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Energy Transition:
External Communication towards a more sustainable logistics sector in Europe

An examination of logistics groups' and European policy-makers' communication

Bachelor Thesis
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University of Twente, 28-06-2019

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Abstract

Objectives: Given the ongoing energy transition in Europe, this study examines external communication on behalf of two main stakeholders in the energy transition, policy-makers and businesses. As a business stakeholder, internationally operating logistics groups are examined. On the contrary, as the stakeholder of European policy-makers the EU member states are taken into consideration. The study seeks to see which aspects towards the energy transition in the logistics sector are communicated, and which communicated topics indicate the highest difference between the stakeholders. In order to establish the energy transition in the European society, main stakeholders from business like the logistics groups, and policy-makers should dedicate themselves towards the same goals.

Method: The study examines two means of external communication on behalf of the stakeholders. The first document type is the corporate social responsibility (CSR) report of major logistics groups. The second one is the draft of the National Energy and Climate Plan (NECP) on behalf of each EU member state. The total number of documents was 42 (N=42), thereof 28 (N=28) National Climate and Energy Plans and 14 (N=14) corporate social responsibility reports of the logistics groups. Both types of documents have been coded and resulted in 50 addressed aspects and 12 topics.

Results: The main communicated aspects of the CSR reports were 'Analysis of Energy consumption in logistics sector', 'Promotion of energy efficiency', and 'Statements about Energy consumption'. Next to that, the main aspects of the NECPs have been 'Promotion of rail logistics', and 'Introduction of alternative fuels'. Regarding the difference in communicated topics between the two stakeholder communications, 'Alternative logistics modes', 'Efficiency Aspects in logistics', and 'Energy Transition' were the main findings.

Conclusion: It became apparent that the stakeholders communicate in rather classical way. Meaning that, on the one hand the logistics groups concentrate on the communication of energy transition aspects, which aim towards the establishment of economic benefits. On the other hand, the policy-makers communicate financially demanding plans such as logistics mode shifts from road to rail. Moreover, it undisputed that both stakeholders have to join forces in order to establish the energy transition in Europe.

Recommendations: Both stakeholders have to join forces in order to enhance the energy transition in the logistics sector. A common platform for stakeholders communication about plans, energy transition outcomes, and financial assets should be established on a European basis.

1. Introduction

The supply of energy is emerging as a central aspect while debating about a society's further sustainable development. Thereby, a number of undesired symptoms of unsustainability, connected to the current energy systems have contributed to rethink current energy systems. Just to name a few examples, air polluting emissions and climate change, the instability of oil producing regions, and exhaustibility of natural resources such as coal or gas. It has become clear that a change in energy systems and its supply, referred to, as the energy transition is necessary to overcome these unsustainability symptoms (Loorbach, 2007). With the sustainable transformation of energy systems, large jumps in environmental efficiency may be possible (Weaver, Jansen, Grootveld, van Spiegel, & Vergragt, 2000).

The Energy Transition as a socio-technical change

It was long common among political leaders that they showed high faith in technical fixes to environmental and societal challenges such as the climate challenge. The former US-president, George W. Bush still stated in a 2007-speech that the greater use of carbon capture and storage, nuclear power and other technologies will help overcome major economies' climate and energy supply challenges. In recent years however, the construct of the energy transition as a socio-economic transition process has gained importance in theory and practice. Most major economies have adapted the point of view that the energy transition is a social at the same time technical challenge (Scarse & Smith, 2009).

Accessing the social-technical nature, the process of the energy transition has increased in complexity. Accordingly, complexity makes the process subject to theories, such as the complexity theory. This theory tries to unravel complex interaction patterns between stakeholders in a societal context. In its light, socio-technical transitions and its impact on different systems within the society can be examined (Loorbach, 2010). Here, social science has gained both, theoretical and practical relevance in the energy transition as a socio-technical change. Moreover, social science can help to more suitably grasp the transformation process and enable an interaction between broader social, technical, and economic structures (Rohracher, 2008).

Examining two stakeholders of the Energy Transition

In a socio-technical process like the energy transition, the vast number of stakeholders is originating from different structures and backgrounds. Also the interests of different stakeholder groups in the process might be completely different (Leewis & Aarts, 2011). Nevertheless, stakeholders need to collaborate in order to archive the goals of the energy efficiency.

Especially actors from a business context and policy-makers are following different interests in the process of energy transition. Businesses seek to increase their profit and efforts; actions towards the energy transition might hinder this goal. Changes due to the energy transition are more likely to directly effect business sectors, which have a high-energy consumption. The logistics sector does have a high energy consumption and is therefore subject to change. With the pressure to more

sustainability and energy transition efforts, a dilemma arose for the logistics sector. On the one hand, an increased capacity demand in logistics operations is observable. On the other hand, tight sustainability requirements have been implemented over the last years (Dima, Grabara, & Modrak, 2014).

Many of the sustainability requirements are stemming from policy-makers, who urge the logistics sector to comply with the energy transition. Concerning this, the EU has adopted several policies to pressure businesses to act in a sustainable way (Neto, Bloemhof-Ruwaard, van Nunen, & van Heck, 2008). Therefore, policy making on a European level is an important measure to consider in the energy transition on the European continent (Lenschow, 2002).

Communication in the energy transition in the logistics sector

This study tests whether both stakeholders, policy-makers on a European level and actors in the European logistics sector communicate different aspects and topics towards the energy transition. For that, two means of external communication documents are taken into account.

On behalf of the logistics business stakeholder this is the document type of corporate social responsibility (CSR) Reports, issued by major logistics companies, operating in Europe. The reports are representing the channel through which the logistics groups are communicating social and environmental aspects (Tate, Ellram, & Kirchoff, 2010). With their CSR reports, the logistics groups are urged to respond to an increasing customer demand for environmentally friendly products and services. Besides this, in most CSR reports the alignment with environmental policies and social responsibility is addressed (Wu & Dunn, 1994).

Next to that, the recently issued National Energy and Climate Plans (NECPs) of the member states of the European Union (EU) are examined as a channel of communication. The examined documents are in their draft version and had to be handed in on December 31st 2018. All NECPs are describing plans of the national energy regarding the years 2021-2030. The final version however needs to be handed in December 31st 2019. The focus of the NECP lies on five central dimensions; 'decarbonization', 'energy efficiency', 'energy security', 'internal energy market' and 'research, innovation & competitiveness'. The document type also includes indications about the energy topics and energy transition aspects regarding the logistics sector. Due to the prescriptive nature of the document type and the importance of the EU as a policy-maker in the energy transition, the document type is considered a suitable source of data.

On behalf of the two actors, both types of data are communicating certain aspects and perspectives on the energy transition in the logistics sector. Thus, study's first central research question is:

RQ1: What are the communicated aspects referring to the energy transition in the logistics sector by two stakeholders?

The research question is aimed to answer by means of the research method of a summative content analysis. The method seeks to understand the contextual use of words and content of the documents. Thereby, the method goes beyond mere word count and includes the interpretation of content. The method's focus lies on discovering the underlying meanings of the content (Hsieh & Shannon, 2005).

The identification of the most frequently communicated aspects of both communication channels serves for the second part of the study. This part of the study seeks to compare communicated topics of the two actors, the EU as policy-maker and the logistics groups. Here, several similar communicated aspects are making up a topic of the energy transition in the European logistics sector. Therefore, the second central research questions is:

RQ2: What differences in communicated topics are observable between the two stakeholders, concerning the energy transition in Europe's logistics sector?

Theoretical and practical relevance of the findings

Based on the results of *RQ1* the communicated aspects of two main stakeholders are becoming visible. Accordingly, the communicated aspects entail visions, perspectives, and plans on the energy transition in the European logistics sector. This could serve as an indicator on how the further way of the energy transition might look like. Understanding the plans and motives of two main stakeholders could help to enhance the process of the energy transition in this particular business sector. However, a comparable content analysis could also be applied to other business sectors that are affected by the energy transition. Respecting the different nature of the two means of communication, the CSR reports and the NECPs, the results can be discussed according their relevance to the European energy transition. Moreover, the role, motives, and perceived honesty of CSR reports in this case, could be a suitable subject for further research.

With the central *RQ2,* the study gives an answer to what extent the two stakeholders of the energy transition communicate different topics in external communications. It is important that these two main stakeholders are admitting to the same goals about the energy transition in the logistics sector. Hence, in order to enhance the socio-economic energy transition a possibly occurring gap in communicated topics has to be closed. It could be subject to further studies in this domain to examine certain approaches to close the possibly communication-gap. Moreover, an iterative learning process of these two stakeholders imbedded in the socio-technical landscape of the energy transition has to be encouraged. Thereby, this learning process should not only be limited to business' – policy-makers' communication, but also open up for other societal stakeholders of the energy transition. Here, social science and especially the domain of communication science could help this process, by taking various roles in the process.

This thesis is going to present an overview about main theories and constructs in a theoretical framework. After that, the conduction of the method and the main results, based on the central research questions are presented. As the last part, a discussion and the conclusion will end the conducted study.

2. Theoretical Framework

2.1 Energy Transition as Socio-Technical Transition

It was long believed that technology alone would change a society's sustainability problems, without any need for social change (Scarse & Smith, 2009). However, technologies are not simply designed and engineered material objects, but embedded components of socio-technical systems (Coutard, 1999). Therefore, the technical and the social are co-constitutive, which continue to shape each other (Bijker & Law, 1992). Thus, renewable energy technologies are not simply engineered artifacts that perform the energy transition. Renewable energy technologies are configurations of the social and technical, which mirror wider social, economic, and technical processes (Walker & Bourne, 2007). Nowadays, most major economies have recognized the need to see energy transition as a social and at the same time technical challenge. However, it remains questionable whether low carbon technologies emerge first, inducing social changes. Or whether social changes are required first in order that low carbon technologies become adopted by society (Scarse & Smith, 2009).

New energy winning technologies are emerging, new social practices take place and new regulations, norms and actor configurations develop. Every socio-technical change involves various actors with their specific interest and expectations towards the transformation process (Kamp, 2008). For this to happen, successful technical innovation has to take place and a pressure from external factors has to be given to conduct the socio-technical change (Hermwille, 2016). The process also has to involve a broad basis of societal groups and stakeholders, which have to be organized in a reflexive and flexible way to adapt to changing societal goals during the transformation process (Kamp, 2008).

An important strand of socio-technical research concentrates on understanding the development of socio-technical systems within existing systems. An example for such a niche approach of a socio-technical change is the sustainable energy supply. The industry sector of logistics for the transportation of goods is considered as such niche. At the same time, the industry sector of logistics represents a societal demand area in most major economies (Rohracher, 2008). A stable socio-technical change of energy supply in the logistics sector implements and respects relatively clear roles to all involved stakeholders that contribute to the reproduction of that socio-technical change (Scarse & Smith, 2009). These central actors do not act in vacuum, but are instead imbedded in structures referred to as socio-technical regimes, which are deep-structural rules, which coordinate and guide actors perceptions and actions (Giddens, 1984).

2.2 The Role of Social Science in Socio-technical changes

The transition of energy systems for more sustainability in energy supply is considered as a socio-technical change. Because socio-technical transitions are multi-dimensional phenomena, they can be studied from various angles by different disciplines (Geels, 2010). The process of energy transition is becoming increasingly complex. Its aspects are embedded into broader social contexts of cultural values and socio-economic trends (e.g. globalization & individualization). Social science can help to better grasp the transformation process and enable its interaction with broader social, technical and economic structures (Roharacher, 2008).

Social science can help by providing several functions, which build a niche in a socio-technical transition. Those functions are; the creation of new knowledge, the guidance and direction-setting of search among users and suppliers for new technologies, the supply of non-technical resources such a competencies or capital, the creation of positive external economies, and the formation of markets for innovations (Jacobsson & Bergek, 2004). Geels (2010) adds that societies, especially policy makers with the help of social scientists, should set overarching environmental goals (e.g. the Kyoto Protocol, the Millenium Development Goals) for sustainability transitions (Geels, 2010). Moreover, Rohracher (2008) identified more relevant practices with which social science can help understanding energy transition. He pointed out the support of interactive vision building processes for the development of sustainable aims and the creation of a common pathway for stakeholders, to reach these aims. Moreover, social science facilitates the end-user involvement at different stages of the innovation process (Rohracher, 2008).

Communication Professionals in Socio-technical changes

Communication Professionals find a variety to apply their professional skills in a socio-technical change as the energy transition. Mostly, in innovation management during the process, communication plays a crucial role. A prominent field of work for a communication professional in an ongoing socio-technical change is an intermediary function between science and societal user (Leeuwis & Aarts, 2011). In modern socio-technical changes like the energy transition, change is seen as affected by complex interdependencies, unforeseen developments and interactions, and coincidence (Prigogine & Stengers, 1984). Moreover, innovation processes are conceptualized and dependent on the dynamics of networks (Leeuwis and Aarts, 2011) where communication professionals can help to coordinate and facilitate innovation processes among stakeholders of those networks.

However, communication professionals can also help to overcome conflicts of interests in socio-technical change processes. The behavioral patterns and interests are deeply rooted in socio-technical systems, which is subject to change. Collective actors experience conflicting interests need agency. Communication among the involved stakeholders in such a conflict needs consultancy on different levels. Accordingly, a socio-technical change like the energy transition needs joint efforts, in order to work properly for all involved stakeholders (Leeuwis & Aarts, 2011). An example therefore in the energy transition would be stakeholders such as energy intensive businesses and policy makers. That need to collaborate nevertheless both stakeholders might have different interests.

The main cause for differences lies in the different interpretations of a problem. The construction communication model illustrates the problem. For instance, the policy level may interpret the energy transition and actions different to other stakeholders. Here, communication itself is regarded as an action that has direct consequences to the social and material world (Leeuwis, 1993).

2.3 Complexity Theory:

Socio-technical transitions are considered as processes of structural change in societal systems such as energy supply or mobility (Geels, 2002). Transitions inherit a high degree of complexity, which needs to be taken into account (Ostrom, 2009). Transition activities emerge when the dominant structures in society (regimes) are put under pressure by external changes in society. Seemingly stable societal configurations can transform relatively quickly due to the external pressure (Loorbach, 2010). Therefore, transitions of societal systems like the energy transition are considered as a particular case of complex system dynamics (Grin, Rotmans, & Schot, 2009).

Complexity theory tries to unravel the complex interaction patterns between individuals, organizations, networks, and regimes within a societal context. Thereby, the question is how over time, transition can lead to non-linear change in seemingly stable regimes (Loorbach, 2010). Based on the understanding of transitions in complex societal systems, Rotmans and Loorbach (2008) have formulated tenets in order to face complex transition processes (Rotmans & Loobach, 2008). Talking about the ongoing energy transition as a complex socio-economic process, the following excerpts of tenets by Rotmans and Loorbach (2008) are worth considering.

First, gaining insight into the transition process as an essential precondition for effective management. Secondly, long-term thinking (at least 25 years), in which short-term energy goals are based on long-term goals and development of future scenarios. Third, the objectives are subject to change and therefore should be flexible and adjustable. Forth, creating space for experts to create a new regime in a protected environment. Fifth, putting a focus on social learning about different actor perspectives in the transition process. Sixthly, interaction between stakeholders of transition processes. Here, actors should be engaged in reframing problems and solutions through processes of social learning (Rotmans & Loorbach, 2008).

The given complexity of transitions and exerted indications of Rotmans and Loorbach (2008) serves as the basis for the management approach of transition management, which is presented in the following.

2.4 The Model of Transition Management

The management model of transition management, developed and adopted in the Netherlands might serve as a good-case example to react on the complex nature of the energy transition.

The management approach is based on platform creation between government and stakeholders of the energy transition, in order to set ambitious goals for the energy transition (Kern & Smith, 2008). Transition Management was initially developed as a model for governance, to deal with persistent problems that require change in a systematic way. Persistent problems were identified as problems, which are complex, uncertain and mostly difficult to manage (Kemp, Rotmans, & Loorbach, 2008).

Especially in liberalized, market-based, and decentralized European democracies such an approach to change persistent problems is useful to consider. The Dutch government, namely the Ministry of Economic Affairs has adopted the concept of Transition Management in 2000. By the year 2007, the Dutch government has archived to add the concept as a pillar in policy making. The

goal is to achieve a sustainable energy supply system in the Netherlands. In 2000, however it has started as a niche project by the VROM (Environment and Spatial Planning) later it was picked up as a serious policy-making measure. Transition management understands the sustainable development of the energy supply as a co-evolution of different sectors and a broad variety of stakeholders. Thereby, it is important to combine economic wealth, environmental protection and social cohesion (Kemp, Loorbach, & Rotmans, 2008).

The co-evolutionary perspective provides a common ground to think about policies and implications for business sectors in the context of the energy transition. The view of transition management is that socio-technical change is the result of the interaction between all relevant actors on different societal levels in the context of a societal landscape (Kemp, Loorbach, & Rotmans, 2008).

In this study the complex management approach of transition management is applied to the stakeholders in the specific business sector of logistics and policy-makers on a European basis. Transition management might serve as a suitable approach to this very domain and is discussed later on.

2.5 European Energy Actions & National Energy and Climate Plans

In recent years, numerous efforts to shape the energy transition in society have been initiated by the European Union (EU). New energy policy proposals in the EU are prepared on the basis of wide stakeholder consultations. These consultations are including national authorities, regional bodies, industrial associations, companies, consumers, and non-governmental organizations (Kanelakis, Martinopoulos, & Zachariadis, 2013).

However, the EU is following the overarching goal of common energy policies, it is foreseeable that this operation will include obstacles along the way. A Polish-German researcher team examined the discrepancies that would arise between EU Member States. Here the examined countries, Poland and Germany might serve as an example for the entire EU. The analysis has found out that those neighboring countries have markedly different energy concerns and energy infrastructure. EU institutions should serve as a forum where especially neighboring member states can build trust between national energy policy regulators and decision makers. The gained trust could be antecedent for a further future integration of energy policies among member states (Heinrich, Kusznir, Lis, Pleines, Stegen, & Szulecki, 2014).

Despite the EU's aim of a common ground for energy policies, the institution is also acknowledging sensitive aspects of energy policies in member states. Therefore, EU energy policy will always respect two main principles: First, member states are ultimately responsible for their national energy mix and secondly, all sources of energy remain strictly national and are not seen as an European resource (IEA, 2008).

European National Energy and Climate Plans (NECPs)

In order to enhance the society's energy transition, energy plans are proposed on a European level. The aim is to protect national energy security, but at the same time cope with the EU and the European Commission's (EC) plans for the energy transition. Therefore, the framework of National Energy and Climate Plans (NECPs) has been adopted by EU member states. In an integrated manner, the Member states are asked to plan their climate and energy objectives, targets, policies and measures towards the EC. The EU countries have to develop NECPs on a ten-year rolling basis, with an update halfway through the period.

The iterative nature of the system lies between each member state and the EC. Meaning that if a Member State is not delivering high enough contributions or is falling back in time during the process, the Commission can issue recommendations and ask the state to fall back in line with the plan ("National Energy and Climate Plans NECPs", n.d.).

The draft for the NECPs for the period 2021-2030 had to be handed in by the 31st of December 2018. The submitting of the final draft (including possible recommendations on behalf of the EC) is required by the 31st of December 2019. The focus of this particular NECP is based on five central dimensions. Namely, "Decarbonization", "Energy Efficiency", "Energy Security", "Internal Energy Market", and "Research, Innovation & Competitiveness". According to the EU, the new rules underline the importance of public participation and regional cooperation in the development and implementation climate plans. The NECPs are aiming to ensure the views of citizens, businesses as well as regional authorities (Fernbas, 2019).

The NECP drafts represent an important channel of communication by a main stakeholder of the energy transition. The EU member states are hold on to articulate their NECPs also regarding economic plans, especially for high-energy businesses such as the logistics sector. The plans for the upcoming years in the business sector are communicated to a broad public audience of stakeholders and is therefore considered a suitable subject to research the communicative aspects, as well as topics regarding the further energy transition in the logistics sector of each member state.

2.6 Sustainable logistics

The logistics sector

Given the recent explosion of an international market for all kinds of goods, international logistics has become a prominent business sector across all continents (Mentzer, Myers, & Cheung, 2004). Logistics groups use a magnitude of transportation modes on land, water, and in the air. Therefore, international logistics is considered as complex in nature. For instance due to disparate trade regulations, enormous distances, and cross-currency issues (Zacharia, Sanders, & Nix, 2011). Nevertheless, logistics excellence has clearly been established as a business area in which firms can create competitive advantage, because of its visible service impact on end customers (Mentzer, Flint, & Hult, 2001).

Logistics is the task of mainly managing two key flows. First, the material flow and storage of physical goods from suppliers through the distribution centers to their destination. Secondly, logistics

manages the information flow of data from the end-customer back to purchasing and to suppliers, and supply data from suppliers to retailers. In that way, the material flow can be planned and controlled (Harrison & van Hoek, 2008). Experts agree upon that transportation and logistics traditionally have been among the largest costs in international commerce. Today, global logistics is seen as highly complex. This complexity has brought an extension of operating structure, and an enhancement to the range of products and services (Bowersoxs & Calantone, 2003).

Differentiation between Logistics and Supply Chain Management

Oftentimes, the terms logistics and supply change management are confusingly and used in an economic context. Logistics has been defined as, 'The management of all inbound and outbound materials, parts, supplies, and finished goods (Mentzer, De Witt, Keebler, Min, Nix, Smith, Zacharia, 2001). Therefore, logistics activities imply the integrated management of purchasing, transportation, and storage on a functional basis. However, the definition for logistics remains interchangeable with supply chain management. An organization, operating in the logistics sector is internationally defined as a business, which is engaging in the process of planning, implementing, and controlling the efficient and effective flow and storage of goods, services and related information. Employees actively working in logistics are mostly referring to their profession as being involved with the transportation of goods (Lummus, Krumwiede, & Vokurka, 2001).

With the growing popularity of the term 'supply chain management' in business and academic context, it is important to respect the differentiation between supply chain management and logistics. Supply change management is not just used as a synonym for logistics, the concept includes elements that are not typically included in logistics. For instance, information systems, integration and coordination of planning and control activities. Often, supply chain management is referred to as somewhat larger than the logistics concept (Johnson & Templar, 2007). According to that, logistics is seen a subset of supply chain management (Harrison & van Hoek, 2008).

Aiming for Sustainability in Logistics

On the one hand, the logistics sector is already a highly energy consuming business sector. On the other hand, the volume of goods, which need to be transported through logistics networks, increases steadily. Moreover, actors in the logistics sector face increased external pressure to reduce the climate impact of their operations and to become more environmentally sustainable. The EU for instance adopted several policies on recycling in order to persuade companies to operate in a sustainable way. Also consumers have become both, more aware and educated about environmental issues (Neto, Bloemhof-Ruwaard, van Nunen, & van Heck, 2008). The increased capacity demand, but sustainability requirements created a dilemma for the logistics sector (Dima, Grabara, & Modrak, 2014).

According to the European Commission, road transport alone counted for 70 percent (in 2014) of all Greenhouse gas (GHG) emissions. EU member states have agreed on a gathered commitment to tackle this problem, and to reduce the energy consumption of transportation by at least 60 percent in 2050, compared to 1990 (Wehner, 2018). Because of its high-energy consumption

and its status as a demand business sector in society, the logistics sector is experiencing changes due to energy transition.

A central objective of acting accordingly to the energy transition in logistics is increasing environmental sustainability of logistics operations. In order to deal with the environmental problems, delivered by logistics, the term sustainable logistics was shaped and can be viewed in terms of: An approach in which the three classical pillars of logistics (physical flow of goods, information, and finances) are extended by a fourth pillar, the environmental protection. The fourth pillar delivers paradigm shifts within the logistics sector about the mission, principles, objectives, and tasks (Lichocik & Sadowski, 2014). The logistics organization's compliance with environmental policies is considered as highly mandatory in sustainable logistics.

In order to archive a higher sustainability in logistics operations, many logistics groups are implementing measures and tactics to comply with the policies, as well as the customer demands. The logistics groups have developed a variety of measures to combine economic interests with supposedly sustainability enhancing measures. One of the most important measures is the enhancement of energy efficiency. Accordingly, the energy efficiency of a logistics operation can be increased if the capacity is used to full potential. For example, decisions in fuel capacity will determine both, the operational costs and the environmental impact (Neto, Bloemhof-Ruwaard, van Nunen, & van Heck, 2008). Another aspect that combines sustainability and economic interests in the logistics sector is recycling. Implementing the transportation of recycling goods into the logistics business operations opens up a new market niches. At the same time, it seems to enhance environmental sustainability. Therefore, the realization of this type of product management is considered as source of competitive advantage (Gladwin, Kenelly, & Krause, 1995).

2.7 Corporate Social Responsibility (CSR) in Business context

Socially responsible behavior arose due to the understanding of social expectations towards businesses. Here, not only financial gain counts, but also actions for the social environment (Bosun, Teodorescu, & Teodorescu, 2014).

CSR as a concept was once considered that nebulous concept, which occupied theoretical discussions about the role of business in society. Today however, CSR has evolved and now assumes that management has the duty to make decisions for the firms that contribute to the welfare and the interest of both business and society (Szwajkowski, 1986). Corporate social responsibility is commitment to all stakeholders, on behalf of a company, to sustainable development. Realized in terms of respect for economic responsibility, ethics, and ecology (Bajdor & Grabara, 2014). Next to that environmental issues, diversity in the workplace, safety, and human rights gained importance in corporate social responsibility actions (Carter & Jennings, 2002).

In recent CSR approaches, the prevention of natural resources, air, soil and water pollution, labor practices, violation of human and social rights moved to the top of political agendas. Moreover, the external impact of many businesses' performance has moved from regional to global. Henceforth, global cooperation have realized that they need to show concern about global environmental issues and community affairs. Such environmental responsibility also ensures own future survival and long-term growth (Piecyk & Maria Björklund, 2015).

The cross-functional nature of the logistics sector, makes it vital to corporate strategies. Particularly towards actions, aiming to ensure environmental sustainability. A better environmental and social performance is likely to have a positive impact on a logistics organization's economic performance. An example therefore would be that GHG emissions from freight transportation are directly related to the amount of fuel used, thus could also be easily translated into operating costs. Therefore, the reduction of social and environmental impacts can also serve as a measure to improve their social performance (Piecyk & Maria Björklund, 2015). Although, various corporate sustainability performance measurements systems have been proposed (Searcy, 2012), there is no globally agreed set of CSR related metrics or indicators that would evaluate the sustainability of an organization's operations (Keeble, Topoil, & Berkeley, 2003).

CSR Reports

CSR reports are a way to communicate on behalf of the company. Through this channel, social and environmental aspects and strategies regarding these aspects are addressed to the public (Tate, Ellram, & Kirchoff, 2010).

There is general agreement among scientists that CSR reports are helping an organization in obtaining and sustaining a long-term competitive advantage (Markley & Davis, 2007).
The availability and content of an organization's CSR report depends on different factors. The size of a company seems to influence the company monitors and reports its CSR performance (Knox, Maklan, & French, 2005). Moreover, Tate, Ellram, and Kirchoff (2010) found out that the geographical location of an organization's headquarters has an influence on the content of a CSR report. Thereby, the content is altered by the factors of legislations, such as policies, regulations, maturity of the market, and customer demands (Tate, Ellram, & Kirchoff, 2010). Also the stakeholder pressure is often considered as a factor, which urges organizations to take responsibility actions and report these. González-Benito and González-Benito (2006), indicated that CSR reports are a common way for companies to present their performance to different stakeholder groups (González-Benito & González-Benito, 2006). Although, CSR reporting is done voluntary, there theories that help explaining why organizations are willing to voluntarily report. The most prominent theory has been examined by Deegan and Unerman (2011) who stated that the Legitimacy theory could explain an organization's reporting. Organizations must be accountable for their operations since their license is given by society. Therefore, the disclosure of societal and environmental issues adds legitimacy to an organization's reputation (Deegan & Unerman, 2011).

All major logistics groups are issuing CSR reports periodical (mostly annual). Those reports are easily accessible and include CSR statements and voluntary reporting. The reports include maturity, consciousness, and willingness to become a good corporate citizen. Moreover, the plans communicate aspects and topics connected to the energy transition efforts in each logistics group. Based on the extensive nature of each logistics groups' CSR report and the relevancy of the energy efficiency in the business sector of logistics, recent CSR reports of major logistics groups are a suitable subject to examine the communicated aspects and accompanied energy transition topics.

Environmental issues in CSR reports

However, different issues are discussed in CSR reports, environmental issues appear to be the most prominent aspects in CSR reports, issued in the recent years (Winter & Knemeyer, 2013). Several studies have pointed out that the rise of topic connected to environmentally responsible logistics operations has been a result of governmental regulations, economic considerations, and strong market signals via environmentally conscious customers of logistics services (Scholtens & Kleinsmann, 2011). Customer demands seem to contribute greatly to the recent interest in environmentally responsible logistics practices. González-Benito and González-Benito (2006) showed that non-governmental stakeholders exert a significant influence on the implementation of those practices (González-Benito & González-Benito, 2006). In order to achieve business goals, a logistics company is urged to respond to an increasing customer demand for environmentally friendly products and services. Moreover, show compliance with tightening environmental policies and show the will to act environmentally responsible as a corporate citizen.

3. Method

3.1 Design

In this study, the method of summative content analysis has been applied. A summative content analysis seeks to understand the contextual use of words and content of certain documents. The applied summative approach to the qualitative content analysis goes beyond mere word count and includes latent content analysis. Latent content analysis refers to the process of interpretation of content. Thus, the focus in this analysis is on discovering underlying meanings of the content (Hsieh & Shannon, 2005). The research design helps making use of the different aspects addressed in the documents. Moreover, the approach helps identifying possible gaps between topics articulated in the external communication of logistics groups versus the topics addressed in European Climate Plans. Therefore, two different kinds of documents were chosen.

This particular method was chosen because of its concentration on the geographical region of Europe, more specifically the EU member states. The method inherits the freedom to interpret the concepts, which are necessary to research, while examining the impact of a European energy transition on the business sector of logistics. Moreover, the applied method allows to examine data on a relatively large scale and to later frame the results in a European context. The results serve as an identification of different aspects and topics concerning the energy transition in the logistics sector, retrieved from both types of documents.

The research design and proposed data analysis procedure has been approved by the ethics committee of the Faculty of Behavioral, Management and Social Sciences (BMS) of the University of Twente in April 2019.

3.2 Corpus

The first type of document is the European National Energy and Climate Plan (NECP) draft of the different Member States of the EU in 2019. The NECPs have been examined in its draft version, which have been issued by latest the 31st of December 2018. The second type of document are the latest available corporate social responsibility (CSR) reports of multi-nationally operating logistics groups, which all have a high market share on the European logistics market.

The concentration on these 14 groups was chosen for the following reasons. First, the high market share indicates a high shipping capacity, thus of consumed energy per logistics group, which makes the group responsible to comply to the European energy transition. Second, if the major logistics groups operating in Europe comply with the energy transition and follow different sustainability aspects, the entire logistics sector will have to react and follow the energy transition efforts accordingly (Tweddle, 2008).

The two different document types added up to a total value of 42 (N =42). From the entire corpus, 28 (N =28) were NECP reports. The corpus consisted of 27 NECP drafts of all current EU Member states, and the UK, which was in the process of leaving the EU (see appendix 2).

Next to that 14 (N =14) CSR reports of the 14 logistics groups with the highest turnover in Europe in 2016 have been examined. Nine out of the 14 CSR reports are issued by companies, which are headquartered in a EU member state. Five headquarters however are situated outside the EU (see appendix 1). Regardless the fact that the groups are headquartered outside a EU member state, the groups have to comply with EU logistics policies, operating on European soil and sea (Tyan, Wang, & Du, 2003).

The NECP drafts have been withdrawn from the official Internet page of the *European Parliament*, the executive organ of the EU. The CSR reports have been retrieved from the Internet pages of the concerning logistics group. Both types of documents have been withdrawn in PDF-formats. Moreover, both types of documents have been issued in English, except for the NECP reports of France and Spain. These two documents have been analyzed with the help of a human translator. Due to the public accessibility of both kinds of documents, the NECPs and the CSR reports and the extensive nature of the documents, the data has been considered as suitable during this particular study.

3.3 Coding Scheme

In order to analyze the different kinds of documents regarding the research questions, *RQ1* and *RQ2* two inductive coding processes have been conducted.

In a first inductive coding process seven (N=7) documents of both types, CSR reports and NECPs have been coded. Thereby, three (N=3) CSR reports and four (N=4) NECPs have been coded. This inductive coding resulted in various unrelated codes.

In the second coding process, another seven (N=7) documents from both types have been coded. Now, the found codes from the first inductive coding process have been applied to the other seven (N=7) documents. However, next to the applied codes from the first inductive coding, also new codes have originated during this coding process.

As a result of the first and second coding process, a coding scheme of 50 different codes originated. The resulted 50 codes were then merged with corresponding codes, creating a coding scheme consisting of twelve different code categories (see appendix 3).

The resulting coding scheme had the aim to be applied to both types of documents that is why in both inductive coding processes, both types of documents have been alternately coded.

The first central research question seeks for the communicated aspects in both documents,

RQ1: What are the communicated aspects referring to the energy transition in the logistics sector by two main stakeholders?

Here, the asked communicated aspects were derived from the individual codes.

Next to that, the second central research question seeks for the difference in communicated topics,

RQ2: What differences in communicated topics are observable between the two stakeholders, concerning the energy transition in Europe's logistics sector?

Here, the communicated topics were derived from the originated code categories.

3.4 Reliability analysis

In order to accesses the reliability of the originated code categories, the Cohen's Kappa of each code category has been calculated. Cohen's Kappa is considered as a robust statistic, which is used for interrater reliability. The range of values is -1 to +1, where 0 represents the amount of agreement that is expected from random chance. Value +1 represents perfect agreement between the raters. It has been suggested that Kappa results are interpreted as follows: values ≤ 0 as indicating no agreement and 0.01-0.20 as none to slight, 0.21-0.40 as fair, 0.41-0.60 as moderate, 0.61-0.80 as substantial and 0.81-1.0 as almost perfect intercoder reliability (McHugh, 2012).

In order to access the reliability of the coding scheme, resulted from the two inductive coding processes, the Cohen's kappa of each code category has been calculated. Therefore, three (N=3) different NECPs, and two (N=2) CSR reports were coded by two individual coders. The table 3.2 represents the Cohen's values for each of the categories:

Table 3.2
Cohen's Kappa: Code Categories

Subject	Cohen's Kappa
Analysis of logistics sector	1.0
Carbon Emissions	0.706
Efficiency Aspects in Logistics	0.786
Energy Transition	1.0
Future Aims	1.0
Policy/Government	0.684
Products/Services	-
Promotion	0.750
Alternative Logistics modes	-
Statements	0.455

Sustainable Logistics	1.0
Alternative Fuels in Logistics sector	0.739

The values for Cohen's Kappa indicate that the code category of 'Policy/Government' has a moderate agreement between the two coders with a value of 0.684. Next to that, 'Statements' has the lowest value with 0.455, which was interpreted as a moderate agreement. Four code categories were having values that indicate substantial agreement, and another four code categories indicate perfect agreement. However, for two code categories no Cohen's Kappa could be calculated due to the fact that the codes of the specific code category were not apparent in the documents chosen for the intercoder-reliability.

Due to the moderately to perfect reliability, all twelve (N=12) code categories have been kept and have been used in the further analysis of the corpus.

3.5 Data analysis:

After the reliability analysis the entire corpus has been analyzed with the software program *Atlas.ti.* Thereby, each time two documents of each document type have been analyzed with the originated codes. Beginning with the NECP of Austria and ending with the United Kingdom, due to alphabetical order. The starting point for the analysis of the CSR reports was the logistics group with the highest turnover, *Deutsche Post DHL Group AG* descending to the lowest turnover of the fourteen logistics groups, *Bolloré Logistics*. Every text passage in the CSR reports that entailed information about the energy transition and related energy aspects have been coded. In the NECPs, every text passage that entailed information about the logistics sector and its role on a national and European energy level has been coded accordingly.

The CSR reports indicated statistics about energy performance and about other energy related aspects. This given information has been left out of the final analysis due to the non-transparency of the statistics. Moreover, this information was hard to test on its reliability and validity. Also a statistical counterpart in the NECP drafts was missing.

4. Results

4.1 Descriptive Statistics

In total 382 codes have been applied to the corpus. Thereof, 236 (N=236) (62%) have been applied to the document type of the CSR report. The other 146 (N=146) (38%) were applied to the NECPs, issued by the EU member states. The average number of applied codes for the document type of CSR report has been N=16,86. Compared to that, the document type of NECP had a smaller average number of applied codes per document, with N=5,21. The following table 4.1 shows the descriptive results of the data analysis.

Table 4.1
Descriptive Statistics per Document Type

Measure	CSR Reports	NECP of EU Member States
Number of codes applied	236	146
Average number of codes applied per document	16.86	5.21
Code with highest frequency (N)	Analysis of Logistics' energy consumption (N=32)	Promotion of rail logistics (N=23)

The code with the highest frequency in CSR reports was "Analysis of Logistics energy consumption" with 32 quotations. In the NECPs the code with the highest frequency was "Promotion of rail logistics" with 23 quotations.

4.2 Communicated Aspects in Document types

In order to answer the first central research question, *RQ1: What are the communicated aspects referring to the energy transition in the logistics sector by two main stakeholders?* the frequency of the applied codes served as a first indication for the results. In the document type of the CSR reports, five codes with the highest frequency are presented into detail with corresponding quotes (see appendix 4). However, not all codes found among the codes with the highest frequency are helping to suitably answer the first research question. Therefore, the results that were considered as most important answering *RQ1* are presented in the results section.

This section is beginning with the results of the communicated aspects found in the document type of CSR reports on behalf of the logistics groups.

Communicated aspects in CSR Reports

Table 4.2 represents the most representing findings regarding *RQ1*. In the table, the communicated code, the accompanied code category, and the number as well as the percentage of the overall number of codes is presented.

The highest frequency of codes in CSR reports was 'Analysis of energy consumption in logistics sector' with 11.01%. This code indicates that logistics companies are keen to measure and later communicate the energy consumption of their business operations.

The second considered code was 'Promotion of energy efficiency' with 8.47% of the overall codes. Next to that, the code 'Technology for energy efficiency' has been placed next to 'Promotion of energy efficiency' since both codes are representing the same code category of 'Efficiency Aspects in Logistics'. The promotion of energy efficiency is often closely related to new technologies that should help enhance energy efficiency (see Table 4.2).

The third communicated aspect that has been considered is 'Statement about Energy Consumption' with 8.47% of the overall applied codes. This aspect indicates that logistics groups are using CSR reports to communicate statements about past, current, and future energy consumption of their operations (see Table 4.2).

Table 4.2
Communicated aspects in CSR Reports

Code	Code Category	N (% of overall codes in document type)
(1) Analysis of energy consumption in logistics sector	Analysis of logistics sector	26 (11.01%)
(2) Promotion of Energy Efficiency	Efficiency Aspects in Logistics	20 (8.47%)
(2.1) Technology for Energy Efficiency	Efficiency Aspects in Logistics	19 (8.05%)
(3) Statement about Energy consumption	Statements	20 (8.47%)

Communicated aspects in NECP drafts

Also for the communicated aspects in the NECPs on behalf of the EU member states, the highest found frequencies served as a starting point in order to answer *RQ1.* Here however, the four codes with the highest frequency are presented into detail with accompanied quotes (see appendix 4). Conspicuously, three out of the four codes with the highest frequency are closely related towards each other (see Table 4.3).

Table 4.3
Communicated aspects in NECPs

Code	Code Category	N (% of overall codes in document type)
Promotion of Rail Logistics	Promotion	23 (15.76%)
National logistics infrastructure	Polices/Government	16 (11.00%)
Railway logistics in national infrastructure	Alternative logistics modes	13 (8.90%)

The three communicated codes; 'Promotion of Rail Logistics', 'Railway logistics in national infrastructure', and 'National logistics infrastructure' are related to the mode of rail logistics and its promotion and implementation in the EU member states.

Next to that, the code 'Introduction of Alternative Fuels' was also found among the four codes with the highest frequency with 9.61% of the overall codes applied to the NECPs (see Table 4.4). The code represents the need and the plan to commonly introduce alternative fuels in logistics and related freight transport operations.

Table 4.4
Communicated aspects in NECPs

Code	Code Category	N (% of overall codes in document type)
Introduction of Alternative Fuels	Alternative fuels in logistics sector	14 (9.61%)

4.3 Differences in addressed topics in document types

Regarding the second central research question, *RQ2: What differences in communicated topics are observable between the two stakeholders, concerning the energy transition in Europe's logistics sector?* the seven biggest differences between the code categories of the two document types have

been calculated. However, not all found differences are considered useful towards the research question. Therefore, this section is presenting the most important results. The seven biggest found differences and accompanied quotes are found in the appendices (see appendix 4). The tables in this section represent the differences of communicated topics between both document types in the following form. First, the code category, which serves as the communicated topic. Moreover, the document type in which the significant difference of this topic has been found is presented. Also, the percentage of the topic in both types of documents is shown. The percentage in the last row indicates the difference regarding the topic between the two document types.

(1) Alternative Logistics

The biggest found difference between the two means of communication has been the topic of 'Alternative logistics modes' with 21.48% more found codes of that topic in the NECPs. Closely related to that, the topic of 'Alternative fuels in Logistics sector' has been found 8.09% more in the NECPs. Both topics indicate that in the NECPs a higher percentage of the communication is about alternative modes of logistics, as well as alternatives in fuels (see Table 4.5).

Table 4.5
Comparison between communicated topics

Code category with highest differences between document types	Higher frequency found in (Document type)	% (Document type)	Difference (in %)
Alternative logistics modes	NECP	21.92 (NECP) / 0.42 (CSR)	21.48
Alternative Fuels in Logistics sector	NECP	13.56 (NECP) / 5.48 (CSR)	8.09

(2) Efficiency Aspects in Logistics

With 18.28% another difference between topics has been found within the topic 'Efficiency Aspects in Logistics'. Here, the document type of CSR reports issued by the logistics groups communicates more aspects of that specific topic. The topic includes various kinds of efficiency related concepts, such as fuel efficiency, technology towards efficiency, or programs to enhance efficiency aspects in logistics operations. Table 4.6 represents this finding and the accompanied statistics. Moreover, accompanied quotes are found in appendix 4.

Table 4.6
Comparison between communicated topics

Code category with highest differences between document types	Higher frequency found in (Document type)	% (Document type)	Difference (in %)
Efficiency Aspects in Logistics	CSR	29.24 (CSR) / 10.26 (NECP)	18.28

(3) Energy Transition

Another difference in communicated aspects has been found in the topic of 'Energy Transition'. This topic entails concepts, which are directly related towards the energy transition. For instance the promotion of the energy transition in the logistics sector, or actions directed to enhance the energy transition in a particular context. Here, the CSR reports communicated 17.80% compared to 2.05% in the NECPs, resulting in 15.75% difference between the two means of communication (see Table 4.7).

Table 4.7
Comparison between communicated topics

Code category with highest differences between document types	Higher frequency found in (Document type)	% (Document type)	Difference (in %)
Energy Transition	CSR	17.80 (CSR) / 2.05 (NECP)	15.75

5. Discussion

The first part of the discussion will discuss the main aspects, which have been communicated by the CSR reports as well as the NECPs and therefore aim to answer the first central research question: *RQ1: What are the most frequently communicated aspects in two different types of documents concerning the energy transition in Europe's logistics sector?* The discussion will be based on the most relevant found aspects in each document regarding the energy transition in the European logistics sector. The aspects of the CSR will access the perceived benefits by CSR reporting, based on literature, as well as their deliveries for the enhancement of the energy transition.

The second part discusses the most relevant aspects, communicated by the policy-makers on the European level. The discussion is based on the implications each main aspect can bring to the enhancement of the energy transition in the European logistics sector.

5.1 Communicated aspects in document types

(1) Communicated aspects in CSR Reports

Aspect of Analysis of energy consumption in logistics sector

According to Table 4.2, one of the most frequently communicated aspects in the CSR reports, issued by the logistics groups has been 'Analysis of energy consumption in logistics sector'. Here, the logistics groups reveal information about energy measurements in all kinds of logistics operations. Often, logistics companies do this on a voluntary basis because they are members of the society to which they belong. Thus, the central aspect of analyzing the energy consumption on a voluntary basis is seen as a way the logistics groups respond to the social expectations of their social environment (Post, Lawrence, & Weber, 2002). Reporting energy consumption voluntarily is an aspect that aligns with central CSR benefits in business, found in scientific literature. The most suitable ones are; Improved reputation & brand value (Schaltegger & Burritt, 2005), improved relations to regulators, image improvement (Nielinger, 2003), meeting shareholder expectations (Bertelsmann Stiftung, 2005), and increased company attractiveness for potential employees (Turban & Greening, 1997). Assessing the aspect of 'Analysis of energy consumption' in the light of business benefits, this measure delivers many assets that are needed to successfully communicate on behalf of a multinational logistics group. However, the sustainable impact and strict alignment with an enhancement of the energy transition is not given. Measuring and analyzing the energy consumption might be seen as a first step towards the energy transition. However, it does not have a direct effect on sustainable performance during logistics operations. Moreover, due to the fact that the energy consumption is analyzed and communicated voluntarily, assessing the credibility of the analysis is hard to conduct.

Aspect of Promotion of Energy Efficiency

Another important aspect, found in the communication in form of the CSR reports was 'Promotion of energy efficiency' (see Table 4.2). This code is probably the most representable aspect among all codes of the logistics groups' communication regarding the energy transition. The promotion of energy efficiency aspects delivers several benefits to businesses, directly corresponding to different efficiency aspects such as, efficiency gains & cost reduction and resource preservation (Rodinelli & London, 2002). Energy efficiency and its promotion do not only deliver CSR related benefits and integrity with the logistics groups stakeholders, these aspects also add positive economic performance in a sustainable light. Included in the promotion of energy efficiency is the increased capacity in logistics operations (Neto et al., 2008). Therefore, using the full capacity of storage is seen to promote energy efficiency, as communicated by the logistics group, *Société nationale des chemins de fer français (SNCF)* in their 2017 CSR Report: *"We've made freight transport more energy efficient by shipping higher volume loads and optimizing transport."* (see appendix 4).

Also the promotion of efficiency in fuel capacity will determine both, the costs and the environmental impact of a logistics operation (Neto et al., 2008). In order to be able to enhance the energy efficiency, logistics groups also frequently communicated technological aspects for energy efficiency.

Aspect of Technology for Energy Efficiency

Closely related to the promotion of energy efficiency is the communicated aspect of 'Technology for Energy efficiency'. Also this aspect is associated with CSR benefits and an enhancement of the logistics groups' economic performance. The benefits would be efficiency gains (Schaltegger and Figge, 2005), resource prevention, and product development (Rondinelli & London, 2002). Especially the benefit of product development adds another economic dimension to the aspect of 'Technology for energy efficiency'. Most of the multinational logistics groups are organizations, which are able to spend a significant amount in research and development of energy efficient technologies. As an example therefore serves the *StreetScooter* developed by the logistics group *DHL Deutsche Post AG.* The *StreetScooter* is an in-house technological development in form of an electric vehicle for end-customer delivery of packages as well as letters. Now, the *StreetScooter* initiative grew towards an own company, held by the logistics group, which is selling the vehicles on the market ('Electro Mobility', n.d.).

The promotion and technology for energy efficiency combines both, economic performance and CSR delivered benefits. Also, while assessing the aspects from an energy transition view it seems convincingly. Increasing the energy efficiency for instance in form of fuel efficiency will have a sustainable impact and aims to use less fossil fuels. Moreover, innovative technological developments such as the example of the *DHL Deutsche Post AG's StreetScooter* will cut the energy need based on fossil fuels. Also, competitors of the *DHL Deutsche Post AG* will be urged to deliver technologies themselves to stay competitive.

Besides this seemingly win-win situation of energy transition enhancing assets and increased economic performance, the promotion of energy efficiency remains to be controversial. A promotion of energy efficiency might only be feasible with an increased capacity load, which implies higher

shipped volumes. So in a sense, the energy efficiency is increased. However, the overall consumed energy consumption has increased as well (Haas, Resch, Panzer, Busch, & Ragwitz, 2011). On the one hand the enhancement of energy efficiency through technological innovations appears to enhance behavior towards a successful energy transition in the logistics sector. On the other hand, the logistics groups have several economic and CSR-delivered benefits by communicating the discussed topics. It is to assume that the economic benefits play a bigger role for the logistics companies and therefore negative associated aspects delivered by the promotion of energy efficiency are left out in the communication in form of the CSR reports.

Aspect of Statement about Energy consumption

Another code found with a high frequency and relevance in the communication channel of CSR reports was 'Statement about Energy consumption'. Similar to the code 'Analysis of Energy Efficiency', this aspect represents a classical approach in the communication of corporate social responsibility on behalf of businesses. The quotes found in the reports represent that mostly positive statements about past energy consumptions were communicated. In appendix 4, the logistics group, *DB Schenker AG* stated in their 2017 CSR report: "*We are constantly reducing our energy consumption."*. The aspect of positive statements about allegedly reduced energy consumption is aligned with benefits, derived by CSR reporting. Examples therefore would be, increased competitiveness through process and product benefits (Porter & van der Linde, 1998), and image improvement (Nielinger, 2003). However, the majority of statements about the energy consumption are representing positive results, also statements about increased energy consumption have been made. For instance on behalf of *Kühne & Nagel International AG* in its 2018 CSR Report: *"Comparing 2017 and 2018, 4% more carbon emissions from energy and fuel consumption have been produced".* Here no classical benefit for the business through CSR reporting can be applied. However, this statement represents transparency about energy consumption, and can therefore be indirectly be related to the business benefit of avoidance of negative press (Epstein & Roy, 2001).

Accessing the relevance of the communicated aspect of 'Statement about Energy consumption' from a viewpoint of enhancing the energy transition, this aspect is seen as less beneficial. The logistics groups might be honest about their performance, but stating a positive energy performance does not directly influence an enhancement of the energy transition in the logistics sector. It is more likely that a communication like this tells stakeholders that the energy performance is aligned with energy goals, thus no need to further improvement is given.

(2) Communicated aspects in NECPs

Aspect of Promotion of Rail Logistics

Among the findings with the highest communicated aspects in the NECPs was 'Promotion of Rail Logistics' (see Table 4.3). Many of the EU member states' urban areas face land pressure, meaning that land is only available in a limited extent. It can be stated that the modal shift of the logistics modes would be an aspect that might help solving this scenario. Like in the case of the NECPs, the mostly, intermodal logistics policies are carried out on a national level (Diziain, Taniguchi, & Dablanc, 2014). In global logistics, rail, shipping, and trucking compete, but they are also partners in many logistics operations (Horn & Nemoto, 2005). However, it is stated that private companies do not change their practices as quickly as necessitated by the environmental challenges. Therefore, public policy for a modal shift in logistics may be necessary and a strong asset to improve the logistics sector's energy transition (Diziain, Taniguchi, & Dablanc, 2014). Nevertheless, modal shifts include great investments into the rail infrastructure of the member state. Especially, in urban logistics almost all operations are carried out by road. For instance in Paris, 90% of all urban logistics are carried out by road (Diziain, Taniguchi, & Dablanc, 2014). Despite, the great investments to make a modal shift from road to rail logistics possible, it would have an impact on the positive performance towards the energy transition.

Aspect National Logistics Infrastructure & Aspect Railway logistics in National Infrastructure

Closely related to the aspect of 'Promotion of Rail logistics' are the found aspects of 'National Logistics infrastructure' and 'Railway logistics in National Infrastructure' Italy communicated in their NECP that *"(...) the development of the National Logistics Platform will therefore be continued, aimed at providing services to all logistics and transport operators, with the objective of optimizing processes through increased interconnection and facilitated data management."* (see appendix 4). The mentioned establishment of functioning national logistics systems depend on the availability and condition of the following conditions, defined as the logistics infrastructure. The national logistics infrastructure is a system of land and water routes, airports, seaports and telecommunication networks on a regional-national level (Fechner, 2010). Also the social and economic attitude is important to consider in this context. Logistics groups undertaking business operations in established national logistics centers create jobs, stimulate the local economy, and provide funds to the local government in form of local taxes (Fechner, 2010). Nevertheless, it remains questionable whether the aspect of new national logistics infrastructures is directly having a positive stimulus on the energy transition by itself.

However, the closely related aspect of 'Railway logistics in National Infrastructure' serves as a combination of both aspects 'Promotion of Rail Logistics' and 'National logistics infrastructure'. An example for this code was found in the NECP of Slovenia: *"The share of railway transport in the freight transport decreased in 2015. Transfer of the transport to railways will depend significantly on investments into upgrading and updating the network."*. (see appendix 4). Moreover, it was mentioned that huge investments have to be made in order to archive the desired modal shift from

road to railway logistics. It remains questionable whether the promotion and an improvement of a national railway based logistics infrastructure would have an immediate effect on the energy transition. The found communicated aspects seem to have a rather significant effect seen on the long-term planning of the energy transition in logistics. Shifting the main focus of logistics modes will imply great investments and behavioral change on behalf of all stakeholders.

Aspect of Introduction of Alternative Fuels

Next to the communicated aspects regarding the railway logistics, 'Alternative fuels in logistics sector' was found to be an important aspect. For instance, the Netherlands stated in their NECP that in order to enhance the sustainability of the logistics sector, alternative fuels should be implemented into all modes of the logistics sector (see appendix 4).

Researchers have concluded that the burning of gasoline produces more GHG emissions than alternative fuels such as bio-diesel, hydrogen fuel cells and hybrid electric. Yet, fossil based fuels such as petroleum remain the most viable source of energy due to their abundance and accessibility (Halldórsson & Kovács, 2008). Based on that, the aspect of introducing alternative fuels seems to have a great impact on the fulfilment of the energy transition in the logistics sector. However, the Czech Republic highlights in its NECP that there is a difficulty in introducing alternative fuels in logistics due to technical dimensions (see appendix 4). Despite the technical difficulties, an introduction of alternative fuels is a suitable goal in order to enhance the energy transition. Nevertheless, the introduction of alternative fuels implies investments in the national infrastructure and suitable communication towards stakeholders about required changes towards more sustainable fuels. Especially the communication about the introduction of these fuels is going to be difficult. Economic stakeholders such as the logistics groups, which urged to implement alternative fuels over fossil fuels, are going to be financially pressured.

5.2 Differences between Communications

The second central research question, *RQ2: What differences in communicated topics are observable between the two types of documents, concerning the energy transition in Europe's logistics sector?* Is discussed in the following section. The differences found in the two document types, the CSR reports and the NECPs are presented in the results section 4.3. The main findings in form of the different communicated topics are discussed. Thereby, the found differences are discussed according to its relevance for the energy transition in the European logistics sector. It has to be noted that the topics have to be considered as broader than the communicated aspects of *RQ1*. The topics are based on the code categories and inherit various communicated aspects.

Alternative logistics modes

A difference between communicated topics was found in 'Alternative Logistics' and the closely accompanied topic 'Alternative fuel in logistics sector'. Here, a higher percentage of this topic has been found in the NECPs, issued by the EU member states (see Table 4.5). In all of the NECPs where the topic of alternative logistics modes was found, the communication was referring to change the main mode of logistics from road to rail logistics.

The transition of modes from road to rail logistics can entail an enhancement of sustainability of the logistics sector. Dey, LaGuardia, and Srinivasan (2011) noted that road trucks consume twice as much fossil fuels per kilometre as rail logistics. Moreover, the authors stated that rail and ocean freight transportation are the least carbon intensive logistics modes. Compared to road logistics, those modes produce one sixth of carbon gases per kilometre. Compared to airfreight logistics, the carbon gas production is one hundredth (Dey, LaGuardia, & Srinivasan, 2011). Next to that, Oberhofer and Dieplinger (2014) conclude in their measures for sustainable logistics that a main driver of emission reduction is the multimodal freight transportation and the promotion of rail logistics (Oberhofer & Dieplinger, 2014). Therefore, companies that are implementing those logistics modes are having a positive environmental impact (World Economic Forum, 2009).

However, it remains questionable why the logistics groups tended to communicate the topic of alternative logistics modes this less. Looking into the logistics modes that the examined logistics groups are offering might deliver an answer to this question. The examined logistics groups are multinational organized groups and their business operations already include a variety of logistics modes. Nevertheless, specializations in logistics modes are observable. For instance *Mediterranean Shipping Company S.A.* (MSC) has its specialization in maritime logistics ("WELCOME TO MSC", n.d.) Besides this, other logistics groups already implemented rail logistics as a main logistics mode. An example therefore is the *DB Schenker AG* ("Land Transport Products, n.d.). According to that, logistics groups are not necessarily urged to communicate a change of logistics modes since they inherit most of the modes already. It is mainly up to the logistics groups' customers to choose for rail over other more energy intensive modes of logistics, even if the price for a shipment with alternative modes would probably increase.

Efficiency Aspects in Logistics

Another difference between both means of communication was the topic of 'Efficiency Aspects' regarding logistics (see Table 4.6). However, one of the central dimensions in the NECPs was called 'Energy Efficiency' (Fernbas, 2019) the topic has been more often communicated in the CSR reports by the logistics groups (see Table 4.6). As an example, the 2017 CSR report of *Mediterranean Shipping Company S.A* states that new technologies and operational measures are used in order to enhance the operations' energy efficiency (see appendix 4). However, technologies are considered as valuable assets for energy efficiency (Short, Packey, & Holt, 1995), approaching this topic with technologies only, will not lead to sufficient outcomes in the logistics sector's energy transition. A wide approach that includes all stakeholders of logistics operations should be considered (Wehner, 2018). For the logistics group, the topic of energy efficiency is not only a way to communicate towards more sustainable logistics but also to comply with economic expectations of the groups' shareholders (Short, Packey, & Holt, 1995). Accordingly, communicating energy efficiency could deliver two positive outcomes for the logistics groups. First, the group's positive reputation as a sustainably operating company, which shows compliance with the energy transition. And second, the enhancement of financial performance. Here a suitable combination has been found in a specific CSR report. Namely, the combination of energy efficiency with cost efficiency. Combining energy efficiency with cost efficiency also serves as measure to react on the tightening carbon emission standards and accompanied taxes, as communicated by the group *A.P. Møller – Mærsk A/S* (see appendix 4).

However, the question arises why in the NECPs did not communicate the topic of energy efficiency in the logistics sector more frequently. Also regarding the fact that energy efficiency was a central dimension of the NECPs. The main reason for this might be the study's concentration on the aspects of the energy transition in the logistics sector. While communicating energy efficiency topics, the NECPs were not concentrating on specific sectors of business, such as the logistics sector. The NECPs kept the communication rather general about the energy landscape on a national level.

Energy Transition

The third relevant difference in communicated aspects between the two types of documents has been 'Energy Transition'. Here, specific aspects regarding the energy transition in the logistics sector have been communicated more often in the CSR reports. A main aspect communicated under the topic of energy transition was the commitment to the energy transition. Most logistics groups show high commitment and compliance to the energy transition (see quote in (3) in appendix 4). For the logistics company the communication of topics that are directly related to the energy transition is considered as important.

For many of the logistics groups' stakeholders, the energy transition is a vague construct, which is hard to understand because its goals and consequences are laying far in the future (Armaroli & Balzani, 2007). It is on the logistics group to communicate this topic, and make the construct of energy transition in the logistics sector graspable to its stakeholders. Taking the stakeholder of end-customers for example; Their identities, interests and claims rest on continued patterns of energy

consumption, and on which they to have to constantly reflect (Smith, 2012). In modern economy the need of logistics is indispensable and the end-customer is a part of that development. For instance, the end-customer orders an easily accessible daily good online due to various reasons (better prices, convenience of door-delivery etc.). Nevertheless, he keeps constantly reflecting whether the purchase was in accordance to sustainable development or more specifically the energy transition. However, in many cases the purchasing of daily goods online is not in accordance with the energy transition (Wiese, Kellner, Liedtke, Toporowski, & Zielke, 2012). The logistics group communicates the commitment to the energy transition and therefore takes away a piece of the end-users responsibility to the energy transition. Resulting from that, the end customers will keep purchasing daily goods online.

Nevertheless, the efforts of communicating and complying with the energy transition can also be seen from a different point of view. It could be merely seen as a reaction on governmental regulations, economic considerations, and strong market signals (Scholtens & Kleinsmann, 2011). Likely, would be a combination of all named factors, which leads the logistics groups to communicate this topic in their CSR reports.

Compared to that, the NECP did communicate less in the topic of energy transition directly related to the logistics sector. This might be due to the specificity of the topic. Many NECPs did not cover aspects of the energy transition, as a directly related topic to the logistics sector. However, the NECP of Poland brought up the dilemma the logistics sector is currently facing (see (3) in 4). The dilemma inherits that capacity demands in logistics keep rising, but at the same time stricter sustainability requirements have to be considered by the logistics operators (Dima et al., 2014). By today, in logistics this dilemma is merely tackled by efficiency aspects. However, searching for a solution could be subject to further joint efforts of societal actors.

5.3 Limitations and Future Research Research

Comparing the number of applied codes to the document types, a difference was observable (see Table 4.1). The CSR reports communicated energy transition in logistics and its related aspects very specifically. Compared to that, the NECP did not communicate these aspects as detailed. Thus, fewer codes have been applied to the NECPs, which could have negatively influenced the reliability and validity of this type of document. Moreover, the coding of the NECPs was especially hard due to the different usage of terms and wording between the NECPs. Some NECPs did use the word ‘logistics’ others ‘freight transport’ or ‘transportation’ as an umbrella term. However, the term ‘transportation’ was considered as too broad in this research and therefore has been left out. Resulting from that, between the NECPs itself an uneven number of codes have been applied. For instance in the NECP of Italy twenty codes have been found, in the NECP of Germany one code was found.

However, the same kind of codes and code categories has been applied to the two types of documents, the different nature of the document types had to be respected. Both stakeholders aim to communicate aspects of the energy transition with a different intention. Here, especially the honesty of the CSR reports has to be evaluated. CSR reports are aiming to inform stakeholders about past performance and future developments. The aim for financial performance and gain might have an influence on quality and honesty of the CSR reports. Therefore, reporting energy performance in an

honest manner should be a standardized. Nevertheless, for this study the degree of honesty cannot be independently tested.

Future Research

In future studies a validation of the found differences in topics should be applied. Conducting a semi-structured interview with representatives of each stakeholder group, policy-makers and logistics groups would enhance the study's validity. Moreover, various document types, which represent external communication on behalf of the stakeholder, should be taken into consideration. Widening the corpus would deliver a higher reliability of the results. Also a comparison of communications of other stakeholders in the socio-technical energy transition could be applied. Taking into consideration different societal stakeholders would validate the applied research design. Moreover, two types of communication with an equal depth into the field of interest should be found. This would profoundly enhance the reliability of comparing communicated topics.

6. Conclusions and Practical Recommendation

This study investigated the communicated aspects of two means of communication, issued by two main stakeholders of the energy transition, policy-makers on a European level and logistics groups. Moreover, differences in communicated topics towards the logistics sector's energy transition have been examined. In order to find out about the aspects, which are communicated in both means of communications, the central research question, *RQ1: What are the communicated aspects referring to the energy transition in the logistics sector by two stakeholders?* has been established.
It became apparent how the two stakeholders communicate highly distinctive aspects. In a way, the classical roles of policy-makers and businesses are strongly visible in the stakeholder's communication. The CSR reports of the logistics groups articulate aspects, which are mainly addressing business-related benefits based on CSR reporting. Thereby, energy efficiency aspects are a suitable aspect since they combine sustainability with economic advantages. On the contrary, the NECPs frequently communicated the enhancement of alternative logistics modes such as railway logistics, as well as the introduction of alternative fuels.

In order to examine the differences in communicated topics, the second central research question *RQ2: What differences in communicated topics are observable between the two stakeholders, concerning the energy transition in Europe's logistics sector?* has been established.
The found differences in communicated topics indicated a gap between policy-making and economic interests of the logistics groups. In order to overcome the observed communication-gap, the creation of a platform for energy transition related topics should be taken into consideration. Various stakeholders from different backgrounds should be implemented into policy-making processes. An example therefore would be the model of transition management, presented in the theoretical framework in section 2.4. However, if European energy politics are becoming more international oriented, a common ground for involved stakeholders is increasing in complexity. For the communication platform creation the found difference in the topic of alternative logistics modes serves as an example. Alternative logistics modes should be a driver for the energy transition in the

European logistics sector. The EU member states have to make great investments into the national logistics infrastructure, in order to fulfill a mode change from road to rail. A common ground for communication would be necessary that the extension of the railway network could be planned with the logistics groups as its operators. Corresponding visions, goals and financial assets should be discussed and altered by involved stakeholders.

This practical implication can be transferred to several of the found differences between the stakeholders communication. In this regard, an independent consultant should conduct the establishing of a common ground between the stakeholders. This would give central stakeholders an opportunity to communicate with the overall aim to enhance the energy transition for the entire society.

Acknowledgements

I would like to thank Prof. Dr. Menno de Jong for his guidance during this thesis. All the meetings have helped me to shape my research, and I had the feeling that learned a lot during these talks. I would also like to thank the University of Twente in general. This university has done a lot of great things so far and I have been a proud student of this institution. Some of my life's deepest friendships originated here and I had a truly amazing time so far.

Also, a big thanks to my family and friends, who were always supporting and understanding me, also during this time. I am looking forwards to so many great things and moment that will happen with all of you.

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8. Appendices

Appendix 1: Examined Logistics Groups

Logistics groups

Organization Name	Specific type of document	Concerning year	Headquarters based in (country)
DHL Deutsche Post AG	CSR Report	2018	Germany
DB Schenker AG	CSR/Sustainability Report	2017	Germany
A.P. Møller – Mærsk A/S	CSR/Sustainability Report	2018	Denmark
Kuehne + Nagel International AG	CSR/Sustainability report	2018	Switzerland (non-EU)
Société nationale des chemins de fer français (SNCF)	CSR Report	2017	France
MSC Mediterranean Shipping Company S.A. (MSC)	CSR/Sustainability Report	2017	Switzerland (non-EU)
La Poste	CSR Report	2017	France
CMA CGM S.A	CSR Report	2017	France
United Parcel Service (UPS)	CSR/Sustainability Report	2017	USA (non-EU)
Royal Mail	CSR Report	2017-2018	United Kingdom
DSV A/S	CSR Report	2018	Denmark
XPO Logistics, Inc.	CSR Report	2018	USA (non-EU)
FedEx Corporation	CSR Report	2019	USA (non-EU)
Bolloré Logistics	CSR Report	2017	France

Appendix 2: Examined EU Member State's NECPs

National Energy and Climate Plans (NECPs) 2021-2030 by EU Member State

Country			
1. Austria	8. Estonia	15. Italy	22. Portugal
2. Belgium	9. Finland	16. Latvia	23. Romania
3. Bulgaria	10. France	17. Lithuania	24. Slovakia
4. Croatia	11. Germany	18. Luxembourg	25. Slovenia
5.Cyprus	12. Greece	19. Malta	26. Spain
6. Czechia	13. Hungary	20. Netherlands	27. Sweden
7. Denmark	14. Ireland	21. Poland	28. United Kingdom

Appendix 3: Coding Scheme

Code category with accompanied codes

1. Analysis of logistics sector:
    1. Vulnerabilities of logistics sector
    2. Analysis of logistics energy consumption

2. Carbon Emissions:
    1. Carbon efficiency
    2. Carbon Neutral logistics
    3. Carbon reduction
    4. Energy consumption & GHG emissions
    5. Transparency about carbon emissions

3. Efficiency aspects in logistics
    1. Carbon efficiency
    2. Energy and cost efficiency
    3. Energy efficiency
    4. Fuel efficiency
    5. New technologies for energy efficiency
    6. Product for energy efficiency
    7. Program for energy efficiency
    8. Promotion of energy efficiency

4. Energy transition
    1. Commitment to energy transition
    2. Energy transition & Cost Efficiency
    3. Energy transition as challenge
    4. Energy transition in society
    5. Progress in energy transition
    6. Importance of energy transition in logistics
    7. Solutions for energy transition
    8. Financial Funding of Energy Transition

5. Aims
    1. Aim for renewable energy

2. Aim for usage of biofuels
3. Long Term energy planning
4. Aim for Energy reduction

6. Policies/Government
    1. Carbon dioxide taxation
    2. National logistics infrastructure
    3. Energy consumption taxation
    4. Environmental policy

7. Products/Services
    1. Product concerning energy transition
    2. Product for energy efficiency
    3. Service provision to logistics
    4. Energy recovery in logistics sector
    5. Provision of services to logistics

8. Promotion
    1. Promotion of energy efficiency
    2. Promotion of electric vehicles in logistics
    3. Promotion of rail logistics
    4. Promotion of renewable sources of energy
    5. Promotion of energy transition

9. Alternative logistics modes
    1. Promotion of rail logistics
    2. Railway logistics in national infrastructure

10. Statements
    1. Increased energy consumption in logistics
    2. Statement about energy efficiency

11. Sustainable logistics
    1. Environmental-friendly urban logistics
    2. Implementation of renewable energy sources
    3. Increased renewable energy consumption
    4. Security measure towards logistics

12. Alternative fuels in logistics sector
    1. Aim of usage for biofuels
    2. Introduction of alternative fuels
    3. Usage of biofuels
    4. Implementation of Synthetic fuel

Appendix 4: Extensive Result Tables

Communicated aspects in CSR reports

Code	Subject(s)	N (% of all codes in document type)	Quote(s)	Remarks/Clarifications
(1) Analysis of energy consumption in logistics sector	Analysis of logistics sector	26 (11.01%)	XPO Logistics Inc. 2018 CSR Report: *"(...) monitoring and measurement of energy consumption, wastewater, and noise pollution; (...)"*	None
(2) Promotion of Energy Efficiency	(1) Promotion & (2) Efficiency Aspects in Logistics	20 (8.47%)	A.P. Møller – Mærsk A/S 2017 CSR report: *"Energy efficiency is a discipline where A.P. Moller - Maersk has excelled for decades, yet we still have potential to improve."* Société nationale des chemins de fer français (SNCF) 2017 CSR Report: *"We've made freight transport more energy efficient by shipping higher volume loads and optimizing transport."*	None
(3) Statement about Energy consumption	Statements	20 (8.47%)	DB Schenker AG 2017 CSR/Sustainability Report: *"We are constantly reducing our energy consumption."* Kühne & Nagel International AG CSR Report 2018: *"(...) while consumption of renewable energy also increased 17 per cent in a period of 8 years."* *"Comparing 2017*	None

			and 2018 4% more carbon emissions from energy and fuel consumption have been produced."	
(4) New Technology for Energy Efficiency	Efficiency Aspects in Logistics	19 (8.05%)	CMA CGM S.A. 2017 CSR Report: *"Improve vessels energy efficiency and develop "eco-friendly" technologies."*	None
(5) Environmental policy	Policies & Government	17 (7.20%)	DHL Deutsche Post AG 2018 CSR/Sustainability Report: *"Our action areas are defined in our Environmental and Energy Policy, which provides all employees throughout the Group with guidance on how they themselves can contribute to achieving our environ- mental targets"* Kühne & Nagel International AG CSR Report 2018: *"It (Energy Efficiency) is a team effort guided by the global environmental policy."*	None

Communicated aspects in NECPs

Code	Subject(s)	N (% of all codes in document type)	Quote(s)	Remarks/Clarifications
(1) Promotion of Rail Logistics	Promotion & Alternative logistics modes	23 (15.76%)	NECP Italy: *"(...) freight transport from road to rail."* NECP Portugal: *"Promote goods transport by rail (...)"* NECP Slovakia: *"(...) from road freight to rail (...)"*	None
(2) National logistics infrastructure	Policies & Government	16 (11.00%)	NECP Italy: *"The development of the National Logistics Platform will therefore be continued, aimed at providing services to all logistics and transport operators, with the objective of optimising processes through increased interconnection and facilitated data management."* NECP Slovakia: *"The main measures to achieve this objective (incensement of rail logistics) continue to be the modernisation of transport infrastructure including intermodal freight terminals."*	None
(3) Introduction of Alternative Fuels	Alternative fuels in logistics sector	14 (9.61%)	NECP Czechia: *"(...) more difficult introduction of alternative energies in freight transport, highlights this especially in the area of urban freight transport and city logistics."* NECP Netherlands: *"(...) in order to reduce the emissions of modes of transport that use an internal*	None

				combustion engine, efforts are ongoing to make the fuels that are used more sustainable. This is in part accomplished through the use of advanced biofuels for methods of transport for which no alternatives are as yet available, such as heavy goods road traffic, inland shipping, maritime shipping and aviation."	
(4) Railway logistics in national infrastructure	Alternative logistics modes	13 (8.90%)		NECP Slovenia: *"The share of railway transport in the freight transport decreased in 2015. Transfer of the transport to railways will depend significantly on investments into upgrading and updating the network."*	None

Table 6. Comparison between communicated topics

Code category with highest differences between document types	Higher frequency found in (Document type)	% (Document type)	Difference (in %)	Quote(s)	Remarks / Clarifications
(1) Alternative logistics modes	NECP	21.92 (NECP) / 0.42 (CSR)	21.48	NECP Italy: *"(…) freight transport from road to rail."* Société nationale des chemins de fer français (SNCF) 2017 CSR Report: *"Rail delivers*	None

				low-carbon transport, making trains a key to the energy transition."	
(2) Efficiency Aspects in Logistics	CSR	29.24 (CSR) / 10.26 (NECP)	18.28	Deutsche Post DHL AG CSR report 2018: *"We also made progress in a wide range of initiatives designed to increase energy efficiency and the use of alternative power sources - (...).* Mediterranean Shipping Company (MSC) 2017 CSR Report: *"To maximise the efficiency of our fleet and further reduce our ships' energy consumption we use innovative technologies and implement a number of operational measures."* A.P. Møller – Mærsk A/S 2018 CSR Report: *"(...) as well as meeting the need for cost- efficient energy and helping us prepare for new legislative measures, such as a tax on carbon emission."*	None
(3) Energy Transition	CSR	17.80 (CSR) / 2.05 (NECP)	15.75	Société nationale des chemins de fer français (SNCF) 2017 CSR Report: *"We are moving*	None

				towards this goal through a shared commitment to projects such as self- driving trains, mobility as a service, and bringing the energy transition to our own operations." NECP Poland: *"The task (Energy Transition) will be even more challenging given the fact that further significant growth in transport volumes (...) is envisaged both in Poland and throughout the EU as an unavoidable effect of continued economic development."*	
(4) Policies	NECP	20.52 (NECP) / 7.23 (CSR)	13.29	DHL Deutsche Post AG 2018 CSR Report: *"Our action areas are defined in our Environmental and Energy Policy, which provides all employees throughout the Group with guidance on how they themselves can contribute to achieving our environ- mental targets."* NECP Czechia: *Road freight transport should be more broadly reflected in the forthcoming update of the National Action*	None

				Plan for Clean Mobility.	
(5) Promotion	NECP	28.08 (NECP) / 15.68 (CSR)	12.40	NECP Portugal: *"Promote goods transport by rail (...)"* DB Schenker AG, CSR Report 2017: *"We see cities prohibiting access for diesel vehicles, huge investments in the expansion of renewable energy, and increased awareness of sustainabil- ity issues spreading rapidly across the globe"* (Promotion of renewable sources of energy)	None
(6) Statements	CSR	12.33 (CSR) / 4.24 (NECP)	8.09	Kühne & Nagel International AG CSR Report 2018: *"(...) while consumption of renewable energy also increased 17 per cent in a period of 8 years."*	None
(7) Alternative Fuels in Logistics sector	NECP	13.56 (NECP) / 5.48 (CSR)	8.09	NECP Netherlands: *"This is in part accomplished through the use of advanced biofuels for methods of transport for which no alternatives are as yet available, such as heavy goods road traffic, (...)"*	None

Appendix 5: Literature Log

Research Questions Literature Log

RQ1: What characteristics does a socio-technical change inherit?
RQ2: Is the energy transition a socio-technical change?
RQ3: What policies have an influence of the European energy transition?
RQ4: What are main Stakeholders in the socio-technical energy transition?
RQ5: How can logistics become more sustainable?
RQ6: What factors influence the sustainability of logistics operations?
RQ7: How can Transition Management be applied in the logistics sector's energy transition?

Preferred criteria

The preferred type of literature is scientific journal, due to its scientific depth and centrality on a very specific domain. In various topics the relevance of the scientific sources does not play a big role. However, in other search actions relevance should be given. An example for that would be the 'measurements in CSR reports'. The preferred language is English, since the study report, which is following the literature study is also written in English. If some very important sources would appear in German, they would also be taken into consideration.

Databases

The selected databases have been mainly *Scopus*, followed by *Web of Science*. These two databases have been the main source of literature due to the well-structured lay out and elaborate search options. Moreover, the functions of reporting of these two databases are easy to grasp and align with the reporting criteria for this literature log.
Especially *Web of Science* does provide virtual links to other software programs such as *EndNote*, which might help during the research conduction.

Relevant Terms

Concepts	**Related Terms**	**Smaller Terms**	**Broader Terms**
Energy Transition	Energy Supply; Energy Regime; Renewable Energy; Green House Gases (GHG); Energy	Abundance of Fossil fuels; Green technologies; Alternative sources of energy; CO2	**Change in Energy Supply**

	Transition in Logistics	reduction	
Transition Management	Management Persistent Changes; Transition Management Model		**Policy Consultancy**
Socio-Technical Changes	Technology; Socio-Technical Regimes; Conflicts; Change processes	Embedment in society; Innovation-Society relation; Behavioral Change; Conflicts in Socio-Technical Changes	**Change in Society**
Energy Policies	EU; Climate Plans; National Politics; Energy Policies in Europe	National Energy and Climate Plans (NECPs), Policy communication; Aims for energy plans; Timeframe of NECPs; Interpretive Policies	**Politics, Executive**
Business in Society	Corporate Social Responsibility; Stakeholder Communication; Transparency	Corporate Social Responsibility Reports (CSR); Communication Receivers of CSR, Areas of CSR application, Guidelines for CSR; Aim of CSR Reports; CSR's accordance with societal aims; CSR accordance with financial aims	**Societal Communications**
Sustainable Logistics	Green Logistics; Eco-friendliness; Alternative Logistics Modes, Recycling in Logistics	Logistics groups; Energy Efficiency; Electricity in Logistics; Railway Logistics; Logistics as energy-intensive	**Logistics sector**

		business; Capacity-Sustainability dilemma Logistics; Sustainability employee Training; Internal sustainability measures; CSR measurements; CSR Reports Energy Measurements	

Search Actions

	Date	**Database**	**Search action + Search Technique**	**Total hits**
1	**17.09.2019**	**Scopus**	Societal Impact Energy Transition and-searching *TITLE-ABS-KEY (societal AND impact AND energy AND transition)*	**89**
2.	**22.02.2019**	**Scopus**	Stakeholder Transition Management and-searching + year *(stakeholder AND transition AND management) AND PUBYEAR > 2014*	**713**
3.	**03.04.2019**	**Scopus**	Recycling in Business And-searching; And-not-searching *(TITLE-ABS-KEY (recycling AND in AND business) AND TITLE-ABS-KEY (logistics) AND NOT TITLE-ABS-KEY (trash))*	**180**
4.	**10.04.2019**	**Web of Science**	Rail Logistics Sustainability And-searching	**37**

			TOPIC: (Rail Logistics Sustainability)	
5.	**25.02.2019**	**Scopus**	Logistics and socio-technical Change And-searching *TITLE-ABS-KEY (logistics AND ion AND socio-technical AND change)*	**16**
6.	**05.03.2019**	**Web of Science**	Environmental Employee Training And-searching; Or-searching *TOPIC: (Environmental Employee Training) OR TOPIC: (Sustainability in Business) AND TOPIC: (Logistics)*	**832**
7.	**07.02.2019**	**Scopus**	Logistics in Energy Transition And-searching *TITLE-ABS-KEY (logistics AND in AND energy AND transition)*	**208**
8.	**02.03.2019**	**Scopus**	Delphi Method Conduction And-searching *(delphi AND method AND conduction)*	**20**
9.	**23.03.2019**	**Scopus**	Complexity Theory in Sustainability And-searching; or-searching *(TITLE-ABS-KEY (complexity AND theory AND in AND sustainability) AND TITLE-ABS-KEY (business) OR TITLE-ABS-KEY (environment))*	**280**
10.	**25.03.2019**	**Scopus**	CSR Reports Measurement And-Searching + year *(csr AND reports AND measurement) AND PUBYEAR > 2014*	**97**
11.	**22.02.2019**	**Scopus**	Energy policies in Europe And-searching	**1603**

			(TITLE-ABS-KEY (energy AND policies AND in AND europe) AND TITLE-ABS-KEY (eu))	
12.	**09.02.2019**	**Web of Science**	Social science and socio-technical change And-searching *(social science and socio-technical change)*	**100**

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Reflection

In order to collect useful literature on the topic, I did orient myself towards the most common scientific databases (mainly *Scopus, Web of Science, and Google Scholar*). I tried to begin with broad search terms, especially during the orientation phase on the study's topic. I tried to look for further literature based on applicable sources of already found literature. Moreover, I narrowed down my focus of search actions until suitable literature sources had been found. So, narrowing down results and concepts and base further search actions on previous literature has been my way to orientate.

An excerpt of the most relevant terms of the literature study is presented above. It can be found under the section 'Relevant Terms'. Also, excerpts of used search actions are presented above. In the section 'Search Actions' the date, used database, search action & technique and the corresponding total hits are displayed.

The presented terms did not deviate profoundly from the used terms in the literature study. It helped to gain a complete overview over the research topic and then begin from there to narrow down on the important concepts.

Normally I would have planned to access the literatures relevance based on the indicated citations of the found articles, indicated in the database. However, I learned that the topic is rather specific and that not many citations have been made. So, I tried to evaluate the relevance based on the source's content and quality of reporting. Moreover, the fit for the specific literature section has been taken into account. Nevertheless, I know that this method of relevance assessment is rather subjectively driven.

Overall, I was satisfied with the search operation for the theoretical framework. However, next time I would like to stay more focused on the broad picture of the entire framework. I tend to get too much into detail and loose track of the overall readability. Moreover, I think that structuring the framework would have been way easier if I would have stayed more focused on the overall structure and aim of the framework.