengthen or weaken the relationship between those variables.

In figure 3, the Conceptual model is presented again. Besides, the results of the quantitative analysis, the results of the qualitative analysis are also presented in this figure. The

results of the qualitative analysis are indicated by dashed lines. A green dashed line indicates that the relationship is qualitatively validated, a red dashed line indicates that the relationship is not qualitatively validated.

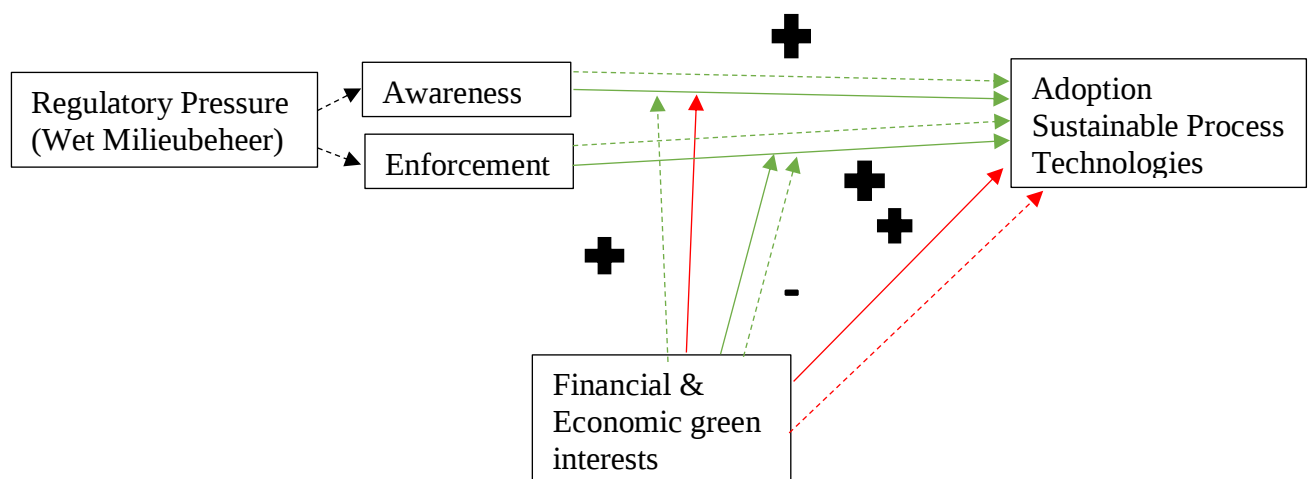


Figure 5 Conceptual Model after validating hypotheses

**Solid line = quantitative validation; Dashed line = qualitative validation*

***Red = not validated; green = validated*

Chapter 6 – Conclusion and discussion

6.1 Conclusion

After the conducted mixed-method study on the effects of regulatory pressure and financial and economic green interests on the adoption of sustainable process technologies, I will be answering my research question proposed in chapter 1:

How do manufacturing firms experience regulatory pressure – especially in the case of the Wet Milieubeheer – for the adoption of sustainable process technologies, and what is the influence of financial and economic green interest on the adoption of sustainable process technologies, and on the relationship of awareness and enforcement on the adoption of sustainable process technologies?

As I already concluded in chapter 5 and as also confirmed in former literature, regulatory pressure is a great driver of adoption of sustainable process technologies. Both the quantitative and the qualitative analyses have shown that policy awareness and policy enforcement have a positive effect on the adoption of sustainable process technologies. This also accounts for the specific case of the Wet Milieubeheer. The influence of the Wet Milieubeheer is examined in the qualitative analysis. In this analysis, the awareness and enforcement of the Wet Milieubeheer cause a positive effect on the adoption of sustainable process technologies, or more specifically energy saving measures. Companies are encouraged by the Activiteitenbesluit to investigate which energy-saving measures are applicable to the company. They also have to report that they have implemented the prescribed energy-saving measures. Which measures are applicable depends on the industry sector in which the company is active. But the obligation to check the measures applies to every company.

There is no influence of financial and economic green interests on the adoption of sustainable process technologies. In the quantitative analysis, the influence of economic relative advantage disappeared through the effects of policy awareness and policy enforcement. In the qualitative analysis, the influence of financial and economic green interests could not be validated. Companies consider financial and economic interests as really important when investing in sustainable process technologies, but this expresses in a way that the investments have a reasonable payback period and that the investments not have a negative effect on the competitive position of the company. Most investments in sustainable process technologies are

not done from a 'green' economic or financial interest. Nevertheless, most companies think that sustainability is important, which may express itself in the future.

The indirect effects of financial and economic green interests are not significant in the quantitative analysis. The quantitative analysis showed no significant effects of the moderation variables which means that economic relative advantage did not have an influence on the relationship of policy awareness and policy enforcement on the adoption of sustainable process technologies. For the effect on policy enforcement no effect was expected in the hypothesis, but for policy awareness a strengthening effect was expected. The qualitative analysis showed a strengthening effect of financial and economic interests for the positive influence policy awareness on the adoption of sustainable process technologies. Companies that had interests to invest in sustainable process technologies, were motivated to invest first in the technologies or measures that were required by law.

An interesting finding of the control variable is that size of companies does matter for the adoption of sustainable process technologies. This is confirmed in the quantitative research as the qualitative research. They have more capital available to invest in sustainable process technologies, and they are forced more by the government to adopt sustainable process technologies by submitting reports and supervisions.

So, regulatory pressure is indeed very important for the adoption of sustainable process technologies, as it has a positive influence on the adoption. Financial and economic green interests do not influence the adoption of sustainable process technologies or at least to a much lesser extent. Furthermore, financial and economic green interest do not affect the relationship between regulatory pressure and the adoption of sustainable process technologies. And lastly, bigger companies adopt more sustainable process technologies.

6.2 Discussion

According to Fu (2019) and Bansal (2005), regulatory pressure drives the adoption of sustainable process technologies. Similar results were found in this research. Both policy enforcement and policy awareness have a positive effect on the adoption of sustainable process technologies. In former research is found that the effect of policy awareness is greater than the effect of policy enforcement. This is confirmed in my quantitative analysis, but not in my qualitative analysis. In this analysis the effect of policy enforcement was greater. The control mechanism of the Wet Milieubeheer causes an obligation for companies to fulfill certain

measures of the Measures Lists. Companies have to explain if they do not implement a measure from these Measures Lists. In former research was also found by Eyraud et al. (2012) that financial and economic green interests also positively influence the adoption of sustainable process technologies. In this research, this effect could not be validated. Companies tend to invest for pure financial reasons, and not because of green economic or financial interests. This difference might be explained by the type of companies that were researched or the origin of the companies (in this research mostly Dutch companies). The country of origin can show a different level of sustainable development. Lastly, the moderation effects of financial and economic green interests were not validated in the quantitative analysis. In the qualitative analysis, the effect via policy awareness on the adoption of sustainable process technologies was validated. Most companies first tend to invest in obliged measures by laws and regulations before investing in other options. This is in line with former research about financial and economic interests (Gibbert et al., 2014; Eyraud et al., 2012; Veugelers, 2012).

6.2.1 Theoretical implications

The first implication of my research is that no effect of financial and economic green interests on the adoption of sustainable process technologies was found. The interviewed companies did not have specific 'green' financial interests to adopt sustainable process technologies. They have a pure financial point of view to adopt certain technologies.

In former literature, including the study of Fu (2019) was found that policy awareness has a greater influence on the adoption of sustainable process technologies than policy enforcement. I concluded the same in the quantitative research, but the effects are different in my qualitative research. For specific cases, the effect of policy enforcement on the adoption of sustainable process technologies is stronger than policy awareness. This also accounts for the Wet Milieubeheer. Most companies have to submit reports about their energy saving measures and when they did not take certain measures, they have to explain why not. But there were also companies that actually did not notice much of this obligation. A difference in sector might declare this difference. Also, company size could matter for this obligation, because especially the smaller companies did not fulfill this obligation.

Financial and economic green interests have no effect on the relationship between policy enforcement and adoption of sustainable process technologies. As discussed in the theory, the availability of capital is a main driver of technology innovation, because this influences the R&D expenses. This is also apparent from the results of my qualitative research. Finances are

a main driver of sustainable technology adoption. But companies do not invest in sustainable technologies based on specific financial and economic green interests. They mostly invest in these kinds of technologies when the investment has a good revenue model and not because of the fact that it is a green investment.

6.2.2 Practical implications

An interesting observation is the effect of economic relative advantage. The effect of economic relative advantage is not significant when the independent variables policy awareness and policy enforcement are added in the regression model, while the effect of economic relative advantage is significant when the other independent variables are not added in the regression model. So, there is a big overlap between the effect of policy awareness and policy enforcement, and the effect of economic relative advantage. It is possible that in the eyes of many companies, policy awareness and policy enforcement are closely linked to economic relative advantage. This also corresponds to the findings in the qualitative analysis. The companies interviewed usually said that sustainable investments that were cost-effective, were often already done by the company, and if not, then it was really not a problem to make that investment.

To companies, the financial interests are important up to a certain point. When laws and regulations oblige companies to take certain measures or to invest in sustainable technologies, then companies are not willing to take the risk of getting a fine. But with investments in sustainable process technologies, the survival of the company itself is certainly taken into account. This is reflected in the payback periods of investments in sustainable process technologies. Energy saving measures obliged by the Wet Milieubeheer are normally carried out by every company, except for the real small companies. The only limitation is that companies do not invest in obliged energy saving measures when they think it cannot be paid back within five years. Unfortunately, with my conducted research the positive influence of financial and economic green interests could not be confirmed, while this effect is found in former literature. It appears that the companies I interviewed are more focused on costs and revenues. A possible explanation for this is that these companies have no consumers, but other companies as customers.

6.2.3 Limitations of this research

The conducted mixed-method study increases the cross validation. Results that were not validated in the quantitative analysis, were sometimes validated in the qualitative analysis, and

vice versa. For the quantitative analysis statements can be made for a larger group of companies, and in the qualitative analysis specific profound results or statements were found. Both analyses provide insight in how companies behave in the adoption of sustainable process technologies. But this conducted study has also some limitations.

A first limitation of this research is, is that it is focused on regulatory pressure only, while also other, different kinds of pressure could influence the adoption of sustainable technologies, as is, albeit to a lesser extent, also found in previous research. Furthermore, the Wet Milieubeheer is taken as an example for regulatory pressure during the interviews. This could influence the results of regulatory pressure on the adoption of sustainable technologies. Of course, also other laws and regulations are discussed in the interviews, but the obligations of the Wet Milieubeheer are specifically discussed in every interview. A third limitation results from the quantitative analysis. This analysis is based on a database from Yao Fu. She has prepared a questionnaire that measures the subject of her thesis well. The questions do not completely fit to the constructs I measured in my research. Especially the construct ‘financial and economic green interests’ is not measured well. Only the economic advantages have been included in the measurement of this construct. This decreases the validity and liability of the quantitative analysis a bit. A fourth limitation is the number of interviews conducted. Due to a limitation of time and the dependence on cooperation of companies, it unfortunately was not possible to conduct more interviews than ten (plus two interviews from another student). Also, some industry sectors are not represented in the qualitative sample.

6.2.4 Future research

Due to certain limitations of this research, I would suggest some directions for future research. Because the results of economic relative advantage from the quantitative analysis is based on a database, it could be better to measure this construct with own items and add measurement items for the financial interests’ part. In this way, not only the economic interests are taken into account, but also the financial interests. This may affect the influence of financial and economic green interests on the adoption of sustainable process technologies.

Second direction of future research could be to research another example of laws and regulations than the Wet Milieubeheer and see how the influence of this law differs from the Wet Milieubeheer. The example could also be a law from the European Union. Even more interesting would be national differences of the experience of European Union legislation in different European countries.

6.3 Recommendations

Some recommendations I would like to propose for the companies are the following. I have noticed that sustainability is becoming increasingly important in the Netherlands. Some companies already noticed this change in the community. In addition to the environmental laws and regulations, companies can go a step further. This trend is in line with my first recommendation, which is that companies should do a SWOT analysis (Strengths, Weaknesses, Opportunities and Threats) in order to create a new, may be more sustainable strategy for the company. In the future, sustainability really could be a very important factor in a company and might provide new customers, especially customers that care for sustainability. Companies might not see this chance, because most companies do not have consumers as customers, but other companies. Therefore, making a SWOT analysis and see if the threats and opportunities of sustainability match the strengths and weaknesses of the company. In this way, companies could create a new strategy or create some opportunity space. This in turn could lead to new, different customers, new business opportunities or new business models. Companies should get more insight into the bigger picture of sustainability and sustainable process innovations to have more economic or financial benefits in the future.

The second recommendation is that companies should either focus on multiple small investments or measures or one big investment and choose what suits the company best. Of course, for every company the availability of capital is restricted. This is also one of the main restrictions to invest in new technology. By the introduction of the Measures Lists of the Wet Milieubeheer, there is for almost every industry sector an applicable Measures List. The measures on these lists can all be paid back within a period of five years. Companies that have not consulted these Measures Lists, should really consider this, because the energy-saving measures can also have financial and economic advantages for the company. I would suggest that companies make clear for themselves what type of sustainable innovations or energy-saving measures the company would like to take or to consider. Subsequently, they should check laws and regulations (among which the Wet Milieubeheer) for mandatory measures and make the decision to take first the mandatory measures, which might have fewer financial and economic benefits to the company than other technologies that are not obliged by laws and regulations. Especially for the obligations following from the Wet Milieubeheer, as the enforcement of these obligations become stricter in the future.

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Annex 1 Interviewscript

- Proposities
- Policy awareness and policy enforcement positively influence the adoption of sustainable process technologies;
 - Financial and economic green positively influence the adoption of sustainable technologies;
 - Financial and economic green interests modify the effect of policy enforcement on the adoption of sustainable technologies;
 - Financial and economic green interests modify the effect of policy awareness on the adoption of sustainable technologies;
 - Institutional Voids (higher heterogeneity) lead to a more active response strategy;
 - When reacting more actively, firms are more likely to adopt Sustainable Technology;
 - Economic Green Demand also leads to more active reaction strategies.

Intro	Wie ben je zelf; Doel van het onderzoek (neutraal geformuleerd): invloed van diversiteit van institutionele druk op duurzame activiteiten/adoptie duurzame procestechnologieën Vraag toestemming voor opname interview; alleen voor transcriptie, geheel anoniem en niet identificeerbaar rapporteren (bv bedrijf X) gesprek van +/- een uur	5 minuten
Oriënterende vragen	over persoon en bedrijf	5 minuten
	Wie bent u en wat is uw rol binnen het bedrijf? Grootte arbeidsduur bedrijfstak	
	Op welke manieren bent u betrokken bij duurzaamheid (in de productie)? (focus op werkzaamheden/ activiteiten)	
	Binnen welke markt opereert uw bedrijf met name? Welke activiteiten worden uitgevoerd...	
	Ondernemingsstrategie: Wat probeert uw bedrijf te bereiken in de komende 5 jaar?	
Duurzaamheid Algemeen / Strategie	Voorafgegaan door neutrale inleiding nieuw onderwerp Algemene informatie over duurzaamheid in het bedrijf	5-10 minuten
	Wat betekent duurzaamheid voor uw bedrijf? (productie, marketing/verkoop, O&O, imago, design)?	
	Welke duurzaamheidsactiviteiten (m.n. in de productie) ontwikkelt uw bedrijf? (in welke fase(n) van adoptieproces: kennis van, concrete plannen, beslissingen, implementeren, monitoren, resultaten, effecten)(afhankelijk van specifieke fase: wat/hoe oriënteren; afwegingen; welke prioriteiten; manier implementatie; monitoren, resultaten, uitwerking (voor wie) (activiteitsgericht, bijv. beleid, rapporten, bespreking in (werk), overleggen, acties, trainingen e.d.)	
	Op welke manier betreft het bedrijf mensen van verschillende afdelingen bij deze (duurzaamheids)activiteiten? (eventueel doorvragen over een nieuwsbrief/ Workshops / Bedrijfsplan	
Duurzaamheid Adoptie	Voorafgegaan door neutrale inleiding nieuw onderwerp over het implementeren van duurzame proces technologieën	10 minuten

Duurzaamheidsresultaten	Welke duurzame technologieën in productie worden er gebruikt binnen uw bedrijf? (kennis van, concrete plannen, beslissingen, implementeren, monitoren, resultaten, effecten)	15 minuten
	End-of-pipe / process improvements / material substitution / recycling	
	Welke duurzame technologieën zijn in potentie beschikbaar/relevant voor uw bedrijf? (Soorten, prijs, leveranciers)	
	Op welke manier zijn de afgelopen drie jaar concrete duurzaamheidsresultaten geboekt? (energie, water, uitstoot (CO2), materialen, verpakking, afval)	
Inst. Pressures Externe invloeden/druk	Neutrale introductie Over de externe druk die vanuit instituties voortkomt (regelgeving, maatschappij, concurrenten, etc.)	
Coercive/legal	Inhoud: Op welke manieren /in welke mate voelen jullie de druk van wet en regelgeving? Welke wet & regelgeving? Rijksoverheid, lokale overheden... -> kennis van de wet milieubeheer, verbruik energie en aardgas, Activiteitenbesluit/Maatregelenlijsten van de Wet Milieubeheer, verplichte energiebesparingsmaatregelen vanuit de overheid. Actoren: In welke maten voelen jullie druk vanuit de rijksoverheid, lokale overheden? (Inspecties gehad? Boetes? Andere maatregelen?) Hoe reageren jullie daarop? Voorbeeld? Transparantie? Onderlinge tegenstellingen? Belasting/administratielast?	Hoe groot is deze druk op 10-puntsschaal
Normative	Inhoud: In welke mate ervaren jullie druk door sociale verplichtingen (normatief)? Actoren: Op welke manieren/ in welke mate voelen jullie de druk vanuit media, deskundigen, consumentenorganisaties of lobbygroepen? Hoe reageren jullie daarop? Niks doen is ook reactie, Voorbeeld?	Hoe groot is deze druk op 10-puntsschaal
Mimetic	Inhoud: In welke mate ervaren jullie druk om zich aan te passen aan ontwikkelingen in de industrie? Actoren: Op welke manier/ in welke mate voelen jullie de druk om te reageren op de concullega's, concurrenten? Hoe reageren jullie daarop? Voorbeeld?	Hoe groot is deze druk op 10-puntschaal
Heterogeneity in Institutional Pressures (Inst. Voids)	Drie soorten druk: normatief (normen, vanuit de maatschappij, media, etc., verwachtingen), coercive (regelgeving en wet), mimetic (imiteren van wat concurrenten en collega's doen, dus vanuit de industrie)	10 minuten
	In welke mate ervaren jullie conflicten/tegenstelling tussen verschillende reguleringen? Hoe wordt daarmee omgegaan? Voorbeeld?	Binnen coercive
	In welke mate ervaren jullie conflicten binnen wat er vanuit de maatschappij/NGOs/etc. wordt verwacht? Bijv. verschil tussen NGOs of media, Hoe wordt daarmee omgegaan?	Binnen normative

	In welke mate ervaren jullie conflicten binnen de druk vanuit de industrie/mimetic?	Binnen mimetic
	Zijn er reguleringen die in conflict staan met wat er vanuit de maatschappij/NGOs/etc. wordt verwacht (normatief) en wat er vanuit de industrie/concurrenten/etc. wordt verwacht (mimetic)? Zo ja, welke? Hoe wordt hiermee omgegaan?	Tussen de soorten druk
	In welke mate ervaren jullie de druk voor duurzaamheid als <i>consistent</i>? Verandert het vaak? Transparant? Reactie?	
Bedrijfseconomische afwegingen	Voorafgegaan door neutrale inleiding nieuw onderwerp Er spelen ook economische factoren die, naast externe druk, invloed kunnen hebben op de adoptie van duurzame technologieën	10 minuten
	Wat is (mogelijk) het bedrijfseconomisch nut van het gebruik van duurzame(re) technologieën voor uw bedrijf? (Innovatie, concurrentiepositie, werving nieuwe klanten, toegang nieuwe markten, prijs/toegevoegde waarde, reputatie/ marketing), vraag voor duurzaamheid vanuit de klanten, kosten van de energiebesparingsmaatregelen, bepalen terugverdientijd, afweging financiële belangen en adopteren duurzame technologieën	
	Welke financiële en economische belangen heeft het bedrijf om duurzamer te werken en dit in te bouwen in het productieproces / bedrijfsproces? (Economische prestaties, verbeteren productkwaliteit, verbeteren reputatie, verbeteren veiligheid)	
	Balansvraag; invloed van externe druk (coercive, normative, mimetic) op het gebruik van duurzame technologieën? Afwegingen t.a.v. bedrijfseconomische overwegingen en duurzaamheidsdoelen.... Speelruimte eigen strategie te voeren? Lobbyen & onderhandelingsmogelijkheden?	
Outro	Vriendelijk bedankt! Afspraken herhalen en bevestigen (anonimiteit) Ontvangen van eindverslag?	5 minuten

Annex 2 Quotes from the qualitative analysis per construct

Quotes about adoption sustainable process technologies

ID	Quotes	Relevantie score	Open codering
WO1	die echte droogovens die we hebben, die stoken we op eigen product. Op dit moment zijn we ook aan het nadenken om zonne-energie te plaatsen op de daken, maar het heeft uiteindelijk ook allemaal te maken, heel simpel met een kostencomponent.	1	Duurzame maatregelen en financiële belangen
MA2	Iets anders wat we continu proberen te doen is minder materiaal. Wij produceren hier alles in [X] maar we leveren over de hele wereld. We hebben in 130 landen over de hele wereld installaties staan. Dat betekent dat wij tot.. continu door lokale concurrenten onze transportkosten ergens moeten terugverdienen. En dat betekent dus dat je dat alleen maar kunt doen door en heel efficiënt te produceren maar ook door zo min mogelijk gewicht te hoeven transporteren. Dus het is... aan de ene kant is dat een kostenbesparing maar ja.. indirect natuurlijk ook een CO2 besparing	1	Duurzame technologieën en financiële en economische belangen
MA2	Maar wat wij proberen continu te doen is ervoor te zorgen dat wij minder materiaal gebruiken, minder elektriciteit, minder chemie. Goedkoper kunnen produceren, lichter kunnen construeren. Al onze ontwerpen, onze nieuwe producten die we hier maken worden daarop getoetst.	1	Duurzame procestechnologieën en economische belangen
TE1	We hebben een fabriek in [D], in Schotland staan, waar een grote recycling staat. Waarin dus ook verschillende stromen van [x] naar toe gaan om te regrinden eh opnieuw korrels van te maken. Vaak zetten we het zelf in [D] in, want die kunnen daar opnieuw touw van maken, he kunststof touw. Op die manier wordt die loop wel redelijk gesloten, maar de trigger is geld. Eh wat in [D] recyclen en weer terugsturen is vaak niet kosteneffectief, dus daar zit de afweging in.	1	Duurzame maatregelen / recycling
WO1	Het tweede duurzame cyclus is de hergebruik-cyclus. Dus wij eh willen voorkomen dat een pallet eenmalig gebruikt wordt en daarna de oven ingaat. Nouja kijk als het een tuinmeubel is dan is het prima, maar daar zit onze business niet. Wij willen die pallet eigenlijk zo vaak mogelijk gebruiken en het liefst zo efficiënt mogelijk gebruiken, dus dat hele pooling systeem bij ons is erop gericht om in de gaten te houden van nou waar zijn grote hoeveelheden pallets en waar zijn ze nodig en hoe kunnen we ervoor zorgen dat de afstand vanaf waar die pallets zijn en waar ze nodig zijn zo beperkt mogelijk is.	1	Adoptie duurzame (process) technologieën: recycling
MA2	proberen wij bijvoorbeeld vet uit afvalwater te halen, daar maken wij biodiesel van, dat bedrijf daar eigen energie van kan maken, terugwinnen van stikstof in de vorm van kunstmest, terugwinnen van fosfaat, terugwinnen van organisch stof, terugwinnen van cellulose, van zeg maar je WC-papier, cellulose, wat je als grondstof voor papierindustrie kunt gebruiken.	1	Adoptie duurzame (proces) technologieën
MA2	We doen al heel veel, het hele dak ligt hier vol met zonnecollectoren bij voorbeeld, wij zijn.. wij proberen.. we produceren 70% van het totale elektriciteitsgebruik produceren we zelf.	1	Adoptie duurzame (proces) technologieën
NM1	Wat we nu doen, op deze locatie, hebben we transport banden gebouwd, dat is een investering, maar ook relatief energie zuinig, hij wekt namelijk ook weer energie op.	1	Adoptie duurzame (proces) technologieën en financiële groene belangen

FO1	“Daarnaast in ons oude gebouw, de stroomconsumptie is in verhouding erg naar beneden gegaan toen we een het nieuw gebouw hebben betreden. En dat komt niet alleen door beter logistiek maar ook doordat de machines die vroeger zeg maar allemaal ster driehoek waren aangedreven. En heb je een keer die piekspanning elke keer als de machine aangaat. Die zijn allemaal vervangen door dan wel softstarter, door dan wel frequentieregelaar. En dus die pieken haal je allemaal weg.”	1	Adoptie duurzame proces technologieën
PV1	“Daarnaast is ook sustainable product, het energieproces. We geven alle jaren om onze uitstoot en energie en hoe we dat kunnen verminderen. Daarnaast ook het gebruik van renewable energy, dus he. Daar starten we mee, we gaan kijken waar we dat kunnen gaan gebruiken.”	1	Adoptie duurzame proces technologieën: gebruik van duurzame energy / energie efficiëntie
EL1	“Hebben we dus een warmteterugwinningsinstallatie daar neergezet. Want die oven, ja die warmte blijft niet alleen in de oven maar die gaat er ook uit. Dat betekent je hebt er ook warmteverlies. Nou wat is nou mooier als dat je die warmte kan gebruiken in de winter om die ruimte op te warmen.”	1	Adoptie duurzame proces technologieën: energie efficiëntie
MA1	“Zoals we hebben hier een bak water van 1000 kuub, en daar pompen we constant warmte in omdat we onze pompen moeten testen. En die warmte winnen we weer terug, in de winter gebruiken we die warmte om de hal te verwarmen.”	1	Adoptie duurzame proces technologieën: energie efficiëntie
FO2	“We hebben sowieso alles naar LED-verlichting gedaan, we hebben wat efficiënter gebruik van warmtewisselaars, bij rookgassen hebben wij een condensor gezet dat wij de rookgastemperatuur nog een keer gebruiken, frequentieregelaars, andere compressoren ook frequentie-geregeld, dus allemaal dat soort kleinere dingen allemaal.”	1	Adoptie duurzame process technologieën: energie efficiëntie

Quotes about regulatory pressure: policy awareness

ID	Quotes	Relevantie score	Open coding
MA1	Ik denk dat het ehm duidelijk is dat veel van onze duurzaamheidsinitiatieven in eerste instantie komen omdat ze gepaard worden met een wettelijke eis of gepaard wordt met een besparing die je sowieso kunt maken.	1	Wettelijke druk: bewustwording/kennis van
FO2	Wat moeten we doen voor de milieuvergunning? En daar zitten dan zo veel eisen aan dat als we die allemaal goed afgedicht hebben en geven de gemeente goed antwoord, en de actielijsten die daaruit komen volgen wij goed op. Dan zit dat eigenlijk altijd wel goed, we hebben niet te veel problemen. Maar om een stapje extra daarin te gaan doen als dat nodig is, daar voelen we niet echt een druk voor. Het is meer de druk voor voldoen aan de huidige regelgeving zo veel als mogelijk.	1	Wettelijke druk: bewustwording / kennis van
WO1	Ja absoluut. En dat is met name wat ik bedoelde net met die wet- en regelgeving vanuit de provincie of vanuit de regio's en dergelijke. We weten dat dat speelt en we acteren daar ook naar. Omdat A. Het is een verplichting waar je straks aan moet voldoen, maar B. Willen we dat ook.	1	Wettelijke druk: bewustwording/ kennis van
MA2	Kijk, je moet nou als je bedrijf nou zo veel kuub gas en zo veel elektriciteit, dan moet je een audit laten doen. Nou ja, we zeggen van ja wat wil je hier dan nog besparen.	1	Wettelijke druk: controles en rapportages
PV1	Ehm dat zijn geen echte investeringen die je dan moest doen. Maar ehm, ja ik denk dat dat allemaal wel meevalt in hoeverre wij verplicht worden.	1	Wettelijke druk en financiële belangen

TE1	Voldoen aan wet- en regelgeving is nooit een probleem, of wel een probleem om te doen, maar het is geen issue. In Nederland heb je sinds 2015 de European Energy Directive wat vertaald is naar nationale wetgeving, ik denk dat we een van de eerste bedrijven waren die dat opgevolgd heeft. Sterker nog zodanig vroeg dat het bevoegde gezag niet wisten wat ze met ons rapport moesten doen.	1	Wettelijke druk: bewustwording/kennis van
NM1	De wet en regelgeving vragen allemaal dingen maar ik vind dat eigenlijk voor ons nog wel te overzien als ik eerlijk ben	1	Wettelijke druk: ervaring
EL1	We zijn bedrijven die voldoen aan het Activiteitenbesluit. Van daaruit zitten we dat de laatste jaren steeds meer druk.. Als je kijkt naar energie besparende maatregelen.. Erkende maatregelen die dan binnen de vijf jaar terug verdiend, ja daar moeten we aan voldoen. Dus we hebben die screening ook wel gemaakt.	1	Wettelijke druk: kennis van / bewustwording
EL1	Wat ik wel veel zie is dat wij vanuit de druk van de groep vaak heel makkelijk aan regelgeving voldoen. Dus we lopen eigenlijk een beetje voor op wat de wet wil omdat de groep heel actief is daarop.	1	Wettelijke druk: kennis van / bewustwording
MO1	Dat zijn dan wetgevingen die dan komen, gebaseerd op die wetgevingen proberen wij daar natuurlijk ook de beste keuzes op te maken. Natuurlijk niet zoveel mogelijk kosten toe te voegen, maar wel gewoon niet een beetje, maar ruim binnen die wetgeving blijven te werken. Dat doen we dan ook, daar zien we dan ook dat wetgeving steeds aangetrokken wordt en dat weten wij ook al, er komen vernieuwingen op die wetgeving in 2025 of 2030.	1	Wettelijke druk: bewustwording / kennis van
FO2	Daarom is het, als je het over normen hebt, is het niet zo zeer van dat we het wenselijk vinden om bepaalde dingen te veranderen maar worden we er gewoon toe verplicht. Dus bij voorbeeld als er een nieuwe proces of een nieuwe apparaat ontwikkelt wordt en het verdient zich geen eh in drie of vijf jaar terug, dan zijn wij eigenlijk haast gedwongen om dat te gaan doen, of wij dat willen of niet.	1	Wettelijke druk
PA1	Als afsluitende vraag over de wettelijke druk: hoe hoog ervaart uw bedrijf de druk op een 10-punt schaal? Zegmaar 10 jaar geleden een 3, vorig jaar een 5 en dit jaar een zeven. Dus het wordt steeds meer, en steeds strenger en je merkt er steeds meer van. Met name op energiegebied maar ook op gebied van verantwoording afleggen over milieubelasting en milieujaarverslag, wat ik net vertelde met die bolletjestabel, dat zijn echt wel dingen die wat ons betreft inhakken.	1	Wettelijke druk: ervaring
WO1	Ehm ja dat voel je omdat je er gewoon heel simpel je wordt door de overheid straks verplicht om bepaalde dingen te doen. Ehm en ik ken niet alle details, maar we hebben vorig jaar iemand voor onze productiebedrijven in dienst genomen om al die regelgeving, met name vanuit de provincie toentertijd om te zorgen dat we daar een goed plan voor hebben.	1	Wettelijke druk: ervaring
MA1	Ja maar daar ligt de regeldruk gewoon hoger dan dat wij het zelf voor zouden kunnen blijven. De regelgeving vanuit Nederland en vanuit Europa die is dusdanig hoog dat je ehm, dat je nouja die dwang die heb je gewoon. Dus hier zou je ook kunnen zeggen van ja we zijn goed bezig, maar ja we moeten. We hebben geen keuze	1	Wettelijke druk: ervaring

Quotes about regulatory pressure: policy enforcement

ID	Quotes	Relevantie score	Open codering
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PA1	Met name met CO2 de financiële druk, de financiële prikkel. En Convenant MEE is echt het behalen van de doelstellingen. Dus je hebt een verplichting opgekregen, je moet energie besparen in zoveel jaar zegmaar, en dan moet je elk jaar over de voortgang rapporteren, en dan is het wel belangrijk, dan wordt echt goed beoordeeld, daar krijg je een uitgebreide rapportage over, of je je doelstellingen gehaald hebt, of je bij moet sturen, dus daar zit echt wel een control mechanisme op.	1	Druk vanuit de overheid, controles
PA1	En hebben die financiën ook nog echt beperking op de aannemen van wettelijke verplichtingen? Uiteindelijk voldoe je aan de wettelijke verplichtingen. En hoe dan.. dan kan het zijn dat je misschien een maatregel hebt waar je heel snel het doel mee bereikt maar dat die heel duur is, of dat je tien kleinere dingen doet om die doelstelling alsnog te bereiken die goedkoper zijn.		Financiële belangen en wettelijke druk
MA1	Maar wat we wel zien is dat echt sinds 2013/2015 er een stroomversnelling ontstaat met wetgevingen ehm, en dat sommige regels goed bedoeld, maar in de uitvoering moeilijk haalbaar zijn. En dat komt waarschijnlijk ook waar jullie meer naar op zoek zijn is, de wrijving die je krijgt van wat wij als minima moeten versus wat buurlanden moeten en daarmee dus ook je concurrentiepositie.	1	Afweging wettelijke druk en economische/financiële belangen
MA1	Daarnaast zien we dan het stukje vijf jaar terugverdiend wat nu in de wet is meegenomen, terwijl als wij kijken naar onze Amerikaanse context, dan is vaak de vraag voor investeringen dat ze in twee jaar terugverdiend kunnen worden. Dus dat betekent dat dingen die tussen de twee en vijf jaar terugverdiend hebben, wettelijk moeten, maar niet op het verlanglijstje staat in de interne politiek.	1	Wettelijke druk en financiële belangen
MA1	Hoe ervaren we die druk op een schaal van 1 tot 10 ‘...’ Het stukje verplicht stellen dat je moet investeren ehm is wel een onhandige druk, omdat dat ook direct relatie heeft met je concurrentiepositie, dus die vind ik zelf wat zwaarder. Zeg maar, zelf kritisch zijn en de sustainability goals, waar ook veel aandacht voor gevraagd wordt, zou ik zeggen geef het een 6. Maar dat verplichte stukje, helemaal weggenomen uit de context van internationale concurrentie, dan schaal ik m op richting de 9 of 10.	1	Wettelijke druk en duurzaam innoveren
FO1	Ik merk eigenlijk van hoe beter je je aan de regels houdt, hoe minder vaak je ze ziet. In de standaard controles die we hebben afgesproken, dat is meer over het milieu inderdaad, aanleveren van de gegevens, dan praat je hier over... enkele misschien.. een keer per het kwartaal.	1	Wettelijke druk: controles
ME1	Ja, maar het is wel zo, je valt gauw tussen wal en schip als je een klein bedrijf bent. Dus in die zin is de focus niet echt op het kleine bedrijf. Eeh, ik krijg daar binnenkort nog wat informatie over. Maar je moet dus eh, ehm, eh de, omgevingsdienst die gaat controleren wat je de afgelopen 10 jaar gedaan hebt, aan investeringen gedaan hebt met betrekking tot duurzaamheid.	1	Wettelijke druk: controles
FO2	Daarom is het, als je het over normen hebt, is het niet zo zeer van dat we het wenselijk vinden om bepaalde dingen te veranderen maar worden we er gewoon toe verplicht. Dus bij voorbeeld als er een nieuw proces of een nieuw apparaat ontwikkeld wordt en het verdient zich geen eh in drie of vijf jaar terug, dan zijn wij eigenlijk haast gedwongen om dat te gaan doen, of wij dat willen of niet.	1	Wettelijke druk: afdwinging

FO2	Want wat [persoon A] ook zei, wij moeten dat ook elk jaar naar de gemeente rapporteren, dus dat milieueffecten rapportage.	1	Wettelijke druk: rapportages
FO2	Ja, dat heeft gewoon te maken met de grootte van het bedrijf, dat ja daartoe verplicht bent. Dus we moeten elk jaar, elk jaar moeten wij een milieuverslag indienen. En ze kwamen ook controleren, he. Elk jaar komen ze dus ergens in het jaar komen ze een rondje maken, en dan lopen ze met een iPadje rond en vullen ze alles gewoon in. Dus controles en rapportage inleveren, daar zit best wel wat werk in hoor.	1	Wettelijke druk: rapportages en controles
FO2	Ja, dus die willen echt de documenten zien en die willen echt het verslag zien, want ze hebben volgens mij vanuit de industrie hebben ze een standaard document opgezet met best practices of zoiets mogelijkheden. En, ja ik geloof dat dat een bulk is van een pagina of 15 en daar staan alle mogelijke energiebesparingen, en de mogelijkheden staan erin, en die vinken ze af en bij ieder puntje moeten we zeggen van wel of niet, en waarom dan niet, weet je wel..	1	Wettelijke druk: rapportages en controles (Wet Milieubeheer)
WO1	Dat betekent heel simpel dat je allerlei formulieren moet invullen en dat je processen en structuren op orde moet hebben. Nou dat hebben we, daaraan voldoen we. En dat betekent dus dat je gewoon voor jezelf in de gaten moeten houden van goh hoeveel energie verbruik je en hoeveel verspil je in feit.	1	Wettelijke druk: rapportages
WO1	nouja heel simpel die controle vindt plaats op het hout dat wij inkopen. PFC en FSC gekwalificeerd hout dat moet voldoen aan de regelgeving, dus af en toe zijn daar steekproeven.	1	Wettelijke druk: controles
WO1	Als bedrijf kun je bepaalde risico's gewoon niet accepteren. Op het moment dat wet- en regelgeving gewoon is dat dit moet gebeuren, dan moet je dat gewoon heel simpel doen of je krijgt een boete en als die boete als dat een tientje is dan is dat te overzien, maar als die 10.000 euro is dan wordt dat al heel anders. Tuurlijk de kans bestaat dat je je bedrijfsproces moet stil leggen, nou jongens dat risico wil je toch überhaupt niet lopen. En dat willen wij ook niet.	1	Afweging financiële belangen en wettelijke druk
MA2	En ehh maar voor de rest, ik ben me, ik ben me van geen controles bewust, laat ik het zo zeggen er komt niet hier iemand fysiek controleren hoe veel energie of gas je nou gebruikt hebt.	1	Wettelijke druk: controles en rapportages
MA2	Zodra je wettelijk, zodra je vanuit de wetgeving iets moet doen, dan doe je dat. Ja oké, daar wordt geen boete geriskeerd? Nee.. nee, dat past niet bij onze bedrijfsfilosofie, totaal niet. Heel veel andere bedrijven zullen dat wel doen.. dus zien we heel veel grote voorbeelden van.	1	Afweging wettelijke druk en financiële belangen
PV1	Wij zijn een duurzaam bedrijf, wij worden niet zozeer gecontroleerd door de overheid, maar door de spelers in de hele markt, daar wordt wel naar gekeken.	1	Wettelijke druk: weinig afdwinging
TE1	Dat is dus een wettelijke verplichting, we worden zelfs in de gaten gehouden, er wordt gehandhaafd op het plan dat we ingediend hebben, dat ook uitvoeren, dus dat betekent elk jaar hebben we een soort stappenplan en elk jaar betekent zo 100.000 euro investeren. En als we dat niet doen, worden we op onze vingers getikt, maar het helpt wel ook, want op die manier het is leuk de wettelijke verplichting, maar als hier de boel in de fik vliegt, dan	1	Wettelijke druk: verplichting en handhaving

	zeten wij zeker zonder werk, maar misschien nog wel het hele bedrijf wel.		
TE1	Ja er zit enorm veel druk op kosten, als het moet dan moet het en doen we het ook, maar als het ff niet hoeft en we kunnen het uitstellen, dan moeten we wel een hele goede businesscase hebben en als de businesscase er is, dan krijg je het geld ook wel. De businesscase kan zijn: het moet of het verdient. Als het verdient, dan zijn we gek, want ja weet je wel, maar als het er een beetje om spant, dan wordt nog wel eventjes de vraag gesteld of het echt al moet.	1	Wettelijke druk en financiële belangen
TE1	Dan komen we wel met die lijsten erkende maatregelen, die zijn onderdeel van de audit. Ja die moeten we gewoon langsgaan en als het erin zit dan moeten we het doen. Dan moeten we wel een goede reden hebben dat het niet kan of dat het toch geen vijf jaar terugverdientijd is, dus dat moeten we gewoon uit gaan zoeken	1	wettelijke druk: rapportering
TE1	En ze vragen keurig inderdaad van 'joh, waarom heb je die maatregel niet gedaan?'. Nou omdat die uiteindelijk als je hem in detail doorrekende, ja die maatregel verdiende zich toch niet terug. Ehm, maar bijvoorbeeld er stond in ons rapport dat LED-verlichting meer dan vijf jaar terugverdientijd had, maar hebben we gerekend, van ja dat kunnen we wel binnen vijf jaar krijgen. En dat komt dan op onze investeringslijst te staan. Dat gaan we wel doen, dus dan wisselen we ze om.	1	Wettelijke druk en energiebesparingsmaatregelen (wet Milieubeheer) / financiële belangen
NM1	Dan ben je dus ook door die wetgeving gedwongen om wel te investeren, maar natuurlijk dat zijn wel grote bedragen en de ene ondernemer kan dat wel maar er zijn ook ondernemers die dat niet kunnen.	1	Wettelijke druk en investeringen / financiële belangen
EL1	Je hebt controles vanuit de certificaten die wij hebben. Maar goed, dat is onze eigen keuze. Je hebt een certificaat, dan krijg je daar ook een toetsing op. En je hebt vanuit provincie en gemeente je controles. De controles die we de laatste jaren gehad hebben, is een op energiebesparende maatregelen doen de odbn: omgevingsdienst brabant noord, hier in opdracht van de gemeente. Die hebben wij gehad, daar kom je redelijk makkelijk, want je data heb je beschikbaar.	1	Wettelijke druk: controles
EL1	Wettelijk druk moet gewoon. Als wij aan kunnen tonen dat de Nederlandse wetgeving vereist dat bepaalde zaken moeten doen, ja goed, dan heb je natuurlijk een hele andere insteek. Een van de zaken vanuit de CSR roadmap is compliance, op alle vlakken. Dat staat boven aan, compliance aan wet en regelgeving staat bovenaan, dus..	1	Wettelijke druk en financiële belangen

Quotes about financial and economic (green) interests

ID	Quotes	Relevantie score	Open codering
PA1	Dus naast de overheid, die ons steeds beperking oplegt en steeds maatregelen een aanvullende maatregelen oplegt om energie te besparen. Is er dus ook financieel zeg maar, dat is ook een van die dingen die dus ook altijd meespeelt en misschien wel nog op plaats 1 staat. Financiën zijn heel belangrijk zeg maar, en nu nog meer belangrijk geworden nu we Amerikaans zijn. Kijken we weer veel meer naar financiën.	1	Druk vanuit overheid en financiële belangen
PA1	Prijs, winst, dat zijn wel hele belangrijke dingen, ja. De kostprijs van je papier naar beneden brengen, dat is een van de belangrijkste drijfveren, en voldoen en de wet en	1	Financiële en economische belangen

	regelgeving. In ons beleid staat ook wij voldoen aan de wet en regelgeving, dus dat is ook een hele belangrijke. En met de komst van de Amerikaanse eigenaar is ook het financiële verhaal wordt steeds belangrijker, omdat het ook beursgenoteerd is. We hebben de financiële afdeling uitgebreid met twee mensen alleen om aan dat soort rapportages te voldoen. Dus financiën is heel belangrijk.		
MA1	We hebben een streven om bij alle pompen een zo hoog mogelijk rendement te ontwerpen, zodat je zo min mogelijk energieverlies hebt, maar dat is natuurlijk ook commercieel. Dus ja dat is ook in de strijd om je orders te krijgen en de beste te blijven in de markt.	1	Economische belangen
FO1	En ik denk dan voor 2020 zal meer zeg maar het milieugedeelte erbij komen, waar die persoon zich dan zeg maar meer zal richten op duurzame productie, en nu is dat denk ik meer ontstaan vanuit ja kijk eens naar andere technieken en het is dus heel interessant dat je, ik denk dat er vestigingen zijn die heel snel zeg maar, nou dan praat ik best wel hoge bedragen, die denk ik wel 25% kunnen besparen op hun lozingskosten om gebruik te maken van CO2, dus het is eigenlijk een gecombineerde samenwerking, aan de ene kant is het kosten gedreven, maar aan de andere kant zijn de milieueffecten natuurlijk een stuk kleiner, dus het is vaak een synergie tussen die twee	1	Energiebesparingsmaatregelen en financieel belang
FO1	Maar onze klanten interesseert dat helemaal niks. Die vraagt alleen maar "wat kost het?". En zeg je ja maar je kan het beter produceren maar dan kost het een cent meer, zeg ie nee nee nee, dat gaan wij niet doen.	1	Economische en financiële belangen en duurzame (proces)innovatie
FO1	Ja als het voor ons kosten bespaart, is het natuurlijk makkelijk om te doen. Als het kostenneutraal is het ook geen issue, dan kan het makkelijk. Als het duurder wordt, dan moet het eigenlijk meer naar mijn klant toe, en mijn klant zegt ja ik ben niet bereid om het te betalen, ja dan wordt het wel een lastig pakket.	1	Financiële en economische belangen
FO1	Ja die zijn zeker denk ik wel van belang, in zo'n geheel project. Omdat het denk ik vaak niet alleen door duurzaamheid gedreven wordt maar ook vanuit andere aspecten. Kijken natuurlijk weer onderaan de streep, wat kun je daaraan overhouden. Wil niet altijd zeggen dat het geen geld mag kosten. Er kan een goede reden zijn dat het best geld mag kosten hier om betere positie in de markt te kunnen krijgen. Maar dat ligt vaak bij ons wel mat moeilijk omdat het geen consumentenproduct is.	1	Afweging financiële en economische belangen en duurzaam innoveren
FO1	En als een afweging gemaakt moet worden tussen financiële belangen en energiebesparingsmaatregelen of duurzame technologieën? Dat is lastig.. ik denk wel dat het bij ons op de agenda staat maar inderdaad misschien wel als je het allemaal op een rijtje zet misschien wel wat meer naar onderen zeg maar omdat, we zouden het soms wel willen maar we zeggen dan als je dan inderdaad meer geld zou moeten vragen voor je product, en de klant zegt ja ik weiger dat te betalen..	1	Afweging financiële en economische belangen en duurzaam innoveren
ME1	Denken in kosten en voordeel, dan ga je die verduurzaming meenemen in je oriëntatie.	1	Afweging financieel belang en duurzame innovatie/energiebesparing
FO2	ja bedrijfseconomisch... ja als je een terugverdientijd van 20 jaar hebt, dan ja dat is niet te doen, dus het is eigenlijk altijd	1	Financiële en economische belangen

	een beetje een spagaat waar wij in zitten, maar ja merkt wel dat wij wat, in vergelijking met vroeger zijn wij daar wat meer open in geworden en houden we daar wat meer rekening mee, zeiden wij bij voorbeeld in het verleden van ja het moet binnen drie jaar terug verdiend zijn, dan zeggen wij nu ook van ja vijf jaar, zes jaar vinden wij dan ook wel acceptabel als dat dan beter voor het milieu, beter duurzaamheidsfactor heeft.		
FO2	En uiteindelijk is het zo dat de klant, die bepaalt het want is men ook bereid om daar dan iets meer voor te betalen, want daar komt het toch best vaak op neer, we willen graag dat jullie dit doen en zo zo zo, kunnen we allemaal wel maar dat betekend ook kostenverhoging, en is die klant dan ook bereid om daar dan ook een kleine premie voor te betalen?	1	Afweging financieel/ economisch belang en duurzame innovatie of energiebesparing
FO2	Nou we hebben daar best wel.. laat het maar zo zeggen: we hebben daar best wel geld voor over, maar ja uiteindelijk moet deze schoorsteen ook nog langer roken. Dus wij kijken echt wel bij de investeringen, wat [persoon A] ook zei, het moet wel in een redelijke termijn terug te verdienen zijn.	1	Afweging financieel/ economisch belang en duurzame innovatie of energiebesparing
FO2	Ja, dat mag wel wat geld kosten maar niet dat dat nou een heel substantieel deel is. Wij hebben ook gewoon met ons concurrenten te maken, en onze concurrenten zitten niet alleen in Nederland waar duurzaamheid heel hoog in vaandel staat maar in andere delen is dat nog helemaal geen item. Dus dan moet je, je moet wel je concurrentiepositie in oog houden.	1	Financiële en economische belangen
WO1	Het zou namelijk veel handiger zijn als je daar een chip in kan zetten eh waardoor je gewoon bij wijze spreken weet nou van die tienduizend pallets staan er 894 daar en 321 ergens anders. Nou daar zijn we bezig om proeven te doen, om te kijken joh, technisch is dat geen enkel probleem. Alleen het probleem is dat er nog geen klant is die daarvoor wil betalen. Want dat betekent dat die pallet in een keer twee keer zo duur wordt omdat die chip erin geplaatst moet worden.	1	Duurzame maatregelen en financiële belangen
WO1	Want iedere pallet die op een of andere manier verloren gaat moeten wij herstellen en moeten wij een nieuwe voor in de plaats komen. Nou kijk wij hebben liever dat ze 10 jaar in circulatie blijven want dat levert meer op.	1	Duurzame maatregelen en economische belangen/voordelen
WO1	En daarop gebaseerd koppelen we het aan people, planet en profit. Heel simpel, profit: wij zijn een bedrijf, als wij geen winst maken, in ieder geval op langere termijn, kunnen we niet voortbestaan, maar we zijn wel een familiebedrijf. Dus dat betekent dat bij ons niet de focus ligt op korte termijn score, maar meer op lange termijn focus.	1	Afweging financiële belangen en duurzame innovatie
WO1	Dus als je kijkt naar eh afweging van financiële belangen en duurzaamheid, hoe gaat die afweging? Gaat hand in hand met elkaar, ehm en kom ik weer terug op dat familieaspect. Heel simpel als het bedrijfseconomisch niet rendabel is, gaan we het niet doen, tenzij we denken dat het op lange termijn toch rendabel te maken is.	1	Afweging financiële belangen en duurzame innovatie
MA2	Want alle bedrijven uiteindelijk... he, duurzaamheid is hartstikke mooi, en we willen ook best gaan doen, maar het mag geen cent meer kosten.	1	Economische en financiële belangen en duurzame innovatie
MA2	We weten dat het speelt en dat het steeds belangrijker is maar, als je ook kijkt naar onze grote concurrenten in de wereld, wij lopen qua dat ook gewoon ver voorop, en dat is ook bewust. We willen ons daar mee ook onderscheiden. Dat is de reden dat [Bedrijf I] bij ons komt. Omdat wij ook dezelfde, omdat wij die visie hebben, wij verkondigen die visie ook overal, in symposia, congressen en beurzen over de hele wereld. En dat proberen we continu ook te doen.	1	Economische belangen en duurzaamheid

MA2	Een van de grote uitdagingen is duurzaamheid financieel haalbaar maken, dat lukt bijna niet. Dat kun je alleen maar op doen, op het moment dat je daadwerkelijk de kosten van de vervuiling daadwerkelijk ook gaat doorbelasten. En dan kun je businesscases uitrekenen. Is de enigste manier waarop je dat kunt. De CO2 moet je gewoon gaan beprijzen. Dat gebeurt nu heel beperkt maar dat zullen ze veel meer moeten doen.	1	Afweging financiële belangen en duurzame innovatie
MA2	Ja.. nummer een is geld, nummer twee is waar maken voor wat je belooft. Nummer drie is veiligheid is een hele belangrijke, zeker bij de olie en gasindustrie.	1	Financiële en economische belangen
MA2	Maar uiteindelijk, het heeft allemaal te maken met verdienmodel, terugverdiëntijden en dergelijk, want alles wordt afgerekend op terugverdiëntijden	1	Financiële belangen
PV1	En dan ja onze klanten dat sporen wij ook aan, omdat ze dus beter na te denken over de wetgeving en verspreiden van hun profielen en hun raam te maken. Dus uiteindelijk proberen we onze klanten zo sustainable mogelijk te maken. Maar goed dat wij zijn sustainable en willen het belang om sustainable te zijn wel goed in laten zien.	1	Duurzaamheid binnen bedrijf, economische voordelen
PV1	Ik denk dat financieel, sustainable zijn, heeft dan ook een voordeel, want ik denk dat onze fabricage voorbeeld. Daar wordt materiaal gemaakt voor ons productieproces, wij hopen dus altijd minder afval te krijgen bij externe suppliers en bedrijven verantwoordelijk te houden. Dus dat is een financieel voordeel.	1	Economische belangen en duurzame- en energiebesparings maatregelen
PV1	Doordat wij als verminderen, hebben wij minder stroom en. Dat is dan ook een financieel voordeel. En ja dan energieverbruik, hoe minder dat je verbruikt, hoe beter financieel plaatje dat is.	1	Financiële belangen en duurzame- en energiebesparingsmaatregelen
PV1	Maar ja, dat zijn ook andere investeringen, maar die investering als je die doet, die moet wel gedragen worden. Ja maar ook die return on investment is zeker wel belangrijk ja, anders wordt het onmogelijk.	1	Afweging financiële belangen en duurzame maatregelen
TE1	We hebben een A-product, komt er ineens een B-product. Ja als dat product net zo goed is als dat A-product, hoe vlieg je dat aan. Dus je moet echt andere markten, andere toepassingen ehm en daar hangt alles van af. We gaan terug: beursgenoteerd bedrijf, dus alles wordt financieel doorgerekend.	1	Economische en financiële belangen
TE1	Maar zit daar geen wettelijke verplichting achter, dan gaan we wel naar 2, 3 jaar en dat hangt er een beetje van af. De belangrijkste driver is gewoon de hoeveelheid kapitaal die beschikbaar is. He dus eh, dan kan het nog steeds binnen 3 jaar terugverdiend zijn, maar als het er niet is, dan houdt het op.	1	Financiële en economische belangen en duurzame maatregelen
NM1	Dus ik denk dat daar ook wel die bottleneck zit om de betaalbaarheid, dat is ook wel een ding. Technisch kun je van alles, en ik heb ook met klanten te maken en als zij zeggen, dit is de marktprijs, want eigenlijk zijn het gewoon marktprijzen.	1	Duurzame maatregelen en financiële belangen
NM1	Want alle andere aanbieders doen het op bepaalde manier en dat bepaalt toch je marktprijs, dan kun je wel zeggen we kunnen het nog veel mooier maken, nog schoner en duurzamer, maar als die klant zegt heel fijn maar ik kijk toch naar die marktprijs, dan is je bedrijfsmodel gewoon voorbij.	1	Financiële en economische belangen
NM1	Maar van dat certificaat naar de klant, dat de klant zegt heel mooi dat jullie dat doen, dat ik daar ook wat meer voor ga betalen. Dat is nog wel lastig, maar je wel eindelijk nu daar verschil in merkt. Dat kruist dan ook wel die wet en	1	Economische en financiële belangen en duurzaamheid

	regelgeving. De klant is nu ook wel bereid, het kost natuurlijk ook allemaal geld.		
EL1	als je <i>niet</i> werkt aan duurzaamheid, wat dat dan voor economische impact heeft. Dat is eigenlijk gigantisch. Als je daar niks aan doet, als je zegt van, ik ben alleen maar geïnteresseerd in zo efficiënt mogelijk, en zo goedkoop mogelijk in de markt, en duurzaamheid interesseert me niets, ik doe daar niks aan, even los even van de druk, maar als beursgenoteerd kom je daar niet meer mee weg. En dan heb je het over een economisch motief, nou dat is het.	1	Economische belangen voor duurzame maatregelen
EL1	ik weet niet hoe het nu zit, moet je me corrigeren als ik fout zit, maar als je gewoon kijkt naar investeringen is het vaak binnen 2 jaar terug verdiend kun je het wel doen, krijg je daar wel goedkeur op, voor duurzame investeringen hebben ze het opgerekt naar 4, 5 jaar. Als je een investering wilt doen, he, bijvoorbeeld een ton, en je kunt aantonen dat de binnen 4, 5, jaar terugverdiend is, mag je het ook doen. Om het bedrijf de mogelijkheid te geven, want heel vaak is 2 jaar gewoon te kort, om toch die duurzame investering te kunnen doen. Maar gedreven vanuit de regelgeving vanuit de groep, kijken naar terugverdiendtijd. Daar moeten we gewoon al voldoen	1	Financiële belangen en duurzame maatregelen
EL1	He, kijk en de druk, die regeldruk, die komt ergens vandaan maar dat betekent wel dat, als je een investering wil doen die terug te verdienen is, dan heb je financieel een gezond bedrijf die daar achter kan staan en die ook de middelen ter beschikking kan stellen. Dus je hebt wel, je hebt wel iets achter je staan om te zorgen dat je als bedrijf zijnde in de toekomst kunt groeien.	1	Financiële belangen en duurzame maatregelen
MO1	Als iemand zegt van; ja, wij hebben een veel zuinigere machine die levert nog 1 Kwh per jaar minder op. Ja dat is leuk, dat is een kwartje, die kost dan 4 miljoen extra. Dan houdt het wel ergens op natuurlijk, maar in het merendeel van de gevallen, zie je dat soort zaken vrij snel meewerken.	1	Financiële belangen en duurzame maatregelen
MO1	iemand die onze vrachtwagens gebruikt die is altijd zeer interesseert dat hij zo min mogelijk vervuילend is, zo min mogelijk CO2 uitstoot, want verbruikt hij namelijk minder diesel en diesel is een derde van zijn kosten. Zijn kosten zijn dan gewoon lager en dan houdt hij meer over. Dat is een stuk, wat al tientallen jaren loopt en dat loopt altijd gewoon door. Als je daar naar kijkt is dat een race waarbij je bezig blijft om te blijven besparen	1	Economische belangen
MO1	En dus is er eigenlijk niet zo'n klimaat om business cases te ondersteunen en daar naar te kijken. En dat is eigenlijk wel heel belangrijk, dus als jij praat over met verschillende mensen over mensen van waarom investeren ze, dan uiteindelijk investeert iedereen om er iets voor terug te krijgen.	1	Financiële en economische belangen en duurzame maatregelen

Annex 3 Assumptions regression analysis

Sample size

As a bare minimum, there should be 20 bases per independent variable. The conducted analysis consists of three independent variables, namely policy awareness, policy enforcement and financial and economic green interests). As already mentioned, the conducted regression analysis is based on Fu's database. Therefore, the sample size is quite large with 861 valid cases. This means that the rule of thumb for sample size is duly met.

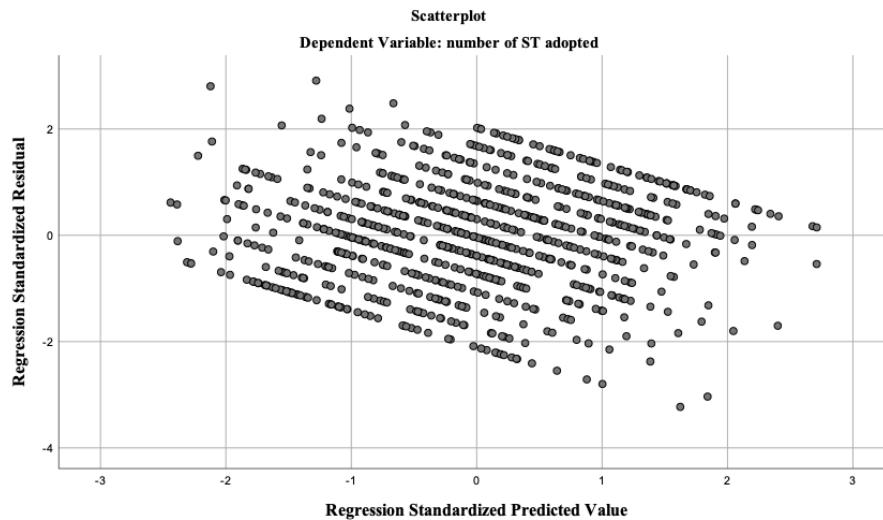
Constant variance of the error terms

Variances should be equal, in other words, they should be homoscedastic. Homoscedasticity can be examined via a scatterplot or with the Levene test for homogeneity of variance (Hair et al., 2014, p.181). Looking at the scatterplot (**Figure 4**), there is no deviating pattern. All lines are equal. It seems that there is an equality of variance in the data.

Linearity

The linearity of the relationship between dependent and independent variables represents the degree to which the change in the dependent variable is associated with the independent variable (Hair et al, 2014, p.179). The linearity can be examined through a residual plot. In the residual plot, there is no clear pattern or deviation visible, except for the fact that there is a bottom and sealing effect. In the bottom left corner and top right corner there are no observations. This effect is acceptable, because the scale has a minimum and a maximum, and there are no lower or higher observations possible.

Figure 4 Res-Pred Scatterplot



Multicollinearity

Multicollinearity can be checked in three ways. First, all correlation coefficients in the analysis need to be smaller than 1. This rule is met, no correlation coefficients come close to 1 (**Table 11**). Second, the tolerance values should be higher than 0.1. This requirement is also met, because all tolerance values are above 0.4, most of them even above 0.8 (**Table 11**). This accounts for all four models in the regression analysis. A last way to check for multicollinearity is with the Variance Inflation Factor (VIF). The values of the VIF should be below 10. All values are well below 10 for all variables (**Table 11**). In conclusion, there is no multicollinearity, so this assumption is fulfilled.

Table 11 Tolerance and VIF values

Variable	VIF	Tolerance
Economic Relative advantage	1.892	0.529
Policy awareness	1.695	0.590
Policy enforcement	1.740	0.575
Policy awareness*economic advantage	1.354	0.739
Policy enforcement*economic advantage	1.286	0.777

Independence of error terms

No correlation between errors in the data, the error terms should be independent. The Durbin-Watson test measures the correlation between error terms and their immediate predecessors. The Durbin-Watson statistic ranges from zero to four, where values close to 2 tend to be

independent. The Durbin-Watson statistic is 2.048 (**Table 5**), so really near to the perfect value of 2. In conclusion, the assumption of independence of error terms is fulfilled.

Annex 4 Correlations table

Pearson Correlation

	AST	China	Iron	Pulp	Chem.	Food	Non-metallic	Petrol	Non-ferrous	Other
Adoption Sustainable technology China	1.000	.240***	-.041	.075**	.081**	-.007	.020	.003	.021	-.076*
China	.240***	1.000	-.231***	.086*	.078*	-.085**	.107**	.094**	.119***	-.217***
Iron	-.041	-.231***	1.000	-.076**	-.091**	-.101**	-.080**	-.061**	-.067*	-.204***
Pulp	.075*	.086**	-.076*	1.000	-.066*	-.074*	-.058*	-.045*	-.059	-.149***
Chemical	.081**	.078*	-.091**	-.066*	1.000	-.088**	-.070*	-.053	-.059*	-.178***
Food	-.007	-.085**	-.101**	-.074*	-.088**	1.000	-.078*	-.060	-.065*	-.198***
Non-Metallic	0.20	.107**	-.080**	-.058*	-.070*	-.078*	1.000	-.047*	-.052	-.157***
Petrol	.003	.094**	-.061*	-.045	-.053	-.060*	-.047	1.000	-.040	-.120***
Non-ferrous	.021	.119***	-.067*	-.049	-.059*	-.065**	-.052	-.040	1.000	-.132***
Other	-.076*	-.217***	-.204***	-.149***	-.178***	-.198***	-.157***	-.120***	-.132***	1.000

	Size_75	Size_175	Size_375	Size_750	Size_1000p	Economic rel. advantage	Policy awareness	Policy enforcement	iCOawP Rec	iCOenP Rec
Adoption Sustainable technology China	-.093**	-.011	.053	.228***	.183***	.373***	.482***	.436***	-.060*	-.019
China	-.072*	.072*	.091**	.152***	.191***	.397***	.382***	.333***	-.115***	-.004
Iron	-.012	-.057*	-.048	-.032	.026	-.079*	-.117***	-.026	.089**	.026
Pulp	-.032	.000	-.009	.017	.035	.076*	.066*	.051	-.022	-.029
Chemical	-.043	.022	.044	.067*	-.018	.062*	.056*	.037	-.055	-.013
Food	-.004	-.001	.056*	-.028	-.031	-.067*	-.054	-.017	-.041	-.072*
Non-Metallic	.034	.011	.013	.043	-.045	.020	.044	.050	-.037	-.017
Petrol	-.059*	-.010	-.013	.006	.135***	.027	-.013	.046	.115***	.095**
Non-ferrous	-.041	0.28	-.008	.035	.077*	.045	.066*	.053	.023	.053
Other	.007	-.034	-.026	-.038	-.035	-.097**	-.063*	-.082**	.016	.003

	AST	China	Iron	Pulp	Chem.	Food	Non-Metallic	Petrol	Non-ferrous	Other
Size_75	-.093**	-.072*	-.012	-.032	-.043	-.004	.034	-.059*	-.041	.007
Size_175	-.011	.072*	-.057*	.000	.022	-.001	.011	-.010	.028	-.034
Size_375	.053	.091**	-.048	-.009	.044	.056*	.013	-.013	-.008	-.026
Size_750	.228***	.152***	-.032	.017	.067	-.028	.043	.006	.035	-.038
Size_1000p	.183***	.191***	.026	.035	-.018	-.031	-.045	.135***	.077*	-.035
Economic relative advantage	.373***	.397***	-.079*	.076*	.062*	-.067*	.020	.027	.045	-.097**
Policy awareness	.482***	.382***	-.117***	.066*	.056*	-.054	.044	-.013	.066*	-.063*
Policy enforcement	.436***	.333***	-.026	.051	.037	-.017	.050	.046	.053	-.082**
iCOawPRec	-.060**	-.115***	.089**	-.022	-.055	-.041	-.037	.115***	.023	.016
iCOenPRec	-.019	-.004	.026	-.029	-.013	-.072*	-.017	.095**	.053	.003

	Size 75	Size 175	Size 375	Size 750	Size 1000p	Economic rel. advantage	Policy awareness	Policy enforcement	iCOawPRec	iCOenPRec
Size_75	1.000	-.256***	-.180***	-.151***	-.215***	-.119***	-.076*	-.064*	-.048	.005
Size_175	-.256***	1.000	-.200***	-.169***	-.239***	.013	.045	-.043	-.052	-.067*
Size_375	-.180***	-.200***	1.000	-.118***	-.168***	.090**	.079*	.106**	-.073*	.008
Size_750	-.151***	-.169***	-.118***	1.000	-.141***	.151***	.139***	.162***	.034	.008
Size_1000p	-.215***	-.239***	-.168***	-.141***	1.000	.180***	.205***	.161***	.044	-.016
Economic relative advantage	-.119***	.013	.090**	.151***	.180***	1.000	.509***	.597***	-.148***	-.184***
Policy awareness	-.076*	.045	.079*	.139***	.205***	.509***	1.000	.477***	-.256***	-.049
Policy enforcement	-.064*	-.043	.106**	.162***	.161***	.597***	.477***	1.000	-.043	-.082**
iCOawPRec	-.048	-.052	-.073*	.034	.044	-.148***	-.256***	-.043	1.000	.409***
iCOenPRec	.005	-.067*	.008	.055	-.016	-.184***	-.049	-.082**	.409***	1.000

*p<.05; **p<.01; ***p<.001