

MSc THESIS

The role of CO₂ footprint during order acquisition

An exploratory research from a value chain perspective

W.M.C. van Slooten

Abstract

Companies that undertake CO₂ emission reductions not always gain direct profits themselves. Benefits can be situated elsewhere in the supply chain. The current political climate stimulates CO₂ footprint measures, but it does not yet motivate firms to have a discussion about it throughout the supply chain. A discussion about CO₂ not only leads to intense feedback from clients and end consumers, it also enhances innovation.

Does a reduction in CO₂ emissions lead to a better suppliers' negotiating position during order acquisition? If no, why not? And if yes, how does it lead to this better negotiating position? The negotiating process is the critical moment for a company to succeed in attracting consequential benefits. The supplier that lowers its carbon footprint needs a way to present and discuss the matter with its direct clients. Relevant concepts are the bargaining power of suppliers and the mechanism of the Transaction Cost Economics.

This exploratory research conducts three case studies, each case involving up to three companies situated in the same supply chain. Six possible mechanisms are identified for further investigation. The conclusion is positive indeed, a reduction in CO₂ emissions does lead to a better suppliers' position during order acquisition. But the mechanisms behind it may be very surprising.



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Contents

List of Figures	v
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List of Tables	vii
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1 Executive Summary	1
2 Introduction	3
2.1 Research	3
2.2 Relevance	4
2.3 Research Methods	5
2.4 TU Delft and Intelligence for Business	6
2.5 Outline	6
3 Literature Review	7
3.1 Emission Trading Scheme	7
3.2 CO ₂ footprint	9
3.3 Corporate Social Responsibility	11
3.4 Financial Performance	11
3.5 Innovation	13
3.6 Porter: Five Forces	14
3.7 Competition and Co-opetition	15
3.8 Transaction Cost Economics	16
3.9 Research Framework	18
4 Methodology	21
4.1 Research Question	21
4.2 Research Design	21
4.3 Theory Development	23
4.4 Quality of Research Design	24
4.5 Case Study Protocol	25
4.5.1 A: Introduction to the Case Study and Purpose of the Case Study Protocol.	25
4.5.2 B: Data Collection Procedures	26
4.5.3 C: Introduction to the Interview	27
4.5.4 D: Definitions	28
4.5.5 E: Case Study Questions	28
4.5.6 F: Data Analysis	31
5 Data Analysis	33
5.1 Case Descriptions	34
5.1.1 Case: Coffee Industry	34
5.1.2 Case: Paper Industry	38
5.1.3 Case: Carpet Industry	46
5.2 Cross Case Analysis	52
5.2.1 Cross Case: High TC versus Low TC	52
5.2.2 Cross Case Mechanisms	54

6	Conclusions and Discussion	57
6.1	Conclusions in Relation to the Research Question	57
6.2	Discussion	60
6.2.1	Scientific implications	60
6.2.2	Managerial implications	62
6.3	Limitations and Future Research	63
A	Measurement Tools	69
A.1	Measurement Tools	69
A.2	Pas 2050	69
A.3	Categories	70
A.4	Selection	70
	Bibliography	68
B	Research Introduction	71
C	Interview Questions	73

List of Figures

3.1	The optimal level of Pollution	8
3.2	Pollution level Greater than (left) and Less than optimal	9
3.3	Reuse of waste in a Closed Loop Supply Chain	13
3.4	Porter's Five Forces	14
3.5	The Value Net	15
3.6	Transaction Cost Theory	18
3.7	Research Context	19
3.8	Research Scope	20
4.1	Structure of the Cases: Interviewed Companies in the Value Chain	22
4.2	Research Scope, Organizational Theory	24
4.3	General overview of the contact between researcher and company	27
5.1	Structure of the Coffee Industry Case	35
5.2	Coffee A suggestion: CO ₂ footprint changes the context of negotiating processes.	36
5.3	Structure of the Paper Industry Case	39
5.4	Paper A suggestion: Production Efficiency lowers the Transaction Costs.	41
5.5	Paper B suggestion: CO ₂ footprint needs proper Certification.	42
5.6	Paper C suggestion: CO ₂ footprint enhances Transparency.	44
5.7	Structure of the Carpet Industry Case	46
5.8	Carpet A suggestion: CO ₂ footprint impacts through Image Building.	48
5.9	Carpet C suggestion 1: CO ₂ footprint enhances Transparency and the Visibility of Savings.	50
5.10	Carpet C suggestion 2a: CO ₂ footprint decrease the Uncertainty level.	50
5.11	Carpet C suggestion 2b: CO ₂ footprint decrease the Uncertainty level indirectly.	50

List of Tables

5.1	Construction of the Cases and Visiting Dates	34
5.2	Case Conclusions Coffee Industry	37
5.3	Case Conclusions (Part I) Paper Industry	44
5.4	Case Conclusions (Part II) Paper Industry	45
5.5	Case Conclusions Carpet Industry	51

Executive Summary

From the perspective of the Emission Trading Scheme, which obliges companies to monitor and reduce their CO₂ emission rates, possible advantages from these regulations are studied. It is interesting to know whether a lower CO₂ emission rate can additionally be an advantage if companies act from a value chain approach. The value chain is the sequence of activities that add value to a product for it to become an end product (Porter, 1985b). The mandatory CO₂ emission reductions can be used to a company's advantage by securing a lower CO₂ footprint for an entire value chain. By footprint we mean all Greenhouse Gas emissions a company is responsible for (WRI and WBCS, 2006). The relevant question is whether supplier companies can communicate the importance of a value chain cooperation beneficially during order acquisition negotiations and how to do that.

Research Question: *From a suppliers' perspective, does a reduction in CO₂ emissions lead to a better negotiating position during order acquisition? If no, why not? And if yes, how does it lead to this better suppliers' position regarding the acquisition of orders?*

This study shows that a reduced CO₂ footprint actually gives a supplier significantly more power during negotiations. This follows from the fact that a certain product X becomes more valuable with a lower CO₂ emission rate, because it becomes more specific. But for the buyer firm of this product X, lower CO₂ emission reduction has not yet been related to direct financial benefits. There is a conflict of interest. However, the supplier company benefits most from its reduced CO₂ footprint if it can guarantee a reduced footprint for product X throughout the value chain. If this guarantee can be given to the consumer market, the initial product X suddenly becomes profitable to the buyer.

From a suppliers' perspective it is therefore of significant importance to communicate those advantages, in order to succeed in attracting consequential benefits. The supplier needs a way to discuss the CO₂ footprint reductions with its immediate clients during order acquisition negotiations. Relevant mechanisms on how to introduce this discussion in negotiations are the bargaining power of suppliers and buyers described by Porter and the Transaction Cost Economics developed by Williamson.

This exploratory research is based on interviews. Three in depth case studies were executed, involving the Coffee industry, Paper industry and the Carpet industry. The multiple-case design had a supply chain approach: interviewing supplier-client relations, discussing the difference in high and low transaction costs during order acquisition negotiations. This design allowed for high quality information collection.

A reduction in CO₂ emissions leads to a better negotiating position for the supplier during order acquisition negotiations.

Carbon emission reduction is strongly related to higher production efficiency, which lowers the cost price. So, direct financial benefits are gained from lower transaction costs. Furthermore, there is a key role for transparency. Transparency throughout the supply chain can guarantee 'healthy' emissions in that chain. The emission reduction then has to be a CO₂ footprint reduction. The approach offers innovation, increased feedback and efficiency collaboration. CO₂ footprint transparency also determines whether companies that have built an image of

sustainability are really significantly involved in emission reductions. Transparency emphasizes openness during transactions and enhances the level of trust.

The case interviews suggest six possible mechanisms for the role of CO₂ footprint in negotiations:

(1) *Production efficiency lowers the transaction costs, CO₂ reduction is a ‘side effect’.*

An inventory of CO₂ emissions can identify high energy consuming parts of the production process. The higher efficiency level that can be established after excluding slack from the process is significant for a better suppliers’ negotiating position.

(2) *The footprint decreases the level of uncertainty.*

A discussion about CO₂ footprint reduction entails a high level of information sharing. Information asymmetry is indicator of uncertainty, so by having a more intense discussion about footprinting, uncertainty levels are lower. The transaction costs of the transaction therefore decrease, giving the supplier a better negotiating position.

(3) *Carbon emission reduction changes the context of the negotiating process.*

The CO₂ footprint discussion raises the balance issue of People vs Process vs Product. The attitude of a company in this respect originates from the organizational structure and culture of a company. The impact of a CO₂ footprint discussion in negotiations is then dependent on changes in the dimension of organizational psychology and the interaction between agents.

(4) *CO₂ footprint reduction impacts through image building.*

Market demands can stimulate companies to build a sustainable image. Especially for transactions involving high transaction costs, the sustainable image serves legislation, which tries to increase the visibility of company actions. The transaction costs of transactions are not influenced by image building, but it might be that an image in itself enhances a suppliers negotiating position.

(5) *The footprint needs proper certification.*

Certificates set a common standard for footprint reduction that can be relied upon, so they may give an incentive that a company is trustworthy. By enhanced trust, the level of uncertainty to a transaction decreases and lower transaction costs are established. The result is a better negotiating position to the supplier owning the certificate.

(6) *CO₂ footprint enhances transparency and the visibility of savings.*

The supply chain approach while having the CO₂ footprint reduction discussion offers several advantages: increased feedback, innovation and higher production efficiency. The enhanced level of communication will create transparency and the visibility of savings. The level of trust will be increased, this lowers uncertainty and thereby lowers the transaction costs. Lower transaction costs lead to a better suppliers’ negotiating position.

This study shows that ***CO₂ footprint reduction is a valuable addition to the TCE model.*** It lowers the transaction costs involved in transactions in general via trust and decreases the level of uncertainty during negotiations because of intense information sharing and increased transparency. CO₂ emission inventory might furthermore be the initiator of decreased production costs, which are a significant part of the transaction costs.

This study further shows that there is an *intrinsic motivation* to reduce CO₂ emissions among industries. Companies are not yet certain if and how financial improvements to individual companies can be established, but there is the opinion that to participate in CO₂ emission reduction is an advantage. Particularly if the quantification records are really explicit.

This research was executed in cooperation with Delft University of Technology and Intelligence for Business. TU Delft facilitated the study and guided the researcher during the process. Intelligence for Business is a management consultancy firm specialized in value chain services and provided the researcher with insights and contacts in the field.

Introduction

CO₂ emissions have been regarded as one of the largest problems recently. The emissions are assumed to cause severe damage to the ozone layer, which again is a cause of global warming. Large amounts of CO₂ are yearly emitted into the air, both by nature (e.g. volcanic eruptions) and by humans, most significantly in burning fossil fuels. For example freight transport, heavy cooling machines and formula-one cars are large emitters of CO₂. This report will focus on the burning of fossil fuels used for production and transport in the industry.

An observation from the literature is the relation between a company's CO₂ emission rate and its financial performance: the lower the CO₂ emission, the better its financial performance (Carbon Trust, 2006). When optimizing a company's value chain according to CO₂ emission, it will generally become more efficient. The term value chain refers to the sequence of activities, starting from raw material, that add value to a product for it to become an end product that can be sold in the market (Porter, 1985a). The main assumption to the statement that value chain optimization most often results in higher production efficiency, is that in all companies there is a lot of slack that can be excluded from the production process (Porter & van der Linde, 1995). Furthermore, in identifying where most CO₂ is emitted, energy consumption throughout the value chain is mapped. This seems to be the first step towards a more efficient process. A more efficient production uses less resources to produce the same output of end products and will lead to a better financial health. The newly introduced Emission Trading Scheme (ETS) allows companies to an additional financial benefit: that of trading CO₂ emission rights.

2.1 Research

The Emission Trading Scheme (ETS) was introduced in Europe in 2005 and it obliges a set of 5000 larger companies across Europe to measure the amount of CO₂ that is emitted at their production locations. These companies are then bound to buy sufficient 'emission rights': rights that allow for a certain amount of CO₂ sent into the air at the location. A reduction in total CO₂ emission leads to direct profits: a company does not need to buy emission rights, or it has the opportunity to sell rights it bought previously. The total amount of CO₂ emitted by one company is called the CO₂ footprint of that company.

From the perspective of the ETS, the possible advantages from these regulations are studied. It is interesting to know whether a lower CO₂ emission rate can additionally be an advantage if companies act from a value chain approach. The mandatory CO₂ emission reductions can be used to a company's advantage by securing a lower CO₂ footprint for an entire value chain. By footprint we mean all Greenhouse Gas emissions a company is responsible for. The relevant question is whether supplier companies can communicate this beneficially during order acquisition in negotiations and how to do that. The **research objective** then is to determine **if and how** companies can **benefit** from their lowered CO₂ emission rates, **if and how** they can use them to their **advantage** during **order acquisition**.

As it was indicated, a value chain represents a sequence of activities that add value to a specific product (Porter, 1985a). When considering the value chain, one considers a chain of

value adding companies and is thereby related to the supply chain of a company. When a company wants to increase the total value of a product, it will have to work together with its supply chain to alter the value adding activities throughout the value chain.

This research paper recognizes the increased product value if the total amount of CO₂ emissions during its production chain can be reduced. To achieve value chain reduction, a supply chain approach is needed: an entire supply chain needs to work on the matter together. A specific company can create awareness and motivate its suppliers by having or announcing increasing demands. But it seems more difficult to have similar demands to clients, the companies one delivers to. Discussing the CO₂ footprint during order acquisition, and creating awareness from a value chain approach, may positively influence on the negotiating position of a supplier.

Research Question:

From a suppliers' perspective, does a reduction in CO₂ emissions lead to a better negotiating position during order acquisition? If no, why not? And if yes, how does it lead to this better suppliers' position regarding the acquisition of orders?

We will answer several sub questions to gain better understanding of theoretical models about transactions and the role of CO₂ footprints during those transactions. The sub questions served as a general guideline during data collection.

To get an idea of important characteristics during order acquisition negotiations and what aspects are discussed, the first sub question is:

(a) What aspects are involved in negotiations and which are strategic advantages?

Secondly, it is important to understand the current attitude towards and opinions about CO₂ footprints and we would like to know if CO₂ emission reductions are currently mentioned during negotiations. We need to find what role there is for the CO₂ footprint and how this influences the negotiating position of both a supplier and a client:

(b) Do companies use their 'CO₂ emission -status' during order acquisition negotiations?

(c) And if they use it, can we identify the characteristics of the link between a lower CO₂ emission rate and the benefits regarding the acquisition of orders?

(d) If companies do not use their improved emissions, why do they not?

Furthermore, it is interesting to examine if there is awareness in the business market regarding the added value of a lower CO₂ footprint and to relate this to current and future regulations:

(e) How do CO₂ emissions influence the value chain?

(f) And by what incentives will this change in the future?

2.2 Relevance

Current literature describes that there is **no evidence** that Environmental Management Systems (EMS) have a consistent and significant positive impact on environmental performance (Hertin, Berkhout, Wagner and Tyteca, 2008). The Emission Trading Scheme is an example of an EMS, a system imposed by the government to meet higher environmental performance. Environmental performance comprehends conserving the environment and improving its quality. For companies it is about reducing the impact caused to the environment by consumed resources, products and services and their processing (Encyclopedia, 2009).

CO₂ emission rates become increasingly important as the amount of regulations increases. The Kyoto commitments, which legally bind industrialized countries to reduce greenhouse gases for a four year period, will expire in the year 2012. The most important greenhouse gases are carbon dioxide (CO₂), methane (CH₄) and nitrous oxide (N₂O). New, stricter rules are decided upon during the Copenhagen Climate Conference in December this year, 2009.

For companies value can be added if more information becomes available on the advantages

of lower CO₂ emission rates. Only with full knowledge of the potential of their footprints, companies will be able and willing to adopt the most cost effective carbon mitigation strategies and make full use of these potential advantages. Activities to reduce CO₂ emission will lead to a more efficient production process and a reduction in the burning of fossil fuels. Additionally, as the production process is organized more efficiently, less man-hours are needed. Both contribute to an increase in financial health of a company.

In order to fully benefit from process and product innovations and increased efficiency companies ought to cooperate with their supply chain. Also to be able to give the market a carbon dioxide supply chain guarantee on a product, this collaboration is needed. Therefore, it is important to identify how and when communication about CO₂ emission rates should take place, especially with one's customers or buyers. This research provides knowledge about if and how *decreased CO₂ emissions* in a supplier company can contribute to an *enhanced negotiating position for the supplier during order acquisition*.

The Transaction Cost Theory (Williamson, 1979) explains the mechanism behind negotiations. It bases the total transaction costs of a transaction on three variable characteristics: **transaction frequency**, **uncertainty** and **asset specificity**. The model assumes both bounded rationality and opportunism. Bounded rationality refers to limited memories and cognitive processing power. Opportunism means that people might act in a self-interested way 'with guile', i.e. that people might sometimes not be entirely honest about their intentions or that they might exploit unforeseen circumstances.

The Transaction Cost Theory describes the basic **core** of **negotiations**. Naturally, other variables influence on the negotiation process, such as trust (Groenewegen, 1996). This research tries to establish whether there is another possible addition to the model. It explores whether the CO₂ emission rate per product can be a complementary product characteristic, and if it is, whether it is of significant importance.

For example, the emission rate might influence on one of the three concepts. An asset may become significantly more specific when less CO₂ is emitted during its production as compared to similar products. Or there might be a change in frequency or uncertainty due to changes in production processes or product innovations. Or a reduced CO₂ emission rate per product might influence and alter the context in which order acquisition takes place.

2.3 Research Methods

The nature of the research is **exploratory**. The research question does not require the control of behavioral events and focuses on a contemporary phenomenon within its real-life context; a **case study** is therefore appropriate (COSMOS Corporation, 1984 and Van der Velde, Jansen & Anderson, 2004).

The research consisted of conducting 3 in-depth case studies. Each case study represents a supply chain in a specific industry. Interviews were conducted in up to three companies per supply chain, involving a supplier and two of its clients: a larger and a smaller one.

The interviews were semi-structured, where the questions were developed based on literature and a pilot. By deriving the interview questions from established literature validity is ensured. The pilot interview involved experience from a consultancy firm in CO₂ management. During the interviews constant feedback loops were integrated for reliability.

The **final report** gives clear insight in how the transaction process or negotiation phase between companies practically takes place. It describes the mechanisms in this context and their influence on transactions. The document relates to the Transaction Cost Economics and additionally suggestions are made about the current role of CO₂ emission rates in the

negotiating process, whether highly influential or not. The latter is put into perspective of the newly introduced Emission Trading Scheme.

The **audience** consists of both scientists and executives involved in strategic management of businesses. Although carbon emission reduction may be an environmental issue for scientists, its integration has a direct impact on the role of management accountants. Strategic decision making will cause management accountants to be responsible for formulating techniques to measure, monitor, and report on these factors (Dutta & Lawson, 2008).

2.4 TU Delft and Intelligence for Business

This research was conducted in cooperation with TU Delft and Intelligence for Business. Delft University of Technology (TU Delft) facilitated the research, as this is the graduation project concluding on the Masters degree education program Management of Technology. From the faculty Technology, Policy and Management three supervisors guided the process of conducting a research.

Intelligence for Business (I4B) is a management consultancy firm specialized in value chain services, the company expertise is in program and project management. The current approach is to offer sustainability services in the value chain. From the perspective of the Corporate Social Responsibility initiatives I4B identifies risks and opportunities around CO₂ emission restrictions. The collaboration with I4B consisted of information sharing and research design discussions in the beginning of the research process. The company was further involved during the selection of the cases and in the conduction of a pilot interview. After data collection and analysis, additionally Intelligence for Business was part of the discussions towards the end of the research. The contact person at Intelligence for Business was the fourth member of the graduation committee.

2.5 Outline

The report is structured according to the steps that were taken to conduct this research. In the **literature review** (*Chapter 3*) the reader is informed about the outcome of the literature search that was conducted. It contains information about the Emission Trading Scheme, CO₂ footprint definitions and models, it explains Porter's Five Forces and more in depth the Transaction Cost Theory. The concluding section of this chapter contains a research framework.

A next part of the research was to have a detailed research design. *Chapter 4* handles the **methodology**, the design of the research, defining research methods and ensuring validity and reliability. It explains how to conduct the case studies and how to develop theory from them. The Methodology chapter also contains the case study protocol that was written to conduct the case studies.

The fifth chapter starts the **analysis of the collected data**. The data collection period partly overlapped with the period of data analysis. The chapter starts discussing 10 characteristics according to which the data is analyzed. These characteristics were found important during the data collection period. Additionally it is indicated in the beginning of the chapter what mechanisms seem interesting to investigate and why. The three case studies are discussed separately and the chapter includes a cross case study in the final section.

The final chapter (*Chapter 6*) reports about the **conclusions** to this research. In this chapter we will start summarizing the procedures and characteristics of the research. Then the answers to the research questions are given and their implications are considered. Finally there is a discussion about the advantages and limitations of this research and a concluding section with suggestions for future research.

Literature Review

This section gives an overview of current established literature regarding the subjects of CO₂ emissions, footprint measures, financial performance and the Transaction Cost Economics.

First the Kyoto Protocol is brought up as the initiator of the Emission Trading Scheme (ETS) and its consequences for Europe and The Netherlands. Shortly the working mechanism behind the ETS is discussed. It is noticeable that the CO₂ emissions relevant to the ETS seem different from the emission definitions used in the industry, so next the focus shifts to different definitions of 'CO₂ footprint'. We will discuss emission sub-categories and come to a proper definition of the relevant total amount of CO₂ emissions for companies: the CO₂ footprint.

Furthermore, it is needed to explore the financial performance of companies, in order to get a feeling on how to link financial performance to CO₂ emission rates. Financial performance is a general measure of a company's financial health during a certain period of time. For companies to actively use lowered carbon emissions (or CO₂ footprint), discussing the matter during order acquisition negotiations may be appropriate. This is where the Transaction Costs Economics come to play a significant role, accordingly in a new section the Transaction Cost Theory is introduced and explained. The literature leads us to the conclusion of this chapter: an overview of the research context and the research scope, thereby setting boundaries for the research.

3.1 Emission Trading Scheme

It all started when the Kyoto Protocol was signed in 1997. Industrialized nations¹ agreed to globally reduce greenhouse gas emissions with 5.2 percent with respect to 1990 between 2008 and 2012 (Anderson, 2001). Three mechanisms remain from the agreement: the clean development mechanism (CDM), the joint implementation (JI) and the emission trading scheme (ETS). The first mechanism, CDM, allows countries to invest in emission projects in developing countries and thereby earn credits. JI suggests partnership between countries in either reducing emissions or increasing carbon sinks. The ETS focuses on global trading possibilities for countries that lower their emissions (Janssen, 2003).

In 2005 the Emission Trading Scheme (ETS) was introduced in Europe. The biggest CO₂ emitters, that is 5000 companies, are obliged to take part in the program. They are mainly electricity companies, refineries, cement factories, art manure producers, irons and steel industry. Europe is currently the only continent that obliges high energy consuming companies to participate in CO₂ emission reductions. From the year 2012 a larger amount of companies will be monitored, but already more and more companies around the world are creating emission inventories voluntarily (Davies, 2006).

The ETS implies that each company gets the legal right to send a specific amount of CO₂ into the air at a specific production location (European Commission, 2008). Companies can, when reducing their emissions, trade their right for emission, thereby earning money. The idea behind these emission rights is that companies that have low costs reducing CO₂ emissions will benefit most when selling their rights and therefore will indeed reduce their emissions.

¹The EU had to reduce emission by 8%, the US by 7%, and Canada by 6%. Non-industrialized nations, such as China and India, were not bound to agreements to reduce emissions.

Companies that can barely reduce their footprint can ‘easily’ buy emission rights. This way each euro spend on CO₂ emission reduction is spend where it has its highest value.

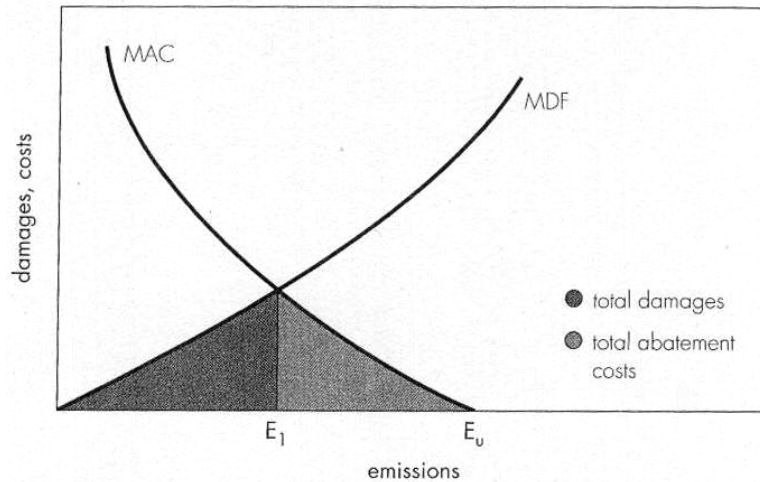


Figure 3.1: The optimal level of Pollution

The mechanism supporting the idea above is graphically shown² in Figure 3.1. The MDF curve shows the **Marginal Damage Function**, with on the horizontal axis emissions and on the vertical axis the costs of the damages to the environment certain emissions generate. The MAC curve displays the **Marginal Abatement Costs**, which compares emissions (horizontal axis) with the costs of reducing pollution to a lower level, thereby ensuring fewer damages (vertical axis).

The functions are marginal functions, which entails that the costs of increased emissions are expressed in additional costs as compared to the current level. The total costs to society can be derived by calculating the grey area underneath the graph. As can be seen in the Figure, there is a market equilibrium or optimal solution E_1 at the intersection of the two curves (Kahn, 1998). It may be clear that this is the emission rate that ensures the minimal total costs, so the smallest area under the graphs.

Figure 3.2 shows³ how a non-optimal solution leads to social costs. The graph on the left shows solution E_2 , representing a pollution level greater than the optimal solution. The triangle abc depicts the consequential additional costs to society. The graph on the right gives us solution E_3 , for which the pollution level is less than the optimal solution. Similarly, triangle ade represents the additional societal costs to this solution.

The ETS is a government intervention that strives to reach the optimal solution in this case of market failure. The optimal solution entails maximizing social welfare, which is minimizing societal costs. The market fails to be efficient because the price to a negative externality (‘product price’) is not equal to the generator of pollution and its victim (in a market respectively seller and buyer) (Kahn, 1998). By introducing the MDF and MAC curves, the government in fact adds costs to certain transactions. The European Commission states that the ETS is still a key

²Figure taken from literature: Kahn (1998).

³Figures taken from literature: Kahn (1998).

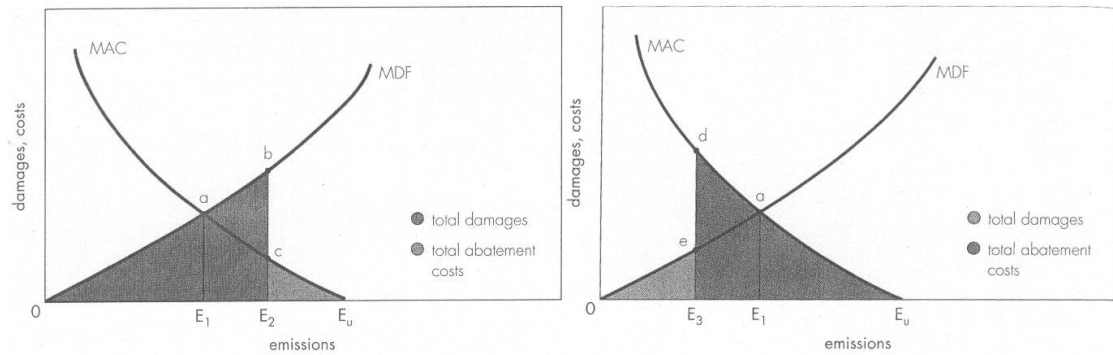


Figure 3.2: Pollution level Greater than (left) and Less than optimal

instrument regarding the Kyoto commitments on climate change (2008).

In 2012 the Kyoto Protocol ends. In December this year (2009) in Copenhagen new climate change preventing regulations will be agreed upon. Given the current trend of importance, regulations will be stricter and more pressing. An increasing amount of companies will be monitored, they can no longer deny global warming and its consequences. It will become increasingly more difficult to buy emission rights, which makes it all the more important for companies to act now and involve the matter in company objectives. The statement that companies can now ‘easily’ buy rights to emit more is correct, but as regulations tighten, what will happen to the buying price of these emission rights? Furthermore, why is there such a limited focus on the positive effects of CO₂ emission reduction? Production processes will become more efficient, which entails that the company endurance is secured. Financial benefits can be found in the selling of emission rights, but particularly in the safe guarding of one’s durability.

To act accurately on CO₂ emission reduction we first need to define what emissions are significantly important to a company with regard to endurance. It seems that not only measurement of emissions at a specific production location is relevant, as it is defined for the ETS. It may be more appropriate to secure a broader range of emissions, as we shall see in the next section.

3.2 CO₂ footprint

To the Emission Trading Scheme the measurement of CO₂ emissions at a specific production location are relevant, but for a company it is the CO₂ footprint that is important. It includes not only CO₂ emitted at a certain location, it has a **broad**er definition. Lynas (2007) defines a footprint as the measure of an individual’s contribution to the total amount of produced greenhouse gases (GHG), translated to units of carbon dioxide equivalent. The carbon dioxide equivalent, or CO₂e, is a unit used to measure the global warming potential for all greenhouse gases (Crown & Carbon Trust, 2008). The most important greenhouse gases are: carbon dioxide (CO₂), methane (CH₄) and nitrous oxide (N₂O), together with families of gases including hydrofluorocarbons (HFCs) and perfluorocarbons (PFCs) (IPCC, 2007).

Tukker and Jansen (2006) divide a footprint into two parts: primary and secondary contributions. The primary or **direct emissions** are all emissions that follow from the burning of fossil fuels: all domestic energy consumption and the burning of fossil fuels used for transport.

Secondary or **indirect emissions** are related to all other remaining emissions during the life cycle of a product and while using services. The life cycle includes the part of the footprint that arises from the manufacturing and eventual breakdown of products and services. This approach is often referred to as Life Cycle Assessment (LCA).

Crown & Carbon Trust (2008) also explain how supply chain GHG emissions, by which processes outside the company itself are meant, can be measured at either the company level or the level of an individual product. They introduce the term '**product carbon footprint**', which can be determined when looking at the Greenhouse Gas emissions of a product through its life cycle. Thereby the individual product level measurement is a form of Life Cycle Assessment again.

The Greenhouse Gas Protocol, which is an initiative of the World Resources Institute and the World Business Council for Sustainable Development, is an international tool for GHG emissions measurement and management. It defines three different **scopes of emissions**: Scope 1 emissions are all direct GHG emissions. Scope 2 are the indirect emissions from purchased energy consumption (electricity, heat or steam). For Scope 3 other indirect emissions remain, e.g. from transport by subcontractors or other outsourced activities (WRI and WBCS, 2006).

Direct emissions used in this definition are emissions from sources the company controls or owns. *Indirect emissions* arise from sources the company does not control, but which are emissions consequential to a company's activities (WRI and WBCS, 2006). The indirect emissions are caused by subcontractors.

For the ETS government regulations only Scope 1 emissions are important, Scope 2 and 3 are excluded because of otherwise occurring double records, accounting for the same emissions twice. The total CO₂ footprint of a company however, should take scope 2 and scope 3 emissions into account. The entire range of activities of a company is then quantified in terms of carbon dioxide emissions. Would it be fair to exclude company cars heavily consuming fossil fuels?

Intelligence for Business (2009) defines the total CO₂ footprint of a company as a combination of three groups of CO₂ emissions: energy-related emissions, emissions caused by actions assigned to subcontractors and other emissions. The energy related emissions are primary contributions; emissions caused by subcontractors can be categorized as secondary emissions. The third group can consist of both primary and secondary contributions. Examples are emissions that are not directly related to the production process, such as the use of resources to use and maintain an office building. This division in emissions is used during the measurement of a company's footprint, as we shall see in the measurement part below.

The above definitions partly conflict with each other. To this research, the most relevant footprint is that of a **company**. The emissions of a company's subcontractors (as a consequence of this company's actions) are very relevant to a company and its supply chain, they must be included in a company's own footprint. The following **definition for CO₂ footprint** or carbon footprint will be used in this document: *The total of all produced Green House Gasses a company is responsible for, translated to units of carbon dioxide equivalent. The footprint includes all direct and indirect emissions: emissions consequential to company activities and from sources the company does and does not control.*

Measurement

The measurement of CO₂ emissions is a difficult matter, but emission rates are accurately quantifiable. The level of pollution is very definite: the concentration of CO₂ in the atmosphere in terms of parts per million. Over the last three years the concentration CO₂ in the atmosphere increased from 381 parts per million (ppm) to 389 ppm (Earth Systems Research Laboratory, 2009). In perspective: the safety limit set by science is 350 ppm and was crossed in 1988.

To get a feeling for the complexity of the measurement of CO₂ emissions and footprints for

individual companies and products, *Appendix A* shows the variety of present measurement tools and models regarding the CO₂ footprint. The mentioned Life Cycle Assessment is more elaborately discussed in particular. Further is it stated what categories in models exist and what selection criteria there are on how to distinguish and select suitable models per situation. As it is not directly related to this research, here we will not elaborate on the matter further.

3.3 Corporate Social Responsibility

CO₂ emission reduction is a form of Corporate Social Responsibility (CSR). CSR implies that companies involve ethical norms in the decision making of their business. Thereby companies should consider the impact of their activities on people and the environment, and take responsibility for it. The mechanism gives importance to the 3 P's: People, Planet and Profit.

CO₂ emission reduction concerns planet and profit. The social responsibility reasons to operate in an environmentally correct way come forth from the political environment and possible business influences, such as company image.

It should be clear that the Emission Trading Scheme causes companies to *involuntarily* participate in CO₂ emission reductions. Social control might enhance the rise of certificates for companies to prove their positive contribution. Certificates that unfortunately are not always problem solving, because their origin is a company acting from a perspective of profit generation. There is a similarity between certificates and the Emission Trading Scheme, part of the generated CO₂ emissions is not accounted for. This causes certificates to not always facilitate Life Cycle Assessment for example.

On the other hand there are companies that *voluntarily* invest in making inventories of emission rates involved in production processes (Davies, 2006). Voluntarily meaning that these companies are not (yet) obliged to monitor their CO₂ emission rates and buy emission rights by the government. They are involved in Corporate Social Responsibility programs and they put in serious effort to change something. These companies are not only involved in CO₂ emission reductions at specific production locations (the ETS regulation), they fight for a lower total CO₂ footprint. Scope 2 and Scope 3 emissions, the emission consequential to a company's activities but produced by subcontractors, are significantly important to those companies. And for long-term durability these parts of the footprint are substantial in the value chain.

It seems that not even the best certificate beats this involvement. A solution could be to emphasize the economic advantages and profits of participating early and voluntarily. The economic incentives are caused decreasingly by the Emission Trading Scheme. Most importantly, as we will see in the next subsections, they are caused by efficiency and financial performance.

3.4 Financial Performance

Social responsibility is also driven by ratings, such as the *Dow Jones Sustainability Index* and *Reputex*, which furthermore increase the visibility of being a 'good' corporation. Dutta & Lawson (2008) even state that a representation of an organization's profitability is actually more properly given by its financial profitability minus its carbon footprint. And, extending that, Carbon Trust (2006) proves the relation between actions on the opportunities in a company's **supply chain** to reduce emissions and the financial improvements that come with it. The result follows from developing a business tool that demonstrates the financial and environmental value that can be gained from supply chain analysis and a pilot that affirms its success.

Also according to PricewaterhouseCoopers (CDP, 2009) companies that are actively working on their CO₂ footprint have a higher stock exchange quotation than companies that are not. They

state that a reduction in CO₂ footprint leads to profit. This is explained by starting from *you manage what you measure*, and its first step which is awareness. The awareness on what steps in a value chain contribute most to the total CO₂ emissions identifies inefficient parts of the chain, thereby identifying present slack. Experience learns that most often this slack represents the first 5% increase in efficiency.

By efficiency the technical or physical efficiency⁴ is meant: actual output divided by effective capacity (Slack, Chambers & Johnston, 2007). An inefficient producer can produce the same with less input. Thereby there is a clear positive relation between efficiency and financial performance.

The supply chain approach can be related to the **value chain analysis** that Porter (1985a) described, but applied to the supply chain. Porter refers to this as the value system. The value chain approach identifies primary activities that add value to a product: inbound logistics, operations (production), outbound logistics, marketing and sales, and services (maintenance). By lowering CO₂ emissions somewhere in the value system, excluding present slack, most often less input of resources is required. Lower energy consumption requires less input of fossil fuels, which again implies that a lower amount of fossil fuels has to be purchased. The company then has lower total offsetting costs. Furthermore, processes will be more efficiently organized, thereby requiring less resources and less man-hours. As a result: a firm achieves a higher production efficiency while its CO₂ footprint is decreased.

Question is, if the PricewaterhouseCoopers relation ‘that a reduction in CO₂ footprint leads to profit’, is also reversible: does maybe profit lead to an agreement in CO₂ footprint reduction? First, CO₂ footprint reduction needs elaborate investments. Secondly, there may only be room for discussing footprint matters when there is a profitable core business collaboration in place. In that case first profit is needed, before CO₂ footprint reductions start to be beneficial.

This research focuses on the possible consequences of CO₂ reductions in the value chain. If a company somewhere in the value chain lowers its CO₂ emissions, the advantages of this reduction are not always directly translated to higher profits for that company. Benefits may be revealed elsewhere in the value chain. Examples in which this is the case are the use of recyclable materials in Company X and the reductions in waste further downstream in the chain. More specifically, Closed Loop Supply Chains are the best example. A Closed Loop Supply Chain (CLSC) ideally is a supply chain with no waste at all, established by the reuse, recycling and the composting of all materials in that chain. A simple design of a CLSC can be seen in Figure 3.3. Assume a company invests in designing resources in a recyclable way, the profits from the action are gained further downstream in the supply chain. CLSC have high levels of interaction and co-operation. Only by designing the production process very carefully, the benefits of sustainability measures initiated by Company X can be retrieved and converted towards profits for Company X.

A supply chain approach seems to be preferable if companies want to invest in CO₂ emission reductions. Significant changes in product and process design need teamwork with suppliers and buyers throughout the supply chain.

Also from the Life Cycle Assessment point of view companies should practise a value chain approach. To the market the product footprint mentioned in *Section 3.2* is relevant: every single activity adding value to the product should add low CO₂ emission rates. Only when an entire value chain participates in CO₂ emission reduction a certain guarantee can be given to the market. But this is not the only incentive for companies to collaborate with their supply chain.

⁴A formal definition is given by Koopmans (1951) as “a producer is technically efficient if an increase in any output requires a reduction in at least one other output or an increase in at least one input, and if a reduction in any output requires an increase in at least one input or a reduction in at least one other output” (quotation).

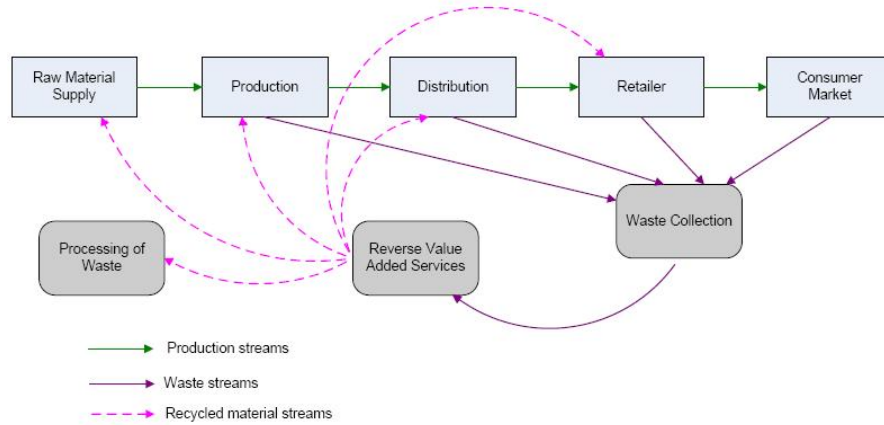


Figure 3.3: Reuse of waste in a Closed Loop Supply Chain

3.5 Innovation

Another positive consequence of the supply or value chain approach is that by discussing the CO₂ footprint it gives rise to **technical innovation** (Carbon Disclosure Project, 2009). If companies are willing to discuss CO₂ footprint improvements in their supply chain, the level of communication is increased and the feedback between companies will be more intense. In thinking together with suppliers and clients from a broader perspective innovative initiatives will start rising. In general higher levels of innovation increase the competitiveness of individual companies towards their competitors (CDP, 2009). Porter & van der Linde (1995) support this statement by saying that environmental standards, if thoroughly reflected upon, can give rise to innovations to lower the total cost of products or increase their value. The innovation changes the use of resources to a more productive one: higher productivity regarding raw materials, energy use and labor increase company competitiveness. Similarly, Desso (2009) presses that the footprint discussion stimulates innovative thinking within the firm. Thereby a *discussion* alone on reducing the footprint in a supply chain *enhances innovation* throughout the whole supply chain.

PricewaterhouseCoopers (in CDP (2009)) indicates that suppliers play a key part in developing more sustainable ways production. Most innovations are also supplier oriented. Also regarding long term carbon implications suppliers play a key role. They advise transparency and integration of sustainability as managed in the supply chain. Suppliers can help focus and ensure efforts are strategically right. Similarly, the CDP (2009) describes how carbon management is about relations and knowledge sharing. The discussion about the carbon footprint with suppliers encourages putting one's cards on the table early in the transaction process.

Adding the value chain characteristics and the innovative quality together, from a suppliers' perspective it is of significant importance to be able to **communicate** those advantages. A key question is if and how a company that takes the first initiative to reduce CO₂ emissions can succeed in attracting consequential benefits. The supplier needs a way to present and discuss the matter with its direct clients during negotiations. The main mechanisms that have influence on how the CO₂ footprint should be introduced during order acquisition negotiations, are the negotiating position of the company (Porter's bargaining power of buyers and suppliers) and the mechanism of the Transaction Cost Economics. The following subsections discuss these two concepts in more detail.

3.6 Porter: Five Forces

For Porter, strategy is about the choices a firm makes. It should pursue things it wants and, most importantly, it should overlook things it does not want. Strategy is a deliberate and conscious effort to be an exceptional player in a specific industry. The matter of CO₂ emissions is thereby also related to one of the Five Forces (Porter, 1985b).

Porter's model of the Five Forces describes, next to the *competitors* in the industry, two main threats to a company and two main forces of power caused by the supply chain. The two main threats are that of new entrants and that of substitutes for the product or service a company is selling. They can be seen on the vertical axis of Figure 3.4.

The threat of *new entrants* raises the question of the existence of entry barriers, which cause a need for high investments, and of fixed long term contracts and agreements, which prevent new entrants from having access to industry distribution channels. Furthermore, in an industry with high economies of scale, new entrants are in a more difficult position. Finally the threat of new entrants is higher if the switching costs for customers is low.

The threat of *substitutes* refers to possible new cheaper production methods with a similar output and the risk of revolutionary substitute products in the market. Although the price-performance ratio is important, the buyers readiness to switch to a substitute remains of high influence. In this sense also switching costs to consumers are significant to the threat of substitutes.

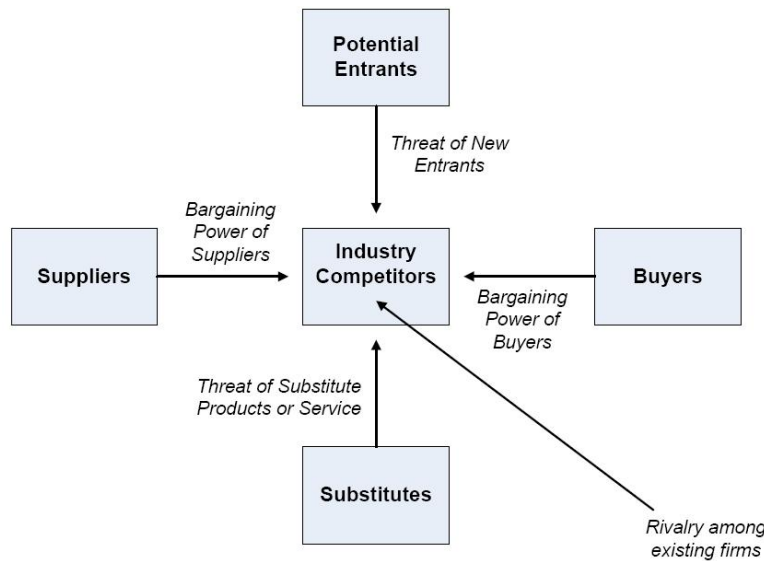


Figure 3.4: Porter's Five Forces

On the horizontal axis the **value chain of a company** is represented, the axis along which transactions take place. The *bargaining power of suppliers* is defined on the market of input: suppliers can have power over a firm through high switching costs or labor unions. It is explained by the existence of monopolies or duopolies regarding specific valuable resources, i.e. scarcity. Suppliers can have higher bargaining power if their brand is important to consumers. And suppliers have a better bargaining position in case the industry is not their most important group of customers, which refers the presence of other options to transfer to.

The *bargaining power of buyers* refers to the ability to influence on price levels. When an

industry has standardized products buyers have higher power as compared to non-standardized products. Also ordering high volumes gives higher power to buyers. Some buyers might cooperate to gain power in this matter.

Another significant aspect to the bargaining power of both suppliers and buyers is the threat of both groups **to integrate** forwards or backwards. Suppliers can threaten to integrate towards the industry and buyers can threaten to integrate towards its suppliers. The level of forward and backward integration determines the **vertical boundaries of the firm**. In this aspect the vertical boundaries of the firm are strongly related the power of supplier and buyer groups.

Since our research question is posed from a suppliers' perspective, the forces along the horizontal axis of the Figure are very relevant. These represent the **value chain of a company** and include the aspects involved in order acquisition negotiations.

As it was indicated the bargaining power of buyers refers to for example the ordering of high volumes. Ordering volumes refer to the ordering frequency of transactions, which is one of the three concepts that determine the total transaction costs of a transaction according to Williamson's Transaction Cost Theory.

Furthermore regarding the bargaining power of suppliers a common phenomenon is the charge of exceptionally high prices for unique resources. This is a reflection of asset specificity, which is the second concept to determine transaction costs. Finally, the vertical boundaries of the firm are not only subject to the bargaining power of suppliers and buyer groups, but moreover to the transactions costs of certain necessary transactions. This leads us to further elaborate on the Transaction Cost Theory of Williamson.

3.7 Competition and Co-opetition

But before we discuss the Transaction Cost Theory, a final part of the literature that is worth mentioning is the article by Brandenburger and Nalebuff (1996). Some (e.g. Preston McAfee, 2002) say their model is an alternative to Porter's Five Forces, either way it was inspired by it. According to Brandenburger and Nalebuff, the game of business is played with 4 groups of players: **customers**, **suppliers**, **competitors** (substitutors) and furthermore the **co-opetitors** (complementors). The latter is a non-competing group, which provides complementary products and services to a company, that *"can make all the difference between business success and failure"* by adding value to the original.

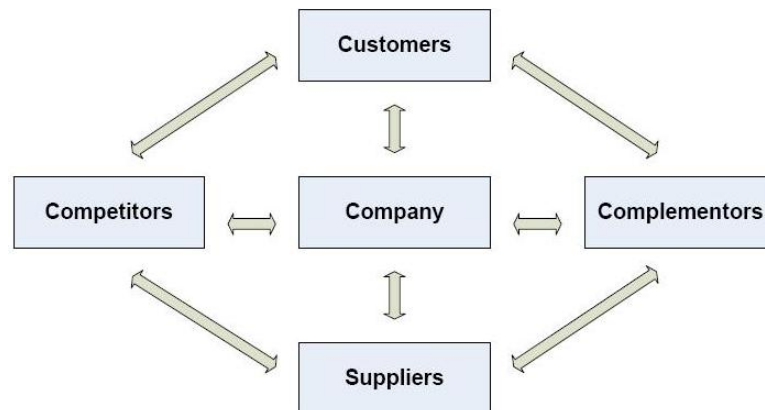


Figure 3.5: The Value Net

In Figure 3.5 it is shown that together with the company the four groups form an interactive network: ‘The Value Net’. One can clearly see the *vertical* axis, which represents company relations involving **transactions**, and the *horizontal* dimension, which refers to only **interaction** (but no transactions). Brandenburger and Nalebuff state that in this regard sometimes the best strategy is to let others be successful.

The groups on the vertical axis are the firms present in a company’s supply chain and it thereby also represents the value chain. This implies that order acquisition negotiations take place along the vertical axis. The innovative character, as it was discussed in *Section 3.4*, is therefore enhanced by discussing the CO₂ footprint along this axis of the Value Net. The vertical boundaries of the firm, as discussed in the previous section, are set along the vertical axis of the Value Net.

For the group of co-opetitors on the horizontal axis it can be suggested that it also adds value to products. As an example, a telecom provider selling subscriptions for mobiles would be out of business selling SIM⁵ cards if there were no stores in the market selling the mobile telephone devices that use these SIM cards. SIM cards need mobile devices, the mobile telephone devices actually create the value of SIM cards. But this group is not involved when we are looking for a value chain guarantee for certain products. The group of co-opetitors is situated in a different value chain than the company’s. The group can however become part of the company’s value chain if the company decides to integrate ‘horizontally’: when it decides to start producing a broader range of products.

Similar to what the Five Forces model Porter suggests, the interactive Value Net represents a dynamic network. The constant dynamics are caused by changes in one or more of the five groups. Changes in customer and supplier groups, caused by (or causing) vertical (dis-)integration and changes amongst competitors and co-opetitors, sometimes initiating horizontal integration.

Independent of the way of modeling the business context, interaction is very important. Companies should communicate and share information with the companies in the same supply chain to align the vision on value adding activities. We will now discuss the Transaction Cost Theory developed by Williamson to understand the mechanisms relevant to order acquisition negotiations. Having full knowledge of the dimensions of the negotiating process, will help us to identify whether, and if yes, how supplier companies can increase the level of interaction by discussing the CO₂ footprint during order acquisitions.

3.8 Transaction Cost Economics

In the Transaction Cost Theory, Williamson (1979) states that the critical dimensions for describing contractual relations are the **frequency** with which transactions occur, **uncertainty** involved in a transaction, and the degree to which investments are peculiar or particular, the latter referring to **asset specificity**. Groenewegen (1996) describes these as concepts of respectively behavioral, human, and technical nature.

Williamson first makes two main assumptions to state the context to the model: bounded rationality and opportunism. **Bounded rationality** represents the limit to the human brain, so the limited capacity in recalling earlier events and limited cognitive processing power of the brain. No human can oversee all consequences of his actions, no matter the amount of information at his disposal.

Opportunism comprehends the relation between actions and the human conscience. Williamson assumes that there always is a possibility that a person will act in a self-interested way “with guile”. Persons may not share all information, they may not be fully honest about their true

⁵Subscriber Identity Module

intentions, or they might try to exploit others when unforeseen situations occur and offer an opportunity to do so. It should be noted that Williamson assumes that only some people might sometimes act opportunistic, where part of the assumption is that one cannot predict who will and in what situations. Further assumptions to the model are rationality in managerial decision making and companies striving for profit maximization (and thus cost minimization).

The Transaction Cost Theory describes whether the costs of a transaction are lowest in the market or within the company (under hierarchy). Important is that the **total** transaction costs are referred to as the combination of production costs and transacting costs (costs of transacting). **Production costs** follow only from the production process within the firm, which can be pictured as an “ideal machine”, either working flawlessly or not. This implies that production costs can be minimized, just by fully optimizing the ‘machine’ or production process. The **transacting costs** on the other hand are the costs involved when trying to sell or buy a product on the market. Market failures, such as deficient available information and non-perfect competition come into play. Market failures cause costs as companies have to take risks, a situation might suddenly turn around, thereby orders might be canceled. The company had already taken the order into production and now it has to sell the stock for a lower price. Or when there is a lack of information available to the company, they might sometimes make a wrong decision, thereby losing money. These types of costs are the costs of transacting products. Hereafter we will use the term **Transaction Costs (TC)** for the *total costs involved in a transaction, so the sum of the production costs and all other costs of transacting products*.

By determining if transaction costs are higher in the market or within the company, a company decides on the **vertical boundaries of a firm**. One can imagine that a company will not integrate vertically if it only needs a product once every two years, but that it will vertically integrate if it can achieve much lower transaction costs by producing a product itself instead of getting it from the market. If a supplier succeeds to lower the transaction costs of a transaction, there are lower incentives for the buyer firm to vertically integrate. This increases the bargaining power of suppliers, as it is identified by Porter (1985b).

As indicated, the first variable relevant to characterize a transaction is the *frequency* with which a product or service is needed or transferred. Bringing ‘in-house’ a product or service that is rarely used, does not seem a smart thing to do from an economical perspective. Using a product with high frequency and producing it within the firm might lower the transaction costs and therefore be a competitive advantage.

A second transaction characteristic is *uncertainty*, which refers to unforeseen difficulties. For example, the length of a transaction is of main influence on uncertainty. A cause to this uncertainty is the assumed bounded rationality: one cannot foresee all eventualities that can occur. Low uncertainty in general causes lower transaction costs, because lower risks are involved. Lengthy transactions have higher uncertainty, and according to the theory for a company it is then more likely to consider integrating vertically.

The final variable is *asset specificity*. Asset specificity indicates the value of a transaction in a specific context. If an asset is only valuable (or much more valuable) in a specific transaction context, integrating vertically can decrease the transaction costs by large amounts. The importance of this variable again originates from the assumptions: bounded rationality and opportunism both steer the risks in dealing in highly specific assets.

Elaborations to the Transaction Cost Economics state that the domain of trust is overlooked. Human and behavioral concepts touch the domain of trust, and that the level of trust influences the level of opportunistic behavior (Noorderhaven in Groenewegen, 1996). For a lengthy transaction on the one hand uncertainty can be lower if trust has developed between two parties, but trust (as well as mistrust) can also encourage opportunistic behavior. A lack of trust can be caused by cultural differences and different habits, or because of a lack of information on

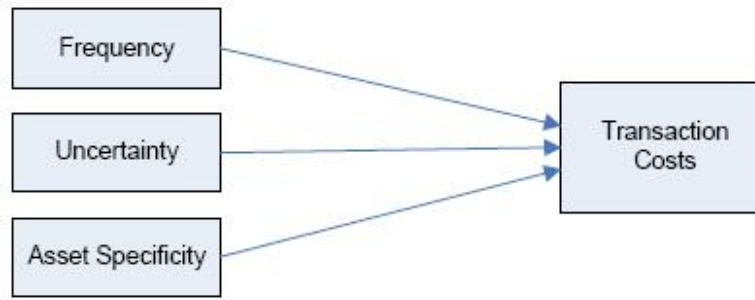


Figure 3.6: Transaction Cost Theory

product quality and reliability. Trust can also decrease transaction costs via a reduction in costs for cooperation and specialization (Hill, 1995). Noorderhaven distinguishes situational trust and character trust, of which character trust is considered more robust and thereby can be a reliable basis for transactions. Relational signals, such as payment, promotion and contract length, are also introduced as most important to better understand human behavior (Lindenberg in Groenewegen, 1996). One can imagine that in this respect reputation might also influence on transaction costs.

Human and behavioral concepts are difficult to integrate in the transaction cost theory, as their division is that of organizational psychology. Interaction between agents, self-interest and agency trust are matters of social behavior and can, similar to reputation, become a competitive advantage (Barney and Hensen, 1995). In this research we will not elaborate further on organizational psychology, we will consider all behavioral aspects to be in the context of order acquisition negotiations. This context is therefore also figured to be dynamic, it is subject to change if given incentives.

To conclude on the literature part, a funny note. Regarding the Transaction Cost Economics, this research is supported by a quote of Williamson's notation: "The TCE model is of necessity incomplete and can benefit from supplementation in given empirical setting" (1985).

3.9 Research Framework

The above literature section discussed the context of the research. It leads us to Figure 3.7, which gives an overview or summary of the **research context**.

We have seen that for CO₂ footprint reduction roughly three main categories exist: Product innovation, Process innovation and Innovation amongst Subcontractors. Product innovation refers to a change in resources, thereby excluding part of one's CO₂ footprint. This is graphically shown by relation 1. It describes the differences in technical specifications regarding the processing of certain materials. Some resource materials may for example need a minimum of energy to be processed, others may have extensive byproducts such as Green House Gasses during processing.

Relation 2 is explained by the fact that Process innovation leads to higher production efficiency, which implies that less resources are needed for production. Particularly the lower levels of energy consumption, that is the burning of fossil fuels, cause a CO₂ emission reduction.

Innovation amongst subcontractors does not influence on CO₂ emission reduction in Production, but lowers the CO₂ footprint of a company. As we identified, the CO₂ footprint is the total

amount of produced Green House Gasses a company is responsible for, translated to units of carbon dioxide equivalent. It includes all emissions consequential to company activities and from sources the company does and does not control. The footprint captures a broader range of emissions, it additionally includes the emissions of subcontractors. This is summarized in relations 3 and 4.

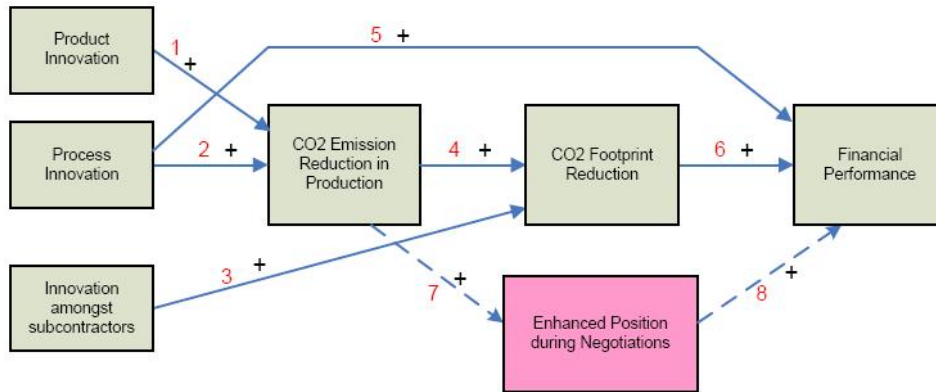


Figure 3.7: Research Context

The link between efficiency during the production process and the financial performance of a company, as it was discussed in the literature review section (*Section 3.4*), is represented by relation number 5. Please note that all relations in the Figure are positive, which means that an increase in the first concept results in an increase in the second concept.

Originally caused by the Emission Trading Scheme, with a reduced footprint, the trading of emission rights leads to a better financial performance. But moreover, as it was discussed, a lower footprint most often requires less purchasing of fossil fuels. Also, the costs for offsetting are lower. Furthermore, by having a higher efficiency for processes, the company will have a more efficient use of other resources. One of the main savings then is the decrease in expenses for man-hours. This is summarized by the link marked with 6 in the Figure.

Additionally, the CO₂ footprint becomes increasingly valuable if companies can succeed to give a supply chain guarantee on CO₂ emissions for specific products. From a suppliers' perspective it is therefore of significant importance to communicate those advantages, in order to succeed in attracting consequential benefits. The supplier needs a way to discuss the matter with its immediate clients during order acquisition negotiations. Relations 7 and 8 situate this problem to the research context. It questions if a CO₂ footprint reduction leads to a better suppliers' position during order acquisition negotiations.

Relations 7 and 8 graphically represent the subject of the research. We will try to establish the characteristics of the dotted links given, thereby identifying relevant mechanisms and determining the strength of the relation.

The box between relations 7 and 8 states ‘Enhanced Position during Order Acquisition Negotiations’, which is a summarizes a set of mechanisms. We have seen in the literature that the Transaction Costs can be determined for every transaction by looking at various concepts.

Buyer companies will, when deciding in order acquisition negotiations, choose the lowest possible transaction costs for each transaction.

A supplier company that wants to ‘enhance its position during order acquisition’ by introducing a CO₂ footprint discussion during order acquisition negotiations, should therefore try to lower the transaction costs of the supposed transaction. To identify the characteristic of the links 7 and 8 in Figure 3.7, we will have a closer look at the Transaction Cost Economics.

More specifically, the research will try to identify and confirm the characteristics of the possible pink relations in Figure 3.8.

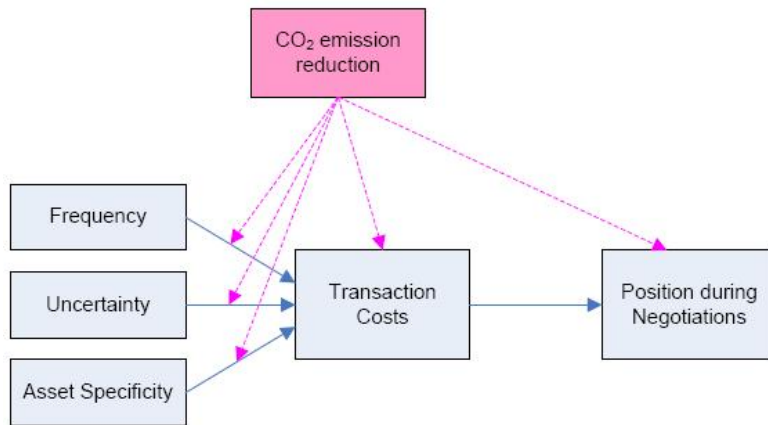


Figure 3.8: Research Scope

CO₂ emission reduction influences on the transaction costs due to the Emission Trading Scheme as explained in the preceding literature. Possibilities regarding the exact company relations can be seen in the light of Porter’s Five Forces. The different levels of bargaining power of suppliers may allow for a reduced CO₂ footprint to become important. For example, in case there is a high transaction frequency, higher costs for CO₂ emissions are involved. A lower footprint might in the long run save money. Asset specificity may also be influenced by a reduced footprint, as the sustainability thought in general is relatively new. Given the current political climate, image may be key.

Since companies are motivated to put their cards on the table early in the negotiating process as soon as the CO₂ footprint is involved, uncertainty may decrease. Or the emissions may directly influence on transaction costs because of lower production costs and higher production efficiency. A final insight is the relation via the innovative character of a footprint discussion. The transaction costs may not directly lower, but they may seem lower and decrease for future negotiations due to innovations: thereby a better position during the current negotiation is established.

Naturally, the exact way the concepts influence on each other and what mechanisms are responsible for the observed behavior remains for now a part of the research question.

Methodology

It is important to have clear steps when conducting a case study research. Starting from clear definitions and goals, a research question was designed. The next step was to select cases using theoretical sampling. A further step was to define instruments and having a case study protocol. This approach is supported by Eisenhardt (1989). Also Yin (2003) argues how a clear framework, logic in design and data techniques, and specific approaches to data analysis can add up to a robust case study, which is appropriate to all phases of research.

This Methodology section reports about the execution of the above steps. The first subsection restates the research question with its sub questions, followed by a section that is about the research design. Then theory development and the quality of the research design are discussed. The concluding subsection contains the case study protocol.

4.1 Research Question

From a suppliers' perspective, does a reduction in CO₂ emissions lead to a better negotiating position during order acquisition? If no, why not? And if yes, how does it lead to this better suppliers' position regarding the acquisition of orders?

Recalling from the Introduction (*Chapter 2*), to answer the research question we have identified sub questions, which served as a general guideline during the design of the case studies and for data collection.

- (a) What aspects are involved in negotiations and which are strategic advantages?
- (b) Do companies use their 'CO₂ emission -status' or CO₂ footprint during order acquisition negotiations?
- (c) And if they use it, can we identify the characteristics of the link between a lower CO₂ emission rate and the benefits regarding the acquisition of orders?
- (d) If companies do not use their improved emissions, why do they not?
- (e) How do CO₂ emissions influence the value chain?
- (f) And by what incentives will this change in the future?

After the data collection 10 important characteristics were identified to further analyze the data. The important mechanisms between the characteristics were also identified after data collection.

4.2 Research Design

The nature of the research is **exploratory**. With the CO₂ emission rights and the market that will arise from these rights, it is interesting to look into the advantages from these regulations. The **research objective** then was to determine *if and how companies can benefit from their lowered CO₂ emission rates*, more specifically: if and how to use them to their *advantage during order acquisition*. The corresponding research question does not require the control of behavioral events and focuses on a contemporary phenomenon within its real-life context; a **case study** is therefore appropriate (COSMOS Corporation, 1984 and Van der Velde, Jansen & Anderson, 2004).

The **final report** gives clear insight in how the transaction process or negotiation phase

between companies practically takes place. It describes the mechanisms in this context and their influence on transactions. The document relates to the Transaction Cost Economics as described by Williamson (1979). Additionally suggestions are made about the current role of CO₂ emission rates in the negotiating process, and about whether it is highly influential or not. The outcome is put into perspective of the newly introduced Emission Trading Scheme.

The **audience** consists of both scientists and executives involved in strategic management of businesses. Although carbon emission reduction may be an environmental issue for scientists, its integration has a direct impact on the role of management accountants. Strategic decision making will cause management accountants to be responsible for formulating techniques to measure, monitor, and report on these factors (Dutta & Lawson, 2008).

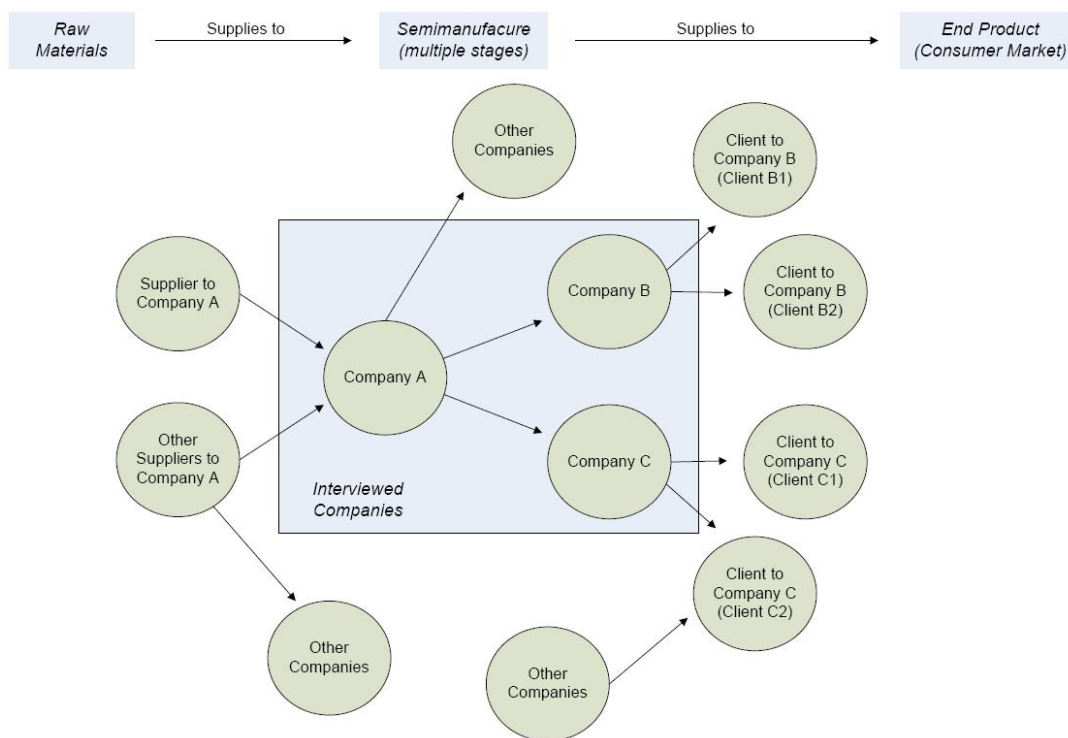


Figure 4.1: Structure of the Cases: Interviewed Companies in the Value Chain

The main **data collection** method was the conduction of semi-structured interviews. Given the time constraint of 6 weeks for data collection, we had 3 in-dept case studies. Each ‘case’ represents a supply chain in a specific industry. Interviews were conducted in up to 3 companies per supply chain, involving a supplier (company A) and preferably one or two of its clients: a larger and a smaller one (resp. Company B and C). The latter is shown in Figure 4.1. The interviews focussed on discussing two specific order acquisition negotiations that took place and in which the interviewee was involved. The discussion involved one deal with relatively high transaction costs and a deal with relatively low transaction costs. All interviewees consequently were from the strategic management level of a company. The part of the case which was focused on, is the actual strategic negotiating ‘game’ that was played by both parties, thereby defining

the limits of the data collection.

This structure makes that we have a **multiple-case design**. When the evidence comes forth from multiple cases, the results are considered more robust than from a single case (Herriot & Firestone, 1983). Three different industries have been chosen intentionally with regard to expected behavior and present CO₂ footprint activities. The structure of the three cases was the same, as was the method of analysis, which made it possible to compare the cases with one another. Studying multiple cases via this method gave the opportunity to make use of literal replication and theoretical replication. *Literal replication* means that if a second case has the same results as the first case, the researcher may claim replication. The result is replicated and this trend is a basis for building theory. *Theoretical replication* may be claimed if a second case has results contrary to the results of the first case, but for predictable reasons (Yin, 2003). If the starting condition for a certain relation is different, contrasting outcomes may be expected. If the researcher can identify the cause to this different outcome, replication may be claimed. This represents a pattern and is a basis for theory building.

The main analytic technique used to link the collected data to propositions is **pattern matching**. Thereby empirically based patterns were compared to predicted ones, which in case of a match ascertained internal validity (Yin, 2003). The application of literal replication then was a pair of matching patterns. Non-matching patterns were used to apply theoretical replication. Related to this was the use of **logic models**, by which empirically observed events were matched to theoretically predicted events. Literal and theoretical replication were likewise applied. Further we have relied on theoretical propositions and defined rival explanations.

The **criteria** for interpreting findings relate to the quality of the case study. Available information is described and major rival theories were presented. And we have used our own expert knowledge to evaluate current thinking about the topic.

4.3 Theory Development

In the Transaction Cost Theory, Williamson (1979) states that the critical dimensions for describing contractual relations are transaction frequency, uncertainty and asset specificity.

While studying the behavior of companies during their negotiating phase, we will work towards the Transaction Cost Theory, trying to identify the theoretical role of the CO₂ footprint in this model. This is graphically displayed¹ by Figure 4.2.

Various propositions underlie the theory development. A first assumption was that the political climate, as it is now, will not change. The Emission Trading Scheme will continuously be introduced throughout Europe in an effective way. The introduction of the Emission Trading Scheme initiated discussion about CO₂ emissions. Most probably by 2012 (I4B, 2009), the Emission Trading Scheme concerns all firms and this is only three years from now. The Copenhagen Climate Conference (in December 2009) will set these regulations. A second assumption stated that companies strive maximum profits, thereby constantly searching and striving for higher levels of efficiency. This includes the use of strategic advantages.

The study shows if, and if yes, how, transaction costs are additionally (so next to transaction frequency, uncertainty and asset specificity) increasingly influenced by the CO₂ footprint of contractors. Given the current literature the origin of this relation becomes evident. The

¹Note that the figure is limited. Many other concepts may influence on the concepts in the diagram, but they are figured out of scope.

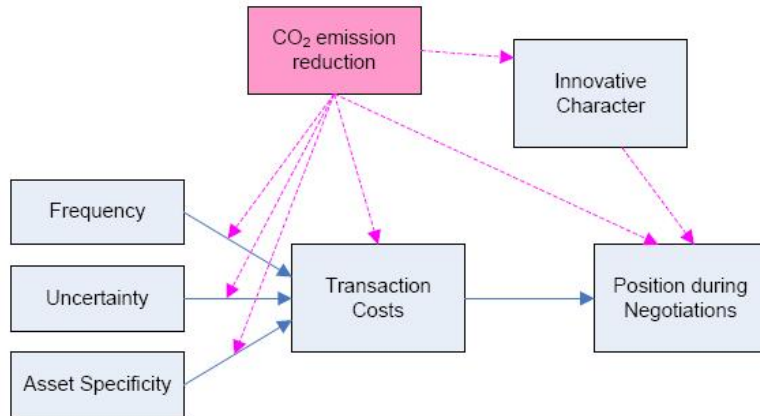


Figure 4.2: Research Scope, Organizational Theory

definition of the CO₂ footprint of a company, the implications of this footprint for the value chain and the assumption that companies strive for profit support the research question. When analyzing the collected data the mechanisms behind certain relations are discussed. This study then also verifies whether or not the influence of these the CO₂ footprint on all industries can no longer be denied amongst companies.

A main concern regarding case study research is that of the absence of a basis for scientific generalization (Kennedy, 1979). The goal when doing a case study is to expand and generalize theories, which is called analytic generalization. The goal is not statistical generalization, to enumerate frequencies. Case studies are not generalizable to populations or universes, but they are generalizable to theoretical propositions (Yin, 2003).

For this research, logically, the mode of generalization is **analytic generalization**: previously developed theory is used as a template to which the empirical results of the case study can be compared. Then, if two or more cases show to support this theory, replication may be claimed. The results can be considered even more powerful if they do not support the presented rival theory (Yin, 2003).

4.4 Quality of Research Design

Many tests have been offered in history to judge the quality of a research design; examples are trustworthiness, credibility, conformability and data dependability (U.S. General accounting office, 1990). This research, however, focussed on the three most commonly used indicators: construct validity, validity (internal and external) and reliability (Batenburg, et al. 2006).

Construct validity

It was needed to assess whether our measurement instrument measured what it was supposed to measure (Batenburg, et al 2006). There are three general methods related to the correct operational measures for the concepts being studied. The first regards the universality of the variables and indicators selected. During the data collection phase we used multiple sources of evidence, which encouraged convergent lines of inquiry. Secondly, we established an evidence-chain, which gives the reader the opportunity to trace back conclusions to their origin.

A final issue refers to the limitations of this research. No matter how systematic the approach was, there are and will always be some constraints with regard to the degree of quality that could be achieved.

Validity

Reliability is a necessary condition for validity, but not fully sufficient² (van der Velde, et al 2004). Validity further consists of internal and external validity. Internal validity, however, is only applicable to explanatory case studies (Kidder & Judd, 1986).

The issue whether there is, indeed, a causal relation between variables (Cook & Campbell, 1979), was primarily solved by studying the literature and prior cases. All interview questions were deduced from established literature. Additionally, the contribution of a consultant in evaluating the indicators can be considered crucial.

While conducting the interview there were various moments in which the researcher briefly summarized the things discussed. When concluding on the interview the key statements were repeated once more to have another opportunity discussing their origin and consequences. These feedback loops were designed to exclude misinterpretations of given answers. The additional check before conclusions were drawn ensured measurement validity.

External validity discusses the domain to which a study's findings can be generalized. As pointed out in the theory development section, replication logic was used as the application of studying multiple cases. Replication logic is the mechanism behind experimental research; it authorizes scientists to cumulate knowledge across experiments (Yin, 2003) and is a valid method in itself.

Reliability

Reliability is concerned with the precision and accuracy of the measurement instrument and reassures the repeatability of the results (van der Velde, et al 2004).

The use of a case study protocol dealt with the documentation problem in detail (Yin, 2003). An elaboration on the case study protocol is given in the next section. An expert panel, i.e. a senior consultant that works at Intelligence for Business, was involved prior to the execution of the interviews. A pilot study was conducted to assure the structure of the interviews. The results of the pilot study are available on request. Furthermore, during data collection, we made sure the interviews were recorded (with permission of the interviewee), this way each interview report was written in a detailed and structured way. This also gave the opportunity to develop a case study database, which is for confidentiality reasons not enclosed in this report. To reassure reliability, moreover, a single interviewer conducted all interviews. This guarantees that no different interpretations of questions across case studies occur.

4.5 Case Study Protocol

To develop a case study protocol is an effective way ensuring the reliability of case studies and can be considered essential when doing a multiple-case study (Yin, 2003). The protocol served and continues to serve as a guide for data collection from a single case-study.

4.5.1 A: Introduction to the Case Study and Purpose of the Case Study Protocol.

When optimizing a company's value chain according to CO₂ emission, it will become more efficient (I4B, 2008). Next to the financial benefit gained from trading CO₂ emission rights, we have a more efficient production which leads to an increased financial health. This research is conducted to establish if and how the mandatory CO₂ footprint of a company can be used to a

²In other words, it cannot be used to define validity, but it sets an upper limit to it.

company's advantage during negotiations.

For **companies** value can be added if more information became available on the advantages of lower CO₂ emission rates. Only with full knowledge of the potential of their footprints, companies be able and willing to adopt the most cost effective carbon mitigation strategies and make full use of the potential advantages. This research provides knowledge about if and how decreased CO₂ emissions can contribute to an enhanced negotiating position during order acquisition and thereby most probably to an increase in financial health of a company.

Current **literature** describes the 'Transaction Cost Theory', which is presently based on the product characteristics transaction frequency, uncertainty and asset specificity. This research tries to establish an addition to the model: the CO₂ emission rate per product can be an important supplementary product characteristic.

Research Question:

From a suppliers' perspective, does a reduction in CO₂ emissions lead to a better position during negotiations? And if yes, how does it lead to this better position?

- (a₁) How does the negotiating process take place?
- (a₂) Which mechanisms are involved in the process?
- (a₃) What transaction costs does the company have?
- (a₄) How are transaction frequency, uncertainty and asset specificity for the product (field)?
- (b) Do companies use their CO₂ emission rate during these negotiations?
- (c) And if they do, how? Does it make a significant difference?
- (d) Or if they don't, why? Is it not a strategic advantage?
- (e) How do CO₂ emissions influence on the value chain?
- (f) And will this change in the future?

The first two sub questions help us better understand the negotiating phase of deal negotiations by giving insight in the process. The third question introduces the CO₂ footprint and identifies further (question four and five) the current position of the CO₂ emissions in these negotiations. Follow up questions are to discover possible strategic advantages regarding CO₂ emissions and transaction costs. Please note that a further elaboration on the interview questions (justification and operationalization) is given in *Section E* of this protocol.

4.5.2 B: Data Collection Procedures

In selecting the cases we had a number of selection criteria, which are listed below. Access to organizations was gained with help of Intelligence for Business³.

The selection criteria used when selecting cases were the following:

1. A case had to involve up to three companies of a specific supply chain.
2. In each company two order acquisition negotiations had to be discussed, one involving high transaction costs, the other involving low transaction costs.
3. Each deal negotiation had to involve at least two parties: one contractor and one or more possible subcontractors.
4. All involved parties were Business to Business (B2B) enterprises.

³As it was indicated in the Introduction, Intelligence for Business (or I4B) is a consultancy firm operating in supply chain management and carbon footprint measures and provided the researcher with some contacts in the field.

5. The subcontractor(s) had the CO₂ footprint embedded in their company.
6. The subcontractor(s) were part of the small and medium-sized enterprises (SME), which for us implies between the 50 and 250 employees.
7. Each case had to be in a different industry.

This resulted in the selection of three cases: the Coffee industry, Paper industry and Carpet industry. A total of six companies participated with the research, all operating in one of the three fields of industry: the Coffee industry (1 company), the Paper industry (3 companies) and the Carpet industry (2 companies). The number of companies per case was mainly limited by the willingness amongst companies to participate in research.

The main data was collected from **semi-structured interviews**. The collection period was 6 weeks, starting from the 18th of May 2009. Each site visit included initial contact, the interview and completion. The company managers were all contacted by phone, firstly introducing the researcher and the research. The relevance of the research was adjusted to an interest particularly to that firm. The phone call had a follow-up email and additional phone calls for setting a date. These steps are graphically displayed in Figure 4.3. Main part of this first communication round was to establish trust and arouse curiosity.

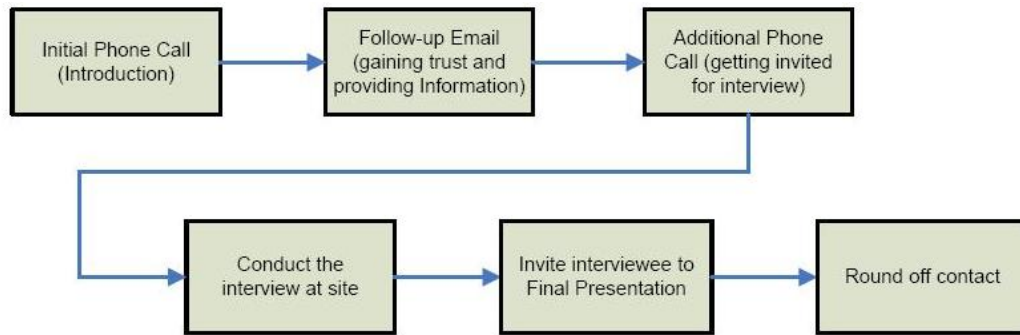


Figure 4.3: General overview of the contact between researcher and company

The interviews were **focused interviews** (Merton, Fiske & Kendal, 1990) and took approximately one hour each. The first ten minutes were taken by an introduction; the last ten minutes by summarizing and concluding on the interview, and setting appointments on possible further involvement in the research project. The effective time to conduct the interview thereby remained only 40 minutes, which was overall sufficient. In some cases the researcher had 10 additional minutes to complete the interview.

Each case study took approximately one week. This included preparations, conducting the interview according to the presented steps and updating the case study database. Preparations included general interview preparations (BCG, 2009) and the reading of specific company documentation. All interviews were recorded (after permission of the interviewee) to be able to accurately present the interview in the case study database.

4.5.3 C: Introduction to the Interview

After a personal introduction, the research was introduced according to the following:

An observation from the literature is the relation between a company's CO₂ emission rate and its

financial performance: the lower the CO₂ emission, the better the financial performance. When optimizing a company's value chain according to CO₂ emission, it will generally become more efficient (Carbon Trust, 2006).

(And optionally: The main assumption to this statement is that in all companies there is a lot of slack that can be excluded from the production process. Furthermore, in identifying where most CO₂ is emitted, energy consumption throughout a value chain is mapped. This seems to be the first step towards a more efficient process. A more efficient production will lead to a better financial health. Furthermore, the newly introduced Emission Trading Scheme (ETS) allows companies to an additional financial benefit: that of trading its CO₂ emission rights).

From the perspective of the Emission Trading Scheme and the market regarding emission rights that will arise, the possible advantages from these regulations are studied. It is interesting to know whether a lower CO₂ emission rate can additionally be an advantage if companies act from a value chain approach. The mandatory CO₂ emission reductions can be used to a company's advantage by securing a lower CO₂ footprint for an entire value chain. By footprint we mean all Greenhouse Gas emissions a company is responsible for. The relevant question is whether supplier companies can communicate this beneficially during order acquisition in negotiations and how to do that.

Scope: *The role of the CO₂ footprint in deal negotiations to directly improve financial performance. Not touching upon possible positive consequences caused by a 'greener' image. Study the influence of a footprint via transaction costs and an introduction of the CO₂ footprint as an innovation tool.*

Additionally a letter introducing the research was sent to all participating companies. An example can be found in *Appendix B*.

4.5.4 D: Definitions

This is how various groups involved in deal-negotiations and business are referred to:

Supplier: company that delivers supplies to company X, which indicates a supply chain relation.

Subcontractor: company that helps company X in selling their end product, either by supplying goods or offering complementary services or goods.

Competitor: competitive company to company X, situated on the same level as the company.

Client: next company in the supply chain, to whom company X delivers. The client is the actual purchaser of company X's end product and is part of the discussed negotiation.

Customer: private (end) consumer that buys an end product from the market.

4.5.5 E: Case Study Questions

The interviews are semi-structured, which indicates that slightly different follow-up questions will be asked depending on responses of interviewees. The following overview of questions provides the researcher with a basic structure: somewhat shorter questions (i)-(iii) on negotiations in particular (approximately 15 minutes), and questions (iv)-(vii) on the role of CO₂ within the company and during negotiations (approximately 35 minutes).

i) Describe generally how a deal negotiation takes place. Could you indicate the differences between the high Transaction Costs (TC) case and the low TC case?

Operationalize the negotiation process by placing actions and events into a framework. Collect information on chronology and causal relations.

— Relation to the research question: 'Locate' where and how in the negotiation process strategic advantages are being used. Link this to Closed Loop Supply Chains and identify how strategic advantages influence the value chain. Thereby the achievable level of persuasion of strategic advantages is indicated.

(Possible follow-up) Elaborate on how the initial introduction is developed. What are the main differences between long lasting relations and new customers?

Try for information on the bases of first introductions and the available or presented information at that time.

ii) In this case, how many competitors were involved?

Distinguish cases of different levels of competition. Thereby already an initial feeling is created regarding asset specificity.

— Relation to the research question: possibly we should identify two different groups when searching for an answer to the research question. One group where one possible subcontractor is involved and one group where more subcontractors-options are available, thereby having larger competition.

(Follow-up) How often are multiple candidates involved?

Collect data on the competition in the field, involving the average amount of rivals. Related to Porter's Five Forces: can you identify a strong bargaining power of suppliers?

iii) We would like to know more about strategic advantages during negotiations. Which characteristics were figured strategic advantages during the transaction you were part of? E.g. for this product, which volumes are usually transferred? How much does the client know about your product? (How many substitutes can be found on the market?)

Relate to the concepts of TCE, that is: find levels of uncertainty, asset specificity and the frequency with which transactions occur. Operationalize the influences on TCE by drawing a diagram and adding numbers that approximate the level of relative influence.

— Relation to the research question: to try and establish an addition to the TCE model, we should first establish and visualize the practical (or real) application of TCE.

(Follow-up) What role do earlier collaborations play during a deal negotiation? Do you work closely together to serve the customers needs and preferences regarding product, service and packaging? How important long established relations and stability?

The question tries to identify the level of influence of a trust relation as an addition to TCE. Operationalize by adding trust to the diagram of the question above.

— Relation to the research question: should 'Trust' be added as a concept for TCE? The CO₂ footprint might only influence negotiations via a trust relation (that is already in place).

iv) How is CO₂ embedded in the company? E.g. what role do subcontractors play regarding CO₂ and what list of demands does your company have regarding transport?

Get a feeling for the importance of the CO₂ footprint for the company and the industry it is in. Operationalize if possible what influences of the CO₂ emission rate of this company and where possible reductions can be made.

— Relation to the research question: Is there also a difference between the group of companies to which the CO₂ footprint is very important and the group to which it is of less importance?

v) During negotiations, is the CO₂ emission rate of a company ever mentioned? Do you mention it and how? Is there a difference between our two cases (high/low TC)?

Quantify a domain which indicates the level of acceptance towards the introduction of CO₂

footprints in the negotiating phase.

— Relation to the research question: classify the current role of the CO₂ footprint during negotiations and identify mediating variables.

(Follow-up) Do you think it is worth mentioning? In what ways? Can you ‘sell’ sustainability to your client, and can your client’s client sell it to the customer?

Operationalize where in the negotiation process (of question (i)) the CO₂ emission rate could come in and what potential the interviewee sees in this tactic.

(Follow-up) And then, would you mention with small clients (low TC) or larger clients (high TC)?

Search for mechanisms through which the CO₂ footprint might influence on negotiations.

vi) In what ways is it worth to introduce CO₂ footprint in a transaction or in the negotiating process? How do you introduce it? E.g. certificates, image improvements, real progression? So, is it reality or is it something companies eventually would do, which only makes it speculative?

Identify possible earlier trends regarding TCE and quantify their influence. Search if the ETS is really influential.

— Relation to the research question: this operationalizes how the mediating variables through which CO₂ emissions influence have been or are changing.

vii) If a discussion about the CO₂ footprint in itself could act as a strategic advantage, is it possible that the CO₂ footprint would be better embedded in the company? How would it be embedded?

Relate the answer to question (iv). Verify the influence the CO₂ footprint really has in different layers of the company, the role it really plays.

— Relation to the research question: this regards to the innovative character a CO₂ footprint can have when it is better embedded in the company.

(Follow-up) It has been proven indeed that introducing and improving the CO₂ footprint together with one’s suppliers, results in clear content concerning feedback to both parties and it stimulates and enhances innovation within the supply chain and within the company. Would this be an incentive for both you and your suppliers to introduce the CO₂ footprint in deal-negotiations?

Relate to the answer to question (v). Verify willingness towards using the CO₂ footprint as a ‘new’ innovation tool (to improve competitiveness).

— Relation to the research question: this regards to the innovative character a discussion on CO₂ footprint can have when it is better embedded in the supply chain.

viii) (Optional) Can you imagine how the Emission Trading Scheme might influence negotiation processes in the future?

Although this is a question inappropriate for a case study, but it gives the interviewee the opportunity to give his opinion about the whole idea. Interesting information might come-up.

— Relation to the research question: issues for discussion are provided.

4.5.6 F: Data Analysis

The above questions were derived from the literature. For the data analysis the researcher had to derive the relevant and most important characteristics regarding CO₂ footprints and order acquisition negotiations. As this is an exploratory research, during the interviews evidence was collected on which characteristics to choose. The exploratory approach justifies this working method, identifying characteristic concepts preceding to the interviews might cause for information loss or blindness to unexpected trends.

For all 6 interviews individually the researcher elaborated on these characteristics. For each case conclusion (that is, the Coffee industry case, the Paper industry case and Carpet industry case) it was furthermore discussed how the characteristics related to each other, thereby having a trend analysis per industry. Not all characteristics are linked to each other: important relations, apparent trends and suspicious linkages were selected. The process of selecting those linkages was executed after the data collection, the information collected during the interviews was needed to get a clear overview first.

After data collection it became clear that we would analyze the interviews by taking a closer look at the following 10 characteristics:

The level of *sustainable involvement* of the *company* and that of its *target groups*, the level of *supply chain involvement* of the company and the level of *supply chain demands*. We will distinguish *involuntary* participation in sustainable development from *voluntary participation* and try to identify the *bargaining power of suppliers* in the industry. We will verify the assumed *innovative character* that raises from sustainable involvement and highlight the observed *trend in CO₂ importance*. Finally we will have a discussion about whether or not to introduce *certificates* and we will conclude with the suitable *timing in the negotiating process*.

Six connections were identified that seemed relevant to determine case conclusions, they are listed below:

Sustainable Involvement Company $\longleftrightarrow$ *Sustainable Involvement Target Groups*

Supply Chain Involvement $\longleftrightarrow$ *Innovative Character*

Supply Chain Involvement $\longleftrightarrow$ *Supply Chain Demands* $\longleftrightarrow$ *Bargaining Power of Suppliers*

Sustainable Involvement $\longleftrightarrow$ *Trend Importance CO₂*

Transaction Costs $\longleftrightarrow$ *Certificates vs In-house Records*

Sustainable Involvement $\longleftrightarrow$ *Certificates vs In-house Records*

Additionally trends regarding the *Location in the Negotiating Process* were discussed per case.

Data Analysis

In this chapter the collected data is presented and analyzed. We will separately discuss three cases: the Coffee Industry, the Paper Industry and the Carpet Industry. The first section of each case gives the structure of the case, showing the reader how the interviewed companies are situated with regard to each other and in relation to the supply chain. A second section handles the data and the data analysis according to several paragraphs.

Per industry, that is, per value chain, one, two or three interviews are discussed. An overview of the interview questions can be found in *Appendix C* (page 73).

For this exploratory research the interview questions were derived from the literature and during the interviews evidence was collected on what characteristics were important to the data analysis. This working method is justified by the nature of the research, identifying characteristic concepts preceding to the interviews might cause for information loss or blindness to unexpected trends.

After the full data collection period, we identified importance for the following **10 characteristics**. The interviews are analyzed by taking a closer look at the following ten concepts: (1) The level of *sustainable involvement* of the *company* and (2) that of its *target groups*, (3) the level of *supply chain involvement* of the company and (4) the level of *supply chain demands*. (5) We will distinguish *involuntary* participation in sustainable development from *voluntary participation* and (6) try to identify the *bargaining power of suppliers* in the industry. (7) We will verify the assumed *innovative character* that raises from sustainable involvement and (8) highlight the observed *trend in CO₂ importance*. Finally (9) we will have a discussion about whether or not to introduce *certificates* and (10) we will conclude with the suitable *timing in the negotiating process*.

Each case has a separate paragraph in which a **trend analysis** is discussed. The 10 characteristics above are linked to one another and the most important, obvious or suspicious links are discussed. These links were identified according to all gathered information and the analysis of the separate interviews. They are listed below:

Sustainable Involvement Company $\longleftrightarrow$ *Sustainable Involvement Target Groups*,

Supply Chain Involvement $\longleftrightarrow$ *Innovative Character*,

Supply Chain Involvement $\longleftrightarrow$ *Supply Chain Demands* $\longleftrightarrow$ *Bargaining Power of Suppliers*,

Sustainable Involvement $\longleftrightarrow$ *Trend Importance CO₂*,

Transaction Costs $\longleftrightarrow$ *Certificates vs In-house Records*,

Sustainable Involvement $\longleftrightarrow$ *Certificates vs In-house Records*.

Additionally trends regarding the *Location in the Negotiating Process* were discussed per case.

The chapter will start with a general overview of the cases below. The three industries are then discussed and analyzed separately. The final subsection (*Subsection 5.2*) of this chapter combines the information found in a Cross Case analysis.

5.1 Case Descriptions

The selected cases and visiting dates are listed in Table 5.1 below. It gives an overview of the negotiations discussed in the separate interviews. The relation between the companies is further clarified over the next subsections.

Sector	Company	Date	Discussed Negotiations
Coffee Industry	Coffee A	18-05-2009	Coffee B Coffee C
	Coffee B	No Participation	
	Coffee C	No Participation	
	Supplier to A	No Participation	
Paper industry	Paper A	20-05-2009	Paper B Paper C
	Paper B	18-06-2009	Paper B1 Paper B2
	Paper C	19-06-2009	Paper C1 Paper C2
Carpet Industry	Carpet A	20-05-2009	Carpet B Carpet C
	Carpet B	No Participation	
	Carpet C	23-06-2009	Carpet C1 Carpet C2

Table 5.1: Construction of the Cases and Visiting Dates

5.1.1 Case: Coffee Industry

With company Coffee A two downstream relations were discussed: Coffee B and Coffee C. Coffee B was a larger client and the order acquisition negotiation involved high transaction costs. Coffee C was a smaller company, which results in a transaction of smaller volumes. The assets are somewhat more specific (niche markets) and the level of uncertainty and the frequency are lower. The negotiation with Coffee C thereby concerned lower transaction costs. The structure of the Coffee Industry case is graphically represented by Figure 5.1.

5.1.1.1 Coffee A

Coffee A is a mid-sized company producing coffee. They are heavily involved in how coffee is produced in the countries of origin, ensuring profitable solutions for farmers and thereby coffee quality. Coffee A has *high sustainability standards*, including being CO₂ neutral. The company *participates voluntarily* in emission reductions.

Coffee A's *target group* includes clients that have an interest in high quality coffee and that care about sustainability. Negotiations are often tailor made, dependent on volumes and the relation with the client. Volumes that are transferred, reach from hundreds of kilos coffee per year to thousands of kilos coffee per year. The high level of competition is dealt with by comparing SWOT analyses, an almost necessary tool to be able to stand out. It is figured important to be reliable, thoroughly and sound. The image one has in the market, built by history and long lasting relations, can be considered crucial. Negotiations with clients consist of multiple rounds.

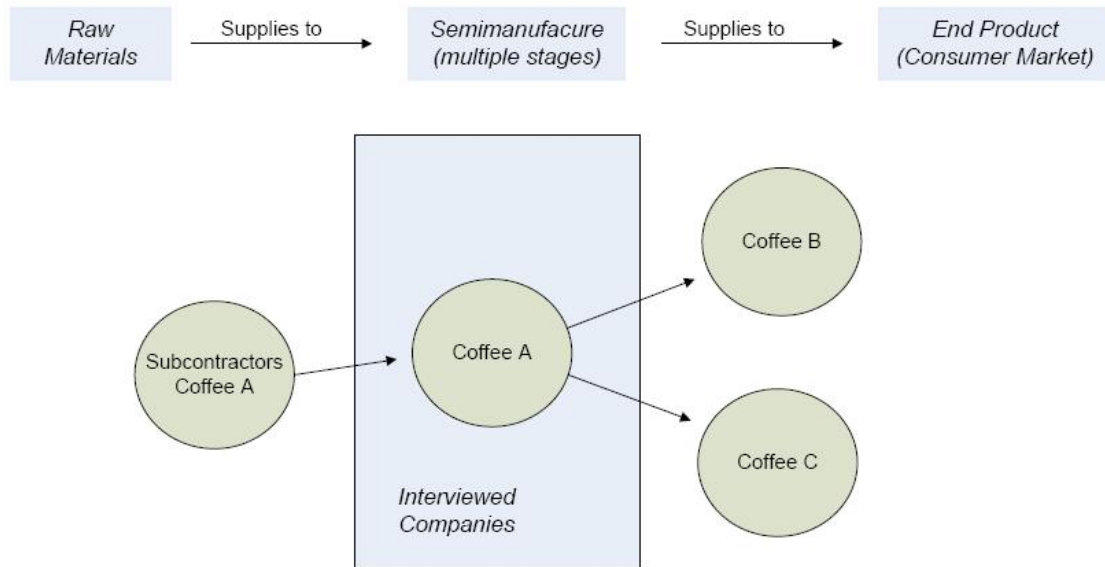


Figure 5.1: Structure of the Coffee Industry Case

The involvement in sustainability and CO₂ reduction comes forward from long term goals. Continuation and durability are higher on the list than short term profits. Coffee A strives to have a *sustainable supply chain*, reaching from the countries of origin to the end product. Storage should for example be CO₂ neutral, by the use of solar panels etc. Energy related to the production process is to be compensated through young tree plantings. Also transport is demanded to actively reduce CO₂ emissions, so the company has *high supply chain demands*. Coffee A can be seen as a trendsetter in its sector.

CO₂ footprint during order acquisition There is a difference between the negotiating position of a client and that of a supplier. A client is in the position to have demands. *Suppliers* can only offer, they do not have the margin to be choosy in picking their clients. Coffee A chooses its suppliers in a way that enhances supply chain sustainability. It furthermore tries to increase awareness among its clients. As transparency becomes important (a call from the market), the competitive advantage from CO₂ emission reduction rises. Throughout the *market* an increase in signs of *interest* in CO₂ reductions is noticed by Coffee A.

A discussion about CO₂ reduction takes place in the very *beginning of the negotiating* process. These core characteristics of the company and the reasons to the approach are mentioned during the very first introduction. It should be noted though that in the end it often seems that there is a huge difference between what people say and what people really do. It might be that during the initial introduction a client fully supports sustainability and CO₂ reductions, but that towards the end of a negotiation the client is not willing to pay the higher price for it.

A clear difference can be noted between transactions with high transaction costs and lower transaction costs. Coffee C, a smaller client, is more sensitive to aspects changing the interaction between agents. As duration of the firm and long lastingness of relations are important goals, sustainability thoughts can change the context of a negotiation. For larger companies, such as Coffee B, short term profit is highest on the list. A good salesman, however, still focusses on the human element: also with high transaction costs there is an interaction between two agents. For high TC it is important to especially address to the market demand further in the supply chain.

Communication is considered crucial, not only throughout the supply chain, additionally towards the market. Coffee A encourages all of its clients to stress the *visibility* of sustainability by giving it an identity. Thereby the product fulfils one of the market demands.

A difficult debate regards *certificates*. Coffee A believes in in-house records, whereas certificates do not belong to that group. We will refer to the situations in which no certificates are involved as in-house records. In practise, certificates undermine real initiatives when badly informed customers are involved. Certificates facilitate for companies to blow tiny steps out of all proportions. The discussion whether or not to have certificates comes down to the choice between a, sometimes easily, approved standard or convincing customers by using in-house records.

Naturally an *innovative character* follows from extensive cooperation with a supply chain. New initiatives rise and collaboration with unexpected parties leads to profit. Problem with this is that the financial benefits cannot be clearly related to CO₂ reductions (yet). The actual price of the product plays a key role compared to the innovative character.

Coffee A has never had a negative experience when mentioning a reduced CO₂ footprint during order acquisition negotiations, while in several transactions it served as a positive characteristic that removed final doubts. The essential quality however, is that it appeals to the personal involvement of human negotiators to change the context of a negotiation.

Theory and Mechanism Findings *The bargaining power of suppliers for this industry is limited, but a supply chain approach regarding CO₂ emissions strengthens their position. The bargaining power of buyers on the other hand is strong, which in itself enhances the supply chain approach. It is crucial to communicate market demands backwards and product characteristics in forward direction in the supply chain. The innovative character resulting from a CO₂ footprint discussion with the supply chain is also enhanced by a higher level of communication throughout the chain.*

CO₂ emission reductions at a supplier cannot be related to direct financial benefits to that supplier during negotiations yet. But there are signs that the CO₂ footprint influences order acquisition negotiations through a change in context. For example, in the Coffee industry it seems that there is a change in interaction between economic agents, which has a positive influence on the position of the supplier during negotiations. This is shown in Figure 5.2. Coffee A identifies that agents become personally involved when a footprint is discussed. The latter is more influential when negotiating with smaller companies than with larger firms.

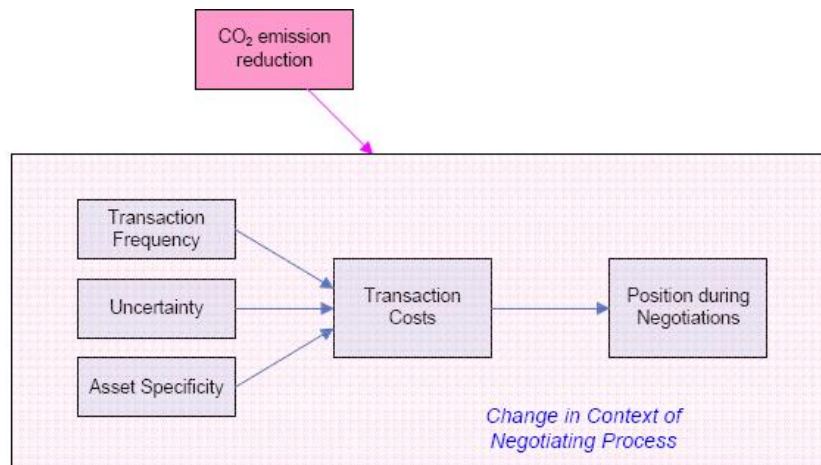


Figure 5.2: Coffee A suggestion: CO₂ footprint changes the context of negotiating processes.

The context of negotiations as discussed above forms a part of organizational psychology. The interaction between agents or the involvement of human emotions in transactions are concepts that are not related to the general transaction cost theory. The organizational structure of a company is part of the context in which a negotiation takes places, but a direct linkage to the transaction costs is not appropriate in this research because context adds a new dimension. Although there might be a trend regarding CO₂ footprint and organizational psychology, the influence of contextual elements such as emotional setting is figured out of scope.

We may however relate the matter to the concept of trust. A (positive emotional) change in the context of the negotiating process might increase the level of trust for a specific transaction. There are no conclusions about if this can be a misplaced sense of trust. According to Noorderhaven (in Groenewegen, 1996) human and behavioral concepts touch the domain of trust, which is an addition to the transaction cost theory because it influences the level of opportunistic behavior.

Case Conclusions The following Table (Table 5.2) summarizes the case findings. Trends are analyzed according to the Table.

Characteristic	Coffee A	
	High TC	Low TC
<i>Sustainable Involvement Company</i>	High	
<i>Participation</i>	Voluntarily	
<i>Supply Chain Involvement</i>	High	
<i>Supply Chain Demands</i>	High	
<i>Sustainable Involvement Target Group</i>	High	High
<i>Bargaining Power of Suppliers</i>	Limited	Fair (context changes)
<i>Trend importance CO₂</i>	Strong (legislation)	Average (specialized products, higher margins)
<i>Innovative Character</i>	Yes (communication crucial to clients)	Yes (communication crucial to supply chain)
<i>Certificates vs In-house Records</i>	Certificates	In-house Records
<i>Location in Negotiating Process</i>	From the beginning	From the beginning

Table 5.2: Case Conclusions Coffee Industry

Sustainable Involvement Company $\longleftrightarrow$ *Sustainable Involvement Target Groups*. In the Coffee industry the market is open to sustainability thoughts. The competition of Coffee A regarding CO₂ reduction increases and target groups that demand involvement are expanding. There seems to be a positive relation between the level of CO₂ footprint measure involvement and the level of indicated involvement of target groups.

Supply Chain Involvement $\longleftrightarrow$ *Innovative Character*. For Coffee A and its suppliers and clients, there is a tendency towards intense supply chain collaboration. This has the positive effect of identified innovation throughout the supply chain. Communication is considered crucial in this process, both to the supply chain and the client.

Supply Chain Involvement $\longleftrightarrow$ *Supply Chain Demands* $\longleftrightarrow$ *Bargaining Power of Suppliers*. A link can be suggested between the level of supply chain involvement and the supply chain demands company Coffee A has. The bargaining power of suppliers is limited in the coffee industry, although transactions with Coffee C with low Transaction Costs (TC) suggest a change in

context when introducing CO₂ footprint reduction. The context changes in a way that increases the bargaining power of suppliers.

Sustainable Involvement Company $\longleftrightarrow$ *Trend Importance CO₂*. Companies that are highly involved in sustainability measures indicate considerable importance of CO₂ emission reductions. Low TC transactions with Coffee C have specialized products and higher margins, CO₂ reductions do not always play a key role. For transactions with Coffee B involving high TC, legislation causes high importance of footprint measures. A difference is noticed regarding the introduction of emission reductions.

Transaction Costs $\longleftrightarrow$ *Certificates vs In-house Records*. High TC transactions seem to need certificates, low TC transactions need in-house records. A possible link causing this difference is that of the difference between communication towards clients and towards the supply chain. A high TC transaction with Coffee B needs communication towards clients, who need a certificate. Low TC transactions with Coffee C need communication towards the supply chain, which increases the value of sharing in-house records.

Participation $\longleftrightarrow$ *Certificates vs In-house Records*. Companies such as Coffee A that are significantly and voluntarily involved in footprint reductions believe that involvement communicated by in-house records instead of an approved certificate should be sufficient, but many have to cope with uninformed parties. This may be the mechanism behind the need for certificates: ignorant clients only value certificates.

Location in the Negotiating Process. Coffee A and its competitors increasingly use CO₂ emission reductions during negotiations. The positive effects follow if the CO₂ footprint is introduced from the beginning of the negotiating process.

5.1.2 Case: Paper Industry

With company Paper A two downstream relations were discussed. The negotiation with Paper B was with a larger customer and involving high transaction costs. Paper C is a smaller company, with lower volumes of slightly more specific assets, the negotiation thereby involved lower transaction costs (TC). Following on the interview with Paper A, also Paper B and Paper C were interviewed. Paper B1 and Paper B2 represent the client relations that were discussed during the interview with Paper B, similarly Paper C1 and Paper C2 for Paper C. Again there was a difference in transaction costs (TC) involved, the first transactions (B1 and C1) involving high TC, the second negotiations (B2 and C2) lower TC. The structure of the Paper Industry case is graphically represented by Figure 5.3.

5.1.2.1 Paper A

Paper A is a mid-sized company in the paper industry. The company made an *inventory* of their CO₂ *emissions* rate and included the matter in its targets. These actions were initiated by the ETS, which we indicate as *involuntarily*. So far the CO₂ footprint has never been part of their negotiation process.

Paper A has no specific *target group*. With most companies they do business with there is a long history, which makes negotiations more to-the-point (i.e. less rounds). The main focus in order acquisition negotiations is on price and quality, also discussed are logistics, technical support and sometimes terms of payment. Volumes that are transferred in the market reach from ten tons (Paper C) to thousands or ten-thousands of metric tons per year (Paper B). Information is widely spread, which makes it possible for a client to compare Paper A with its competitors. The amount of substitutes depends on the niche market one is looking at. But if substitutes are available, a client can always find them.

The competition in the field is fierce, defining delivery reliability and the quality of the prod-

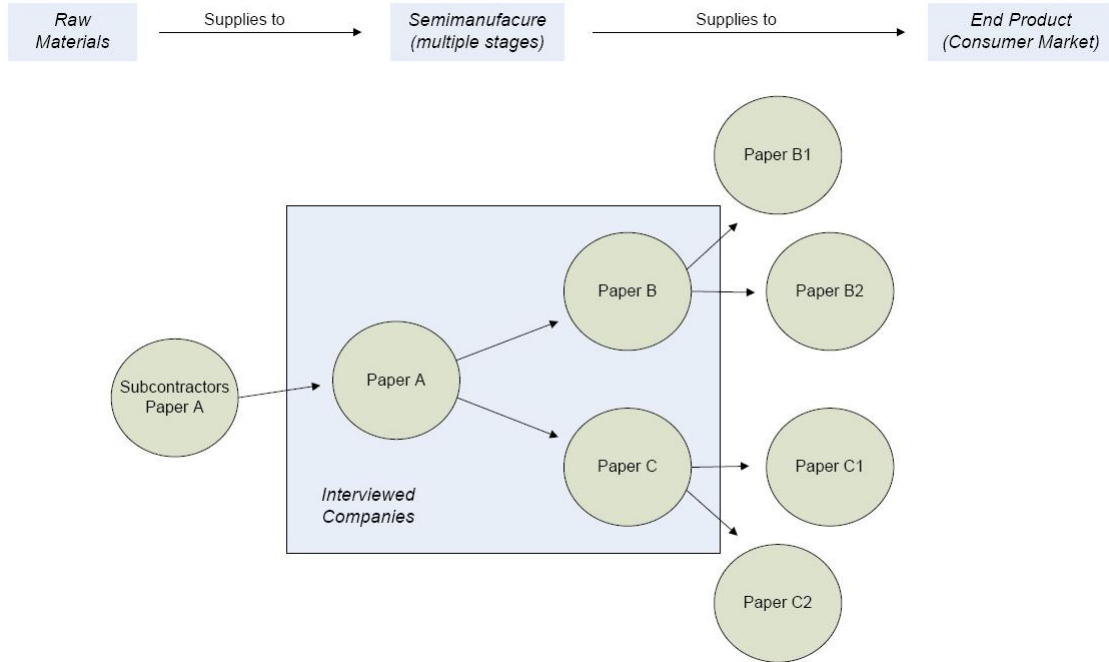


Figure 5.3: Structure of the Paper Industry Case

uct as strategic advantages during negotiations. Although history plays a main role, Paper A noticed a decrease of its importance due to the current unfavorable market (overcapacity). The involvement in CO₂ footprint reduction is meant to decrease energy use and does not go beyond the company's own targets. Paper A has pressing *demands for transport*, but not regarding carbon emissions. And, given the current economic depression, it makes no significant difference to suppliers, partners and clients. Only when the prices of a deal are equal, the carbon footprint might influence the negotiating position. The industry focusses on the price/performance ratio. A better economic situation might increase significance of the CO₂ footprint, but from the eco-analysis Paper A learned that it does not cause sales growth. It seems the industry is not yet ready for this trend.

CO₂ footprint during order acquisition Paper A experienced one negotiation where the development of the CO₂ footprint was discussed. The discussion was about the potential for a client to save energy and originated from the high industry energy consumption, which represents a high percentage of the cost price. The Paper industry consumes huge amounts of energy and the objective is to reduce that amount by half in 15 years. This partly has to do with introduction of the Emission Trading Scheme (ETS), but the real importance is caused by the percentage of the cost price of the product that energy consumption represents. Paper A thinks CO₂ reduction will become more important from now on, but the importance is caused by the opportunities to reduce the cost price of products.

Due to current overcapacity in the market, cost price remains the one and only important product characteristic and the *bargaining power of suppliers* is very low. A better economic climate may positively influence the importance of carbon emission reduction. A demand will rise from the end consumer, which will reach the paper industry via the packing industry. A reduced CO₂ footprint will thereby probably become a strategic advantage in the future. The matter will,

however, be dominated by green labels and *certificates*. Direct financial benefits can be gained when companies negotiate about prices, the detour via CO₂ footprint is not yet appreciated due to a lack of information.

A *supply chain approach* can change this opinion, as that is how real improvements in efficiency can be established. Consequently, on a strategic management level there is a role for CO₂ emission reduction, but not on a lower level (i.e. in local negotiations). The *innovative character* that follows from a discussion about the footprint would be relevant to the whole industry, but especially for smaller companies. After all, the exchange of know-how takes place a lot easier in larger companies than it does in smaller ones, they often have to reinvent the wheel themselves. (Note that this opinion is extendedly discussed in several articles, both supporting and opposing the statement, it is not necessarily true.)

If carbon emissions were relevant, they would be in the *initial phase of negotiations*. Technicians are the important group to convince and the way in which one addresses the issue is crucial, and also to whom. Because in essence, a lower footprint gives the company, a supplier, a convincing argument to raise the transaction costs. When addressing that to someone who is not knowledgeable regarding CO₂ (such as commercial experts), he or she will immediately change the subject.

Currently the paper industry is not occupied with the *developments* around the *CO₂ footprint*. It might be on the agenda, but hidden in the drawer: companies may say they want to actively change things, but when all is said and done, nothing happens. Legislation can turn this around, as can proven financial benefits. References are needed, and information to make the matter tangible.

Theory and Mechanism Findings *The economical crisis caused the product cost price to become most important in order acquisition negotiations in the Paper industry. Due to overcapacity in the market, the bargaining power of buyers is very strong and that of suppliers very low. Suppliers thereby focus on this product characteristic as the only strategic advantage during negotiations.*

So, not the footprint itself, but its origin production efficiency enhances a company's position during negotiations. Higher production efficiency lowers energy consumption, which lowers the cost price of a product. Thereby its transaction costs decrease and this leads to a better position during order acquisition negotiations. Figure 5.4 graphically shows this relation. A better economical climate might alter this reserved opinion, that CO₂ footprint is only a side effect and not a crucial product characteristic.

Changing to a more intense supply chain approach might also alter the situation, again originated from production efficiency. In the supply chain higher efficiency can be established and thereby energy savings. But on a strategic management level (as compared to the local negotiating level) the CO₂ footprint might enhance a company's position during negotiations. It becomes increasingly important to exchange know-how on the subject, and for the Paper industry it seems that smaller companies are dependent on their sustainable supply chain in this.

5.1.2.2 Paper B

Paper B is a larger company focussing on bulk production. CO₂ *emission* rates are *monitored* to reach higher production efficiency and to meet the demands of the Emission Trading Scheme (that is, *involuntarily*). The company invests in combined heat and power plants and schemes to reduce energy consumption.

The target group of customers for Paper B consumes high volumes of paper. Smaller clients need ten thousands tons a year, larger clients order 60 to 70 thousand metric tons per year. Partly due to the fact that Paper B is an integrated company, negotiations are relatively basic. The market price is used for selling the product, only warranties and risks from market fluctuations

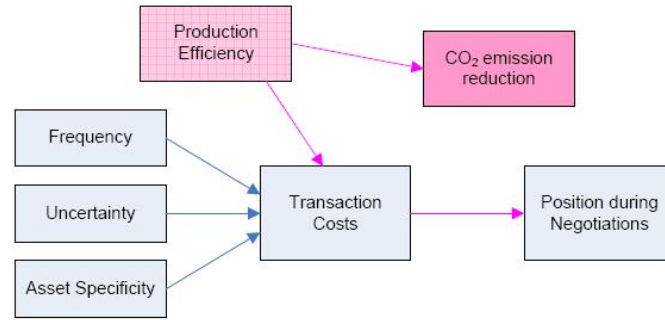


Figure 5.4: Paper A suggestion: Production Efficiency lowers the Transaction Costs.

are discussed. The integrated nature of the company made sure information is widely spread, even the cost price of the product is known to main buyers. The amount of substitutes in the market is endless.

The competition is very fragmented, which makes delivering high quality (against low prices) a main strategic advantage. Also history has significant impact on the position in the market. The company strategy is efficiency, which explains the involvement in CO₂ emission reduction. Paper B practises compliance trading, it believes the real value origins from the potential to save energy. *Subcontractors* are given a key role by benchmarking, which makes mutual comparisons and enhances competition. Regarding transport, Paper B invested in ‘better’ shipping vehicles but it has *no demands* to transport by trucks. The company discusses a great deal what optimizations are possible from a supply chain perspective. It integrated various software programs that optimize the truck routes, truck loadings and return cargo. Paper B believes the combination of purchasers and sales representatives in these *supply chain collaborations* is almost unique in the paper industry.

CO₂ footprint during order acquisition Paper B identifies several stages in the supply chain: the production stage(s) and the stage(s) prior to the market. CO₂ footprint reduction can be relevant in negotiations only in the last stage. Demands origin from the consumer market and they are increasing, so companies serving that market need sustainability and carbon footprint measures. The *bargaining power of suppliers* is in general very limited. To companies in the other stage, such as Paper B, the Emission Trading Scheme only causes a rise in cost price, which is not compensated for by the market price.

A reduced CO₂ footprint might be of higher importance to larger firms compared to smaller firms. Companies that have to serve the demand of a retailer are subject to question from the consumer market. Smaller shops are more specialized and have no need to advertise with certificates. There is, however, an issue regarding CO₂ footprint: it focuses on one aspect only. The paper industry should consider the total impact on the environment, e.g. recycling has a better integral performance. And that is the reason Paper B does not want to make CO₂ emission reduction a marketing tool, it might bring unforeseen environmental disadvantages.

The industry should first communicate a common standard, finding an integral balance. PAS2050¹ or official ISO guidelines might be suitable and none but such standards can truly compare. These *certificates* will become key as they can actually prove something. Currently there is a lack of available knowledge. The introduction of the CO₂ footprint towards substitutes (non-papers), such as plastic and wood, leads to *innovative ideas*. Plastic has much higher emissions than paper. In niche markets these sustainability thoughts are valued and also used during

¹Information on PAS2050 and other measurement tools can be found in Appendix A.

negotiations. Introducing these products in our main business is very innovative. Paper B is convinced an industry standard regarding the *importance of CO₂ footprint* reduction should first be set. If then the company runs out of business because of a higher compared carbon footprint, it is forced to reduce carbon emissions. If the company has a lower carbon footprint compared to the industry, this will definitely become a sales argument. Positive effects in negotiations will not concern the price of the product, given the involvement in bulk production. The footprint can help to secure orders.

Theory and Mechanism Findings *There is a high bargaining power of buyers in the industry, currently the power of suppliers is very limited. This causes a tendency towards a common standard regarding CO₂ footprints, and towards a widely accepted (set of) certificate(s). This is also originated from the desire to find an integral balance between CO₂ reduction and other (alternative) environmental impacts. CO₂ emission reduction can only extensively be introduced in negotiations when an industry standard provokes companies out of business. See Figure 5.5. Certification additionally serves (or solves) the problem of the lack of knowledge that is available in the paper industry.*

On the other hand, currently the CO₂ footprint is the most competitive advantage against substitutes. Companies experience the benefits of a discussion (innovation) and sustainability ideas are exploited in niche markets.

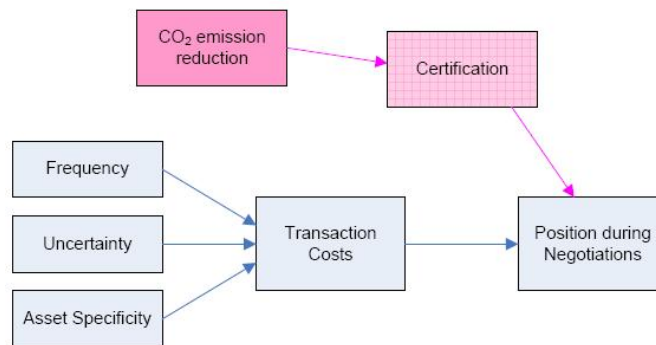


Figure 5.5: Paper B suggestion: CO₂ footprint needs proper Certification.

5.1.2.3 Paper C

Paper C is a small-sized company in the paper industry. CO₂ emission rates are internally monitored and via a *sustainability report* translated into the vision of the company. Paper C carries out market studies and has experienced a negotiation involving the CO₂ footprint now and then. All sustainability activities are initiated voluntarily.

Paper C has a *broad target group* involving new clients and long client histories. With the latter group there is a basis of trust, which positively influences on the 'boundary' conditions. During negotiations distribution matters, terms of payment, discounts and provisions are discussed. The price of the product is often set for longer periods, market fluctuations cause re-negotiations about price. Stability and long lastingness of relations are considered increasingly crucial. Transferring volumes reach from hundreds to ten thousands of metric tons per year. Paper C made an inventory of product substitutes, some represent a huge threat.

Salesmen keep their eyes open for the fierce competition and their actions. Market intelligence can be a strategic advantage during negotiations, as is the Minimum Order Quantity. The latter

refers to a diversity in products applicable to niche markets. Information is equally divided during negotiations, but a client can only estimate the cost price of the product.

Paper C exercises a *supply chain approach*. During the development of the production process the company increasingly involves clients and end consumers. Also transport is organized efficiently, given that CO₂ and efficiency go together. The company intends to communicate a distinct profile and position itself in a more sustainable way.

CO₂ footprint during order acquisition Clients sometimes asked for information on the CO₂ footprint of Paper C. Paper C has also introduced the footprint in negotiations in which they were the client themselves. Discussing the footprint increases awareness in supplier groups and additionally enhances transparency regarding production processes. There is an average *bargaining power for suppliers* in this industry.

Similar to the FSC² *certificate*, CO₂ footprint reduction becomes valuable when a supply chain guarantee can be given. The end consumer has the ability to look backwards in the value chain. The FSC certificate is currently mentioned during negotiations, also by suppliers, the *CO₂ footprint importance* has not yet progressed to that level. The tendency to do so depends on the introduction of the European Eco-label, a standard to measure and be able to compare footprints. The current variety of certificates and labels represent chaos and between countries it can influence a company's level of competitiveness.

When high transaction costs are involved, a client has the ability to communicate the increasing demand for Cradle-to-Cradle and set prices upon suppliers. Transactions with lower transaction costs are not subject to these demands as smaller companies act in a niche market with higher margins and specialized products. So especially during negotiations with larger clients a reduced CO₂ footprint can make a difference. From the FSC certificate Paper C learned that there is still a difference in what people say and how they really act.

Communication throughout the supply chain is also important regarding the search for alternatives. Packaging companies increasingly need alternatives to plastics. The Cradle-to-Cradle initiative suggests a shift from 'technologically degradable' towards 'biological degradable' in the future.

Paper C experiences a clear *innovative character* when discussing the carbon footprint with the supply chain. The company anticipates on an introduction of the reduced footprint in negotiations, waiting for the right time. As soon as it is possible to truly assess a company's CO₂ contribution and have a fair comparison of the matter with other players in the industry, it will be used *throughout the negotiation process* and its role during negotiations becomes evident. And not only CO₂ footprint reduction, also the Water-Footprint and later on Cradle-to-Cradle. Sustainability is of increasing importance and the limited market demands will only expand as time goes by.

Theory and Mechanism Findings *The high bargaining power of buyers gives the opportunity for buyers in the paper industry to introduce the CO₂ footprint in negotiations. The main strategic advantage rising from the CO₂ footprint discussion is transparency. Actually, transparency is a prerequisite for the footprint to matter. Towards clients in the market the CO₂ footprint adds clear value by increasing transparency, and the value adding in itself increases the bargaining power of the suppliers. These mechanisms are graphically shown in Figure 5.6.*

The increasing importance of the CO₂ footprint is confirmed by other trends in the industry, such as the FSC label. CO₂ emission reduction similarly needs a European standard before companies will more widely use it during negotiations. Once the standard is set, however, a company's position during negotiations will be significantly better.

²Forest Stewardship Council, a certificate that ensures responsible forestry.

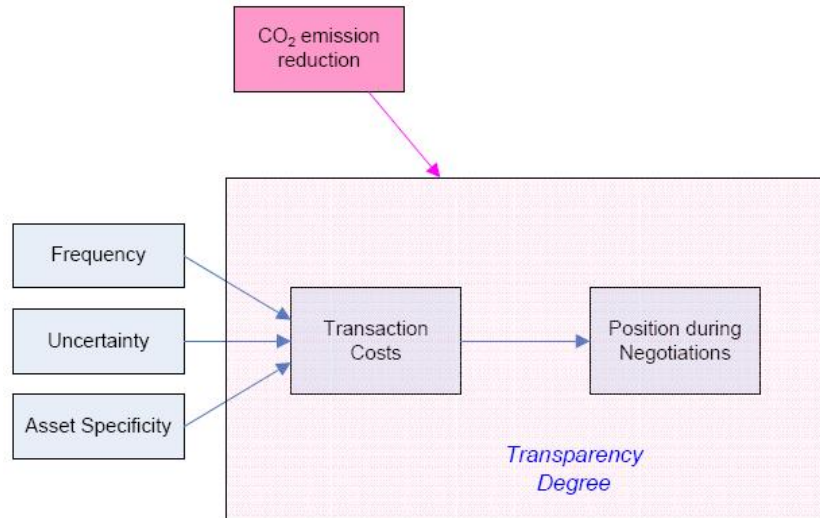


Figure 5.6: Paper C suggestion: CO₂ footprint enhances Transparency.

Case Conclusions Table 5.3 and Table 5.4 summarize the paper cases. The analyzed trends are discussed according to the Tables.

Characteristic	Paper A	
	<i>High TC</i>	<i>Low TC</i>
<i>Sustainable Involvement Company</i>	Low	
<i>Participation</i>	Involuntarily	
<i>Supply Chain Involvement</i>	Average	
<i>Supply Chain Demands</i>	Very low	
<i>Sustainable Involvement Target Group</i>	Low	Average
<i>Bargaining Power of Suppliers</i>	Very Low (overcapacity (eco crisis))	
<i>Trend importance CO₂</i>	None (economic crisis)	
<i>Innovative Character</i>	Average	Yes (valuable know-how exchange)
<i>Certificates vs In-house Records</i>	Certificates	Certificates
<i>Location in Negotiating Process</i>	From the beginning	From the beginning

Table 5.3: Case Conclusions (Part I) Paper Industry

Sustainable Involvement Company $\longleftrightarrow$ *Participation* $\longleftrightarrow$ *Sustainable Involvement Target Groups*. The paper industry is divided into two groups regarding CO₂ footprint involvement. Companies in the early production phases (Paper A) show no interest in sustainability matters. The economical crisis forces them to focus on efficiency. Companies in the supply chain that are situated closer to the market, on the other hand, do seem to have an interest in CO₂ reduction measures. Both companies (Paper B, Paper C) that participate respectively involuntarily and voluntarily in CO₂ emission reduction indicate low to moderate involvement in the matter among target groups.

Characteristic	Paper B		Paper C	
	<i>High TC</i>	<i>Low TC</i>	<i>High TC</i>	<i>Low TC</i>
<i>Sustainable Involvement of Company</i>	Above Average		Very high	
<i>Participation</i>	Involuntarily		Voluntarily	
<i>Supply Chain Involvement</i>	High		Very high	
<i>Supply Chain Demands</i>	Average		Low	
<i>Sustainable Involvement of Target Group</i>	Only close to market		Average	Low
<i>Bargaining Power of Suppliers</i>	Low (Overcapacity)		Average	
<i>Trend importance CO₂</i>	Strong (retailer demand)	Valuable (niche markets)	Strong (transparency)	Average (high margins)
<i>Innovative Character</i>	Not significantly	Yes (against substitutes)	Yes	Yes
<i>Certificates vs In-house Records</i>	Certificates (need for industry standard)		Certificates (need for industry standard)	
<i>Location in Negotiating Process</i>	-		Throughout the process	

Table 5.4: Case Conclusions (Part II) Paper Industry

Supply Chain Involvement $\longleftrightarrow$ *Innovative Character*. Company Paper A is situated in the early production stages and is not too intensively involved in its supply chain, whereas Paper B and Paper C, that are situated closer to the market, indicate high supply chain involvement. Paper A confirms an innovative character from the exchange of valuable know-how in lower Transaction Cost (TC) negotiations. Paper B and Paper C indicate an innovative character for both high TC and low TC transactions, with the emphasis on results of CO₂ emission reduction to use ‘against’ substitutes in the market.

Supply Chain Involvement $\longleftrightarrow$ *Supply Chain Demands* $\longleftrightarrow$ *Bargaining Power of Suppliers*. There is no clear link between the involvement in the supply chain and a company’s demands to its suppliers. The bargaining power of suppliers, however, is considered low in the industry by all involved Paper companies. Once again, the current economical environment caused the overcapacity. The bargaining power of suppliers thereby decreased for both high and low TC transactions. This might be the motive to why none in the industry currently use CO₂ reductions as a marketing tool. Paper A, Paper B and Paper C wait for standard certificates to be introduced, which again can also be linked to the lack of knowledge in the industry.

Sustainable Involvement Company $\longleftrightarrow$ *Trend Importance CO₂*. Paper B and Paper C are at least above average engaged in CO₂ emission reduction, they indicate considerable importance of footprint reduction. And, contrastively, Paper A has no involvement in the matter and indicates no (!) importance of CO₂ emission reduction measures. The economic crisis once more causing this. The importance suggested by Paper B and Paper C is higher for high TC transactions, given retailer demands and desirable transparency. For low TC negotiations CO₂ emission reduction might be valuable for niche markets, but higher margins in this part of the market devalue the significance of the matter.

Participation $\longleftrightarrow$ *Certificates vs In-house Records*. As it was indicated above, paper companies have a tendency towards implementing certificates. There is a clear need for an industry

standard that allows comparisons. It is not fully transparent if the need for certificates is caused by the involuntarily participation of companies. It might be that smaller companies are forced into certificates due to a lack of knowledge in the industry. All paper companies keep sustainable knowledge to themselves and silently wait for the right moment to introduce it. The trend seems to be similar to that of earlier certificates³ introduced in the industry.

Location in the Negotiating Process. As soon as a standard certificate is established for the industry, companies will introduce the footprint in their negotiations. The matter will occur from the beginning (Paper A) and throughout the negotiation process (Paper C).

5.1.3 Case: Carpet Industry

With company Carpet A two client relations were discussed. Carpet B involved a negotiation with a larger customer and involving high transaction costs. Carpet C is a smaller company, the negotiation thereby involved lower transaction costs (TC). Following on the interview with Carpet A, also Carpet C was interviewed. Carpet C1 and Carpet C2 represent the downstream relations that were discussed during the interview with Carpet C, C1 involving high TC, C2 low TC. The structure of the Carpet Industry case is graphically represented by Figure 5.7.

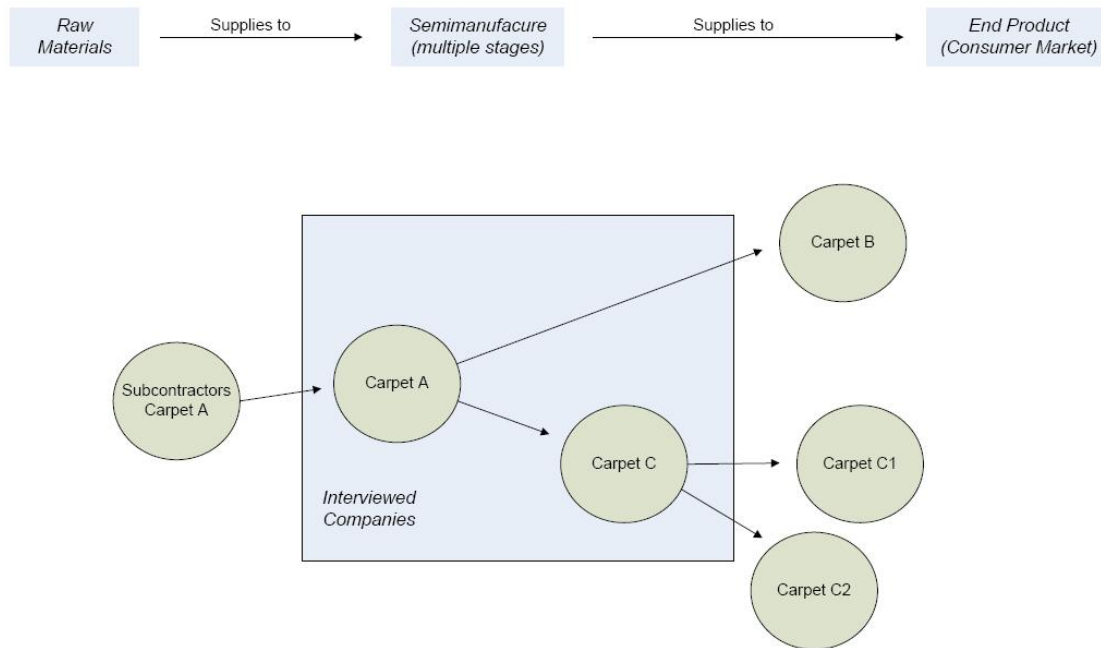


Figure 5.7: Structure of the Carpet Industry Case

5.1.3.1 Carpet A

Carpet A is a mid-sized company producing carbon neutral carpet. *CO₂ emission reduction* is part of the company's DNA: reduction in energy use of the building and throughout the production process, reuse of materials and a constant strive to further reduce the carbon footprint.

³such as the FSC certificate.

Participation is fully *voluntarily*.

Carpet A is situated in the high-end of the carpet market. Negotiations take place with three groups of clients: companies, architects and end-consumers. Lastingness of relations is important in this sector, with that reliability and the quality of the product are very relevant, and this history causes the negotiations to be more direct. Regarding new clients, especially the marketing of the brand is significant. Volumes vary between the 50 square meters and 20 thousand square meters, involving transaction costs of between one thousand and one million euros. Transferring frequencies depend on the size (i.e. the amount of offices) of a client and can be yearly or once every fifteen years.

There is a ruinous competition, as there is an endless amount of substitutes in the market. Especially for larger deals the competition is high. The current economy causes a shortage in larger deals, thereby temporarily increasing the level of competition for smaller deals as well. The main strategic advantage during a negotiation is the salesman. A negotiation is a game to be played without being experienced as an annoying player.

Carpet A has *high supply chain demands* regarding transport, even product development is dependent on goals for CO₂ reduction and recycled content. The company is a real trendsetter regarding sustainability in the industry.

CO₂ footprint during order acquisition Carpet A is *hesitant* to have *demands* to subcontractors, but there is a policy to favor companies that are loyal, reliable and reducing their carbon footprint. The company tries to educate, motivate and inspire other actors in the field. Over the last few years the *sustainability criterium* has shifted from a preferable characteristic to a clear demand further downstream in the supply chain. For Carpet A the cornerstones regarding the purchasing of logistics are: 1) Price, 2) Sustainability and 3) Service. Price is most important and sustainability is the runner up, if a company does not participate it will be out of business. Consequently, the *bargaining power of suppliers* is above average, if the suppliers meets these sustainability demands.

For Carpet A there is no negotiation without mentioning the carbon footprint. A reduced carbon footprint has in-house records serving as proof, that one can commercially exploit. The market started to adapt and truly appreciate the matter two years ago, which was an eye-opener to the industry. The carbon footprint is mentioned from the *beginning of the negotiation* process. Smaller companies may be a little easier to convince, because of the personal nature of such a negotiation. This allows a salesman to even *more extendedly* use the footprint during a negotiation. But larger companies are also very sensitive to the matter: caused by the legislation, public opinion and branding, they more or less have to participate.

Al Gore contributed to the level of communication regarding CO₂ emissions. He also addressed the emotional side of end-consumers. Although this makes it possible for companies to exploit the *in-house sustainability records* towards the end-consumer, there is a lack of knowledge in that group. Most often a client is satisfied by a label or *certificate*, and might be disappointed if there is none. This is particularly true if a client wishes to ‘abuse’ or exploit the sustainability and put it in their own annual report.

In motivating and inspiring others, Carpet A experienced multiple times that *innovation runs freely* and that it brings good things to the company itself. The *discussion throughout the supply chain* resulted in new pallet design for example, thereby saving transportation costs. Part of the market sees this value, so part of the market sees the added value doing business with Carpet A. The carbon footprint moves from hype to mainstream and it might become as important as a good salesman in the future. It is irreversible as the new generation has this thought embedded in their education. In the end a negotiation is between two people, there is no difference between large companies and smaller ones. The outside world will have a more critical attitude, personnel will be increasingly more honest: an acceleration in CO₂ footprint importance is coming.

Theory and Mechanism Findings *The bargaining power of buyers (end-consumers) in the market is very strong. The carpet industry has sustainability as the runner up of the important product characteristics. CO₂ emission reduction is in the interest of larger companies because of legislation and branding (as dependent upon public opinion). Negotiations involving lower transaction costs most often have higher personal involvement, which changes the context of the negotiating process.*

A reduced CO₂ footprint leads to a better position during negotiations if a company gets a fair chance to explain its vision and sustainability activities. Due to a lack of knowledge on the subject certain easily obtained certificates are sometimes appreciated undeservedly, whereas in-house records would reveal a company's lack of interest and involvement in sustainability. The knowledgeability of an industry might consequently influence on the level of impact of CO₂ emission reduction for suppliers during negotiations. The available knowledge in an industry also sets the difference in the role of certificates and that of in-house records. In Figure 5.8 one clearly sees that the mechanism behind the above is the drive towards company image building.

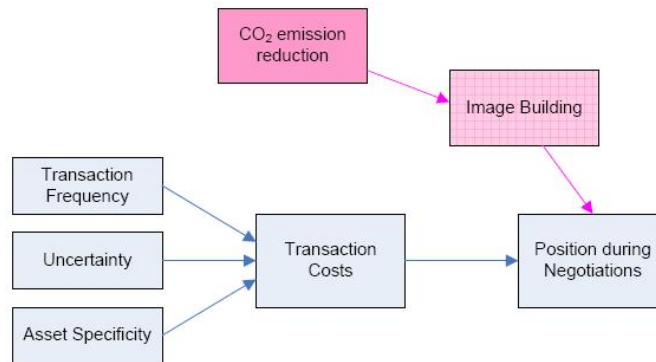


Figure 5.8: Carpet A suggestion: CO₂ footprint impacts through Image Building.

5.1.3.2 Carpet C

Carpet C is a mid-sized company that did business with Carpet A for its interior. Their product is different from carpet, but regarding their own product Carpet C is *involved in CO₂ emission compensation*. Examples of CO₂ emission compensation projects are tree plantings and electricity generation from water. All entail a ‘negative’ footprint, more CO₂ is withdrawn from the atmosphere than emitted to it. The company tries to make its clients aware of easy CO₂ reduction measures and invested in three emission compensation projects in Asia. Carpet C’s vision is to be very transparent regarding emissions and inspires companies towards Corporate Social Responsibility. All of these initiatives are *voluntarily*.

The *target groups* for Carpet C are on the high-end of the market. Negotiations take place with both *governmental organizations*, which have to show sustainable involvement by definition, and business consumers. In larger transactions higher volumes are transferred, but at the same frequency as transactions with smaller companies. Information asymmetries can occur by both larger and smaller transactions, it depends heavily on the person in the negotiation. The long lastingness of a relation ship is of high importance in the industry, moreover because the length of transactions is over three years.

Carpet C has a unique product in its market, but there are many competitors. A main strategic advantage is that the product is unique, because of the CO₂ compensation, but price (through buyers’ combine with parent company) and customer relations (the parent company’s contacts)

are even more important. There is a limited amount of substitutes, of which some substitutes can be a real threat and others can act as complementary products to Carpet C. In order to be able to offer a combination of several products and service to the end-consumer Carpet C works closely together with its *supply chain*.

CO₂ footprint during order acquisition As compared to smaller transactions, larger transactions can involve a somewhat lower price and a higher service level, because of the higher volumes that are transferred. Carpet C *chooses subcontractors* that are willing to have a discussion about CO₂ footprint reduction. Towards customers on the other hand, it only tries to increase awareness, which indicates a limited *bargaining power*. The company's vision corresponds with a trend seen among competitors: over the last two years 70% of the businesses value the idea of CO₂ management.

The CO₂ footprint measures are mentioned in every negotiation Carpet C is involved in. Either to prove the positive environmental impact itself or to prove the beneficial financial consequences of the environmental approach. The matter is discussed from the *start of the negotiation process*. Carpet C uses its transparency to overcome doubts and does not use any official certificates. For the industry, the *in-house records are sufficient*. It could, however, be better used as a marketing tool, for example by producing and presenting a home made unofficial certificate.

For smaller companies it can be easier to avoid emission reductions when CO₂ footprinting has not their interest. Larger companies have Social Corporate Responsibility and are partly forced by the market to act accordingly. Governmental organizations have an obligation to actively reduce their CO₂ emissions. Human emotional reasoning in transactions mainly has to do with the product itself, although for some clients Carpet C can appeal to the better nature of men. The latter causes a change in the context of the negotiating process.

The *level of communication* between Carpet C and its clients is very high. Clients are updated about the trends in the market and Carpet C is closely involved in administration matters. The relation gives the opportunity to value the level of market appreciation, which is difficult to estimate. Currently about 80% of the companies only use data of subcontractors in their annual reports to call themselves 'sustainably-correct'.

The CO₂ emission reduction program enhanced the discussion Carpet C has internally. But it also enhanced the discussion with the parent company and between Carpet C and its suppliers. The emphasis lays on the discussion with larger companies. *Promising concepts* and complementary products originated from the *discussion*. The introduction in negotiations is considered unique in the industry and therefore useful, valuable and innovative.

Carpet C situated itself as a trendsetter in its market by offering the unique product characteristic of *CO₂ emission compensation*. The company makes use of this aspect during all negotiations and believes it could *increasingly* be used as a clear *marketing tool*. The company will continue to improve the emissions from office locations, regardless of the impacts of the Emission Trading Scheme. Their participation is fully voluntarily.

Theory and Mechanism Findings *The extended selection of suppliers demonstrates the bargaining power of buyers for the carpet industry. Buyers can select from among a large group of suppliers and have the opportunity to only choose those companies that support the CO₂ footprint discussion. The bargaining power of suppliers is limited to increasing awareness. The CO₂ footprint discussion is favored because it enhances transparency. Towards clients in the market the CO₂ footprint adds clear value by increasing transparency and increasing the visibility of financial benefits in product use, which also increases the bargaining power of the suppliers. Figure 5.9 elaborates on the transparency and the visibility of financial benefits.*

Another vision is that the level of uncertainty is decreased. Either this is caused by higher transparency, or by the innovative character that originates from a CO₂ reduction discussion. Trans-

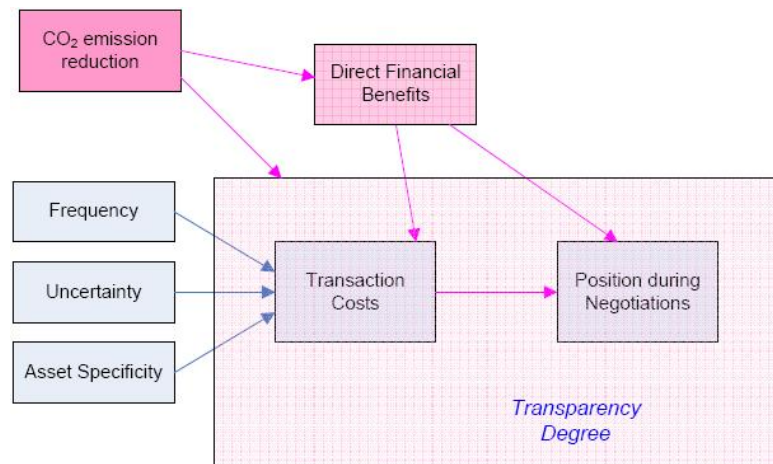


Figure 5.9: Carpet C suggestion 1: CO₂ footprint enhances Transparency and the Visibility of Savings.

parency gives more insight in production processes and company activities, which will give a feeling of familiarity. The matter might be related to the concept of trust.

The innovative character is an extra feature that can be gained freely when effecting a specific transaction. It has been proven that this character often brings innovation (profitable solutions) and efficiency benefits (direct profits). Companies can consider this as a factor that lowers the level of uncertainty. Figure 5.10 gives an overview.

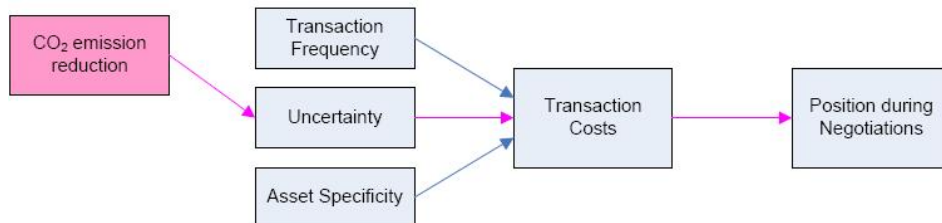


Figure 5.10: Carpet C suggestion 2a: CO₂ footprint decrease the Uncertainty level.

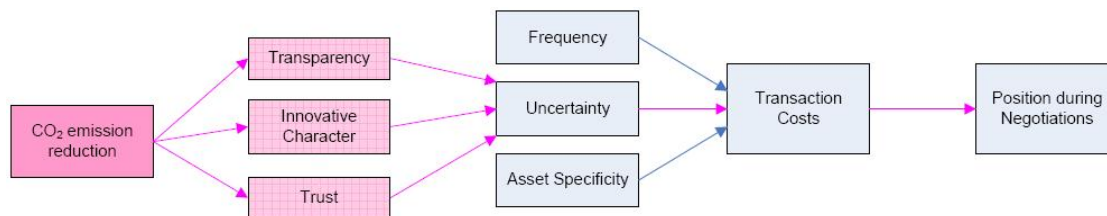


Figure 5.11: Carpet C suggestion 2b: CO₂ footprint decrease the Uncertainty level indirectly.

Case Conclusions Table 5.5 summarizes the case results for the Carpet case. We will discuss the trends that were found according to the Table.

Characteristic	Carpet A		Carpet C	
	<i>High TC</i>	<i>Low TC</i>	<i>High TC</i>	<i>Low TC</i>
<i>Sustainable Involvement of Company</i>	Very High		High	
<i>Participation</i>	Voluntarily		Voluntarily	
<i>Supply Chain Involvement</i>	High		High	
<i>Supply Chain Demands</i>	High		Above average	
<i>Sustainable Involvement of Target Group</i>	Above average		High	Above average
<i>Bargaining Power of Suppliers</i>	Above average (market demand)	Average	Limited (increase awareness)	Limited
<i>Trend importance of CO₂</i>	Strong (legislation)	Above average (context)	Valuable (transparency)	Limited
<i>Innovative Character</i>	Yes	Yes	Yes (communication important)	Not Significant
<i>Certificates vs In-house Records</i>	Depends: client knowledge	In-house records	Strictly in-house records	Strictly records
<i>Location in Negotiating Process</i>	From the beginning	Throughout process	Throughout the process	

Table 5.5: Case Conclusions Carpet Industry

Sustainable Involvement Company $\longleftrightarrow$ *Participation* $\longleftrightarrow$ *Sustainable Involvement Target Groups*. The carpet industry has a significant segment for CO₂ reducing companies. There are various companies involved in sustainability measures and more and more targets groups are available that are interested in CO₂ footprint reductions. It can be seen that companies Carpet A and Carpet C that participate voluntarily identify the level to which target groups involved in sustainability of at least ‘above average’.

Supply Chain Involvement $\longleftrightarrow$ *Innovative Character*. The industry has a tendency towards high supply chain involvement. It seems that the higher the supply chain involvement, the more extensive the innovative character is experienced and confirmed. Communication is considered to be very important by both Carpet A and Carpet C.

Supply Chain Involvement $\longleftrightarrow$ *Supply Chain Demands* $\longleftrightarrow$ *Bargaining Power of Suppliers*. High supply chain involvement seems to be related to (or maybe caused by) high supply chain demands. The bargaining power of suppliers in the industry is limited. According to Carpet A, there is a certain demand from end consumers in the market, which increases the bargaining power of suppliers in high Transaction Cost (TC) negotiations slightly.

Sustainable Involvement Company $\longleftrightarrow$ *Trend Importance CO₂*. Carpet A and Carpet C are both highly involved in CO₂ reductions and both indicate high importance to CO₂ footprint measures. For higher TC transactions CO₂ emission reduction is of even higher importance because of legislation and transparency. Lower TC negotiations of Paper A involve a more personal interaction between agents, which also makes the matter important to discuss.

Transaction Costs $\longleftrightarrow$ *Certificates vs In-house Records*. For both high TC and low TC in-house records are used to prove CO₂ reduction matters. It seems that because both companies vol-

untarily participate they have the opinion that sharing in-house records is sufficient. This also has to do with the available knowledge in the industry: for knowledgeable companies in-house records are sufficient, ignorant clients need the ‘proof’ of a certificate.

Participation $\longleftrightarrow$ Certificates vs In-house Records. Carpet A and Carpet C are highly involved in sustainability and have target groups that are involved above average, participation is fully voluntarily. The trend is to have in-house records without certificates.

Location in the Negotiating Process. CO₂ footprint reduction is intensively used during negotiations, always from the beginning of a negotiation (high TC) and more increasingly throughout the negotiating process (high TC and low TC).

5.2 Cross Case Analysis

This subsection describes the cross case analysis. The case conclusions of the Coffee industry case, the Paper industry case and Carpet industry case are now compared to each other and put through the test of trend analysis. The first paragraph identifies the similarities and differences regarding high and low transaction costs. In the second paragraph the mechanisms that occurred across the different industries are discussed.

5.2.1 Cross Case: High TC versus Low TC

The *bargaining power of suppliers* is generally indicated as low. Coffee A indicates limited power when high transaction costs (TC) are involved and fair power to suppliers in low TC transactions, which is caused by a change in context. Coffee A finds a more personal interaction between agents during negotiations. In the Paper industry the economic crisis causes overcapacity in the market, the bargaining power of suppliers is decreased. Paper C however indicates average bargaining power, because the company is situated more in niche markets (in which there is less overcapacity). The Paper industry does not make a difference between high and low TC transactions. The Carpet industry on the other hand does distinguish between the two. Both Carpet A and Carpet C indicate higher power for suppliers in high TC transactions than for suppliers in low TC transactions. This probably originates from stronger market demands in high TC negotiations.

The sustainable involvement of the *target groups* differs across the industries. For the Coffee industry it seems that for negotiations with downstream relations involving both high and low TC the sustainable involvement of the target groups is high. The Paper industry does not show a trend: Paper A claims that there is low involvement in high TC transactions and average involvement in low TC transactions, Paper C on the other hand states the opposite, that is average involvement in high TC transactions and low involvement in low TC transactions. Paper B does not feel the difference between high and low TC, it distinguishes the supplier group close to the market. This group has above average involvement, whereas the group situated further from the market shows no involvement. In the Carpet industry there is a trend towards involvement in general, Carpet C indicates that high TC transactions involve target groups that are highly involved.

A clear trend is that of the *importance of CO₂*. Except for Paper A, all companies confirm that for transactions involving high TC the importance of CO₂ is much higher than for low TC transactions. Paper A again refers to the economic crisis and does not distinguish between high and low TC when stating there is no CO₂ importance whatsoever. The Coffee industry and Carpet industry both indicate that legislation causes CO₂ to be of strong importance. Carpet C and Paper C furthermore state that CO₂ emission reductions increase the transparency in transactions, which is very important in high TC negotiations. Paper B indicates that for high TC negotiations the CO₂ demands of the retailer play a key role. When low TC are involved products are more specialized and margins are higher, the importance of CO₂ decreases to an

average level. Carpet A however indicates that a CO₂ discussion increases personal involvement of an agent and supported by the current political climate this slightly increases the importance of CO₂.

Regarding the *innovative character* Coffee A, Paper C and Carpet A do not notice a difference between high TC and low TC transactions, the innovative character is confirmed for both. Coffee A and Carpet C indicate the importance of communication, according to Carpet C mainly for high TC transactions. Coffee A sees the difference between communication towards clients, which is most important in high TC negotiations, and the communication towards the supply chain, which is most important in low TC transactions. Paper B indicates that the innovative character serves best in low TC negotiations, as it is valuable in fighting substitutes. Also Paper A indicates that the innovative character serves low TC transactions, because of the valuable know-how exchange that takes place in a CO₂ footprint discussion. For larger companies this is of less importance. It should be noted that various studies have indeed confirmed this relation, but various other studies have taken the edge of those arguments and proved the opposite.

The Coffee industry indicates that *certificates* serve high TC transactions and low TC transactions need no certificates. High TC negotiations are often more distant and impersonal, a situation in which certificates help building an image by ascertaining involvement. The Paper industry shows a trend towards the use of certificates. All companies indicate that an industry standard needs to be set in order to successfully introduce the matter in negotiations. In the Carpet industry however, there seems to be a trend towards **no** certificates. The matter is related to the client knowledge regarding CO₂ emission reductions. Carpet A states that in high TC transactions there only is a need for certificates if clients are not knowledgeable on the subject. From the Coffee and Carpet industry it is suggested that no certificates are needed in low TC negotiations.

The *location in the negotiating process* is confirmed by three industries: the CO₂ footprint plays its role from the beginning of the process. Only Carpet A distinguishes between transaction costs, all other companies consider high and low TC negotiations as similar. In high TC transactions it is more important to introduce the CO₂ footprint from the beginning of the process because the technicians need to be convinced. On a management level later on in the process the footprint only plays a significant role if the matter is supported by technicians. This opinion is related to the knowledgeability of the person one is negotiating with. The Coffee, Paper and Carpet industry confirm that CO₂ footprint reduction remains important throughout the negotiating process.

Summarizing, differences between high and low transaction cost negotiations are mainly personal involvement versus legislation, the efficiency in know-how exchange, the (niche) market situation and the importance of branding. High TC transactions are often subject to legislation, thereby increasing the importance of CO₂ reductions. Low TC transactions focus more often on long term goals (as compared to short term profits) and this slightly changes the context of the negotiation and maybe increases the level of trust. Sources differ in opinion about know-how exchange when it comes to low TC transactions, but a discussion on CO₂ footprint may enhance innovations especially for smaller companies. Larger firms benefit from the knowledge exchange by footprint discussion within the company. In niche markets with low TC transactions the opportunity for CO₂ reduction marketing is much lower than for non-specialized products and high TC transactions. The latter group is much more dependent on branding and image building. For low TC transactions branding plays a minor role, whereas for high TC transactions it increases the importance of CO₂ emission reduction.

5.2.2 Cross Case Mechanisms

This section contains a cross case comparison of the individual case study conclusions. The comparison is executed by considering the six connections that were discussed in each case conclusion.

Sustainable Involvement Company $\longleftrightarrow$ *Sustainable Involvement Target Groups*. The three different industries showed a rise of market segments that are sustainably involved and interested in CO₂ emission reductions. The Coffee industry confirms that there is a significant expanding target group appreciating the company's high sustainable involvement. The matter is getting in the main stream of the Coffee industry. The Paper industry identifies a division in supply chain: companies early in the chain show no involvement in CO₂ emission reduction. Footprint reduction becomes increasingly important because of the link with energy use reduction. Companies situated closer to the market respond to market demands and are concerned with sustainability. In the carpet industry currently a shift is going on for the importance of CO₂ footprint measures from nice-to-have towards need-to-have. In all industries this CO₂ importance trend is appreciated by companies that voluntarily participate in emission reductions programs.

Supply Chain Involvement $\longleftrightarrow$ *Innovative Character*. Supply chain involvement becomes increasingly important in three industries, as a discussion about CO₂ footprint in itself enhances the innovative initiatives throughout the supply chain. The innovative character is observed by the Coffee industry, the Carpet industry and to a lesser extend in the Paper industry. And while a reduced footprint actually makes an asset (product) more specific, which gives a supplier reason for higher transaction costs, most companies have a tendency towards introducing it during negotiations. It may increase the bargaining power of suppliers, originating from increasing market (end consumer) demands.

Supply Chain Involvement $\longleftrightarrow$ *Supply Chain Demands* $\longleftrightarrow$ *Bargaining Power of Suppliers*. The Coffee industry shows a link between the supply chain involvement and its high demands to the supply chain. This also corresponds with the indicated low bargaining power of suppliers. For the Coffee industry it seems that the bargaining power of suppliers is highest in low TC transactions, as there is a change in context of the negotiation process: it emphasizes the interaction between agents. The Paper industry shows no clear link between supply chain involvement and supply chain demands. The overall bargaining power of suppliers in the industry is low. The critical view is caused by the economical crisis, which causes overcapacity in the market. Companies have to focus on efficiency, the reason why none of the involved companies use CO₂ reductions as a marketing tool. The Carpet industry confirms the relation between supply chain involvement and supply chain demands. It suggests the demands cause the high level of communication. There is a limited bargaining power for suppliers, but the increasing demands from end consumers in the market increase this level.

Sustainable Involvement Company $\longleftrightarrow$ *Trend Importance CO₂*. Different transactions ask for different sales approaches, but the overall trend is that companies can fit CO₂ footprint in every negotiation, according to the situation. Most clearly this was confirmed by Coffee A, Paper C and Carpet A and Carpet C. First of all, *legislation* causes larger clients to need sustainable subcontractors. Secondly, also the *visibility* of the actions of larger companies forces them to sustainable image building. A third important characteristic of transactions with high transaction costs is the *transparency*. A high level of transparency influences on the position of a supplier via for example mindset (e.g. in lower transaction cost cases in the Coffee industry), via transaction costs directly (e.g. related to energy consumption in the Paper industry) or via a reduction in the level of uncertainty to a transaction (e.g. the mechanism of trust and history in the Carpet industry). An important observation is that the Paper industry showed a contrasting result for predictable reasons: Paper A had no involvement in CO₂ emission reductions and did not confirm the positive trend importance of CO₂.

Sustainable Involvement Company $\longleftrightarrow$ *Certificates vs In-house Records*. Available knowledge across industries determines what concept, certificates or in-house records, is favored in order acquisition negotiations. The Coffee industry values certificates for high TC and in-house records for low TC transactions. The Paper industry clearly needs an industry standard, it waits for certificates. The Carpet industry obviously favors the use of in-house records. Across the industries knowledgeable companies prefer involvement and the sharing of in-house records, ignorant companies value certificates.

Participation $\longleftrightarrow$ *Certificates vs In-house Records*. The cases indicate that there is a relation between companies that want to build an image without significant involvement and the plead for certification. These are mostly companies that involuntarily participate in CO₂ emission reduction programs. Contrastingly, companies that are significantly involved (Coffee A, Paper C, Carpet A, Carpet C) in CO₂ reduction matters despise certificates and plead for intense contact with customers and intense discussions: they want to share in-house records as they voluntarily work on their CO₂ footprint. Paper C pleads for intense discussions but favors certificates however. This is a difference between the two industries. Coffee A is unique in its loud and clear division between low TC (in-house records) and high TC (certificates).

Location in the Negotiating Process. The different industries show no trend regarding the right way of introducing the CO₂ footprint in negotiations, introducing certificates or sharing in-house records. A trend however was discovered regarding the timing in the negotiation process. All companies confirm that CO₂ reductions can and will make a difference from the beginning of negotiations. Companies Paper C, Carpet A and Carpet C, who are highly involved in CO₂ reduction measures, indicate that salesmen use it throughout the negotiating process. Sustainability and CO₂ reduction will become increasingly important for both smaller and larger companies. And it already has, or it soon will have, a key role during negotiations.

Conclusions and Discussion

The chapter Conclusions and Discussion tries to conclude on this research. The first subsection summarizes the research methods and deals with answering the research question and its sub-questions. Furthermore, in the second subsection a discussion will go into the consequences of the outcome of this research, both for companies and for theory development. A final subsection handles future research and limitations.

6.1 Conclusions in Relation to the Research Question

This exploratory research was based on interviews. We had 3 in depth case studies, involving the Coffee industry, Paper industry and the Carpet industry. The main structure within the cases was to have a value chain approach. The companies that were interviewed per case had a supplier-client relation. The interviews focused on the difference in high transaction costs (TC) and low TC during order acquisition negotiations.

The interview questions were derived from the literature and during the interviews evidence was collected on what characteristics were important to the data analysis. Identifying characteristic concepts preceding to the interviews might cause for information loss or blindness to unexpected trends.

After the full data collection period, the importance of the following ten characteristics remained. (1) Sustainable involvement of the company and (2) that of its target groups, (3) the level of supply chain involvement of the company and (4) supply chain demands. (5) Involuntary vs voluntarily participation and (6) bargaining power of suppliers in the industry. (7) The innovative character and (8) the trend in CO₂ importance. (9) Certificates vs in-house records and (10) the timing in the negotiating process. The data analysis was done according to these concepts and their relations.

In conducting three case studies this research took off to answer the following research question and sub questions that served as a guideline during data collection:

From a suppliers' perspective, does a reduction in CO₂ emissions lead to a better negotiating position during order acquisition? If no, why not? And if yes, how does it lead to this better suppliers' position regarding the acquisition of orders?

- (a) What aspects are involved in negotiations and which are strategic advantages?
- (b) Do companies use their 'CO₂ emission -status' or CO₂ footprint during order acquisition negotiations?
- (c) And if they use it, can we identify the characteristics of the link between a lower CO₂ emission rate and the benefits regarding the acquisition of orders?
- (d) If companies do not use their improved emissions, why do they not?
- (e) How do CO₂ emissions influence the value chain?
- (f) And by what incentives will this change in the future?

(a) It seems that a large variety of aspects is involved in negotiation rounds. E.g. trust and history are very important, but the main importance is with product cost price. Higher production efficiency implies less resources, among others lower energy use, which directly

reduces cost price. The lower production costs lead to lower transaction costs. So the main mechanism that influences the importance of CO₂ emission reduction is if it can generate direct and immediate profit, create direct financial benefits. Note that from this perspective CO₂ emission reduction is actually only a positive side effect. Especially given the current economical climate, the one-to-one relation is highest on the list.

(b) Currently the CO₂ footprint is mentioned during order acquisition negotiations in specific segments of the market. This research identified that it is currently mentioned in the Coffee, Paper and Carpet industry, but not always through entire supply chains. The financial benefit that rises from footprint reductions is figured indirect: CO₂ emissions are not (yet) translatable to tangible profits. But it was also observed that companies that use a reduction in CO₂ emissions in their negotiations, do benefit from it.

(c) It seems that there is a strong link between lower CO₂ emission rates and the benefits regarding the acquisition of orders. The Coffee and Carpet industry cases identified multiple mechanisms that support this finding. The characteristics of clients, however, influence the strength of this linkage. The cases indicated high TC clients as companies focusing on short-term profits. The linkage between CO₂ emission rates and order acquisition benefits is than only supported through efficiency improvements. For low TC clients long-term focus is more important, as is durability of the firm. The supply chain approach during order acquisition is in their very interest.

(d) The interviewed companies that do not use their improved emissions as a marketing tool hesitate because of a lack of knowledge: they do not comprehend the possible role of CO₂ emissions during order acquisition. Companies are waiting for an industry standard or an integral measure to inform them how exactly CO₂ footprint measures impact on company health. Managers are not yet able to make the translation from CO₂ footprint reduction to financial improvements. For many this argument is sufficient when making the decision whether to use improved emissions during order acquisition or not. Others claim that the current economical climate does not allow for sustainability investments.

(e) The literature states that a discussion on CO₂ emissions enhances the innovative character throughout the supply chain (Porter & van der Linde, 1995). The cases support this statement as the level of communication is enhanced and the exchange of know-how is increased. All parties indicated to benefit from the intense feedback process and creative suggestions. For example in the Carpet industry, effective new pallet design resulted from CO₂ emission reduction discussion. Implementation of CO₂ footprints throughout the value chain will increase the value of products if a value chain guarantee can be given. The necessary condition is that the market appreciates the 'new' product.

(f) Regarding the appreciation level of the market, from previously integrated sustainability initiatives (e.g. the FSC certificate in the Paper industry) it can be learned that value chain guarantees are valued by customers. After the careful introduction of previous value chain guarantees, they soon became industry standards, as it is observed by the companies participating in this research. Currently, for the FSC example, without being able to meet the FSC requirements, Paper companies are out of business. Corporate Social Responsibility is stimulated by growing client awareness of the social costs of pollution (Kahn, 1998) and soon to be stricter governmental regulations at the Copenhagen Climate Conference. The Coffee, Paper and Carpet industry all indicated that the CO₂ footprint and its discussion will therefore become increasingly important as the matter is shifting from a nice-to-have asset, to the need-to-have mainstream over the next few years.

This research shows that a reduced CO₂ footprint actually gives a supplier significant more power during negotiations. Since lowering CO₂ emission rates per product increases the asset specificity of that product, which makes it more valuable. And the selling of more unique products increases the bargaining power of suppliers (Porter, 1985b).

Therefore, references may be considered crucial. A product X becomes more valuable with a lower CO₂ emission rate, more specific. But for the buyer of this product X, lower CO₂ emission rates have not yet been directly related to real tangible financial benefits. There is a conflict of interest. However, the supplier company benefits most from its reduced CO₂ footprint if it can guarantee a reduced footprint for product X throughout the value chain. If this guarantee can be given to the consumer market, the initial product X suddenly becomes profitable to the buyer.

The answer to the *Research Question* is: **‘Yes, a suppliers’ reduction in CO₂ emissions leads to a better negotiating position for the supplier during order acquisition negotiations’**. This answer originates from a different perspective than we assumed a priori to the research.

CO₂ emission reduction as it is required by the Emission Trading Scheme does not necessarily lead to a better position in negotiations. On the one hand, it does, as the ETS requires CO₂ emission reduction at specific production locations (European Commission, 2008). Related to the important aspects during negotiations, a negotiating position will be positively influenced if there is a **reduction in cost price**. And a reduction in CO₂ emissions is strongly related to higher production efficiency. Higher production efficiency lowers the cost price, because less resources are consumed for producing the same output, as it was suggested in the literature (Slack, Chambers & Johnston, 2007). In this respect, a reduction in CO₂ emissions brings direct financial benefits to the buyer firm as it lowers the transaction costs (Williamson, 1979). This in turn leads to a better suppliers’ negotiating position (Porter, 1985b).

But on the other hand, the cases indicated that CO₂ emission reductions become valuable if they are **integrated in the entire company** and not only in the production process. As it was explained in the previous example with ‘Product X’, CO₂ emission reduction is significantly important if it is integrated in a company from the value chain perspective. Recall from the literature section that the definition of CO₂ footprint is much broader than the ETS requirements: *All GHG emissions a company is responsible for: scope 1, 2 and 3 emissions* (WRI and WBCS, 2006). It is the reduced CO₂ footprint in an entire value chain that leads to financial improvements, because of the opportunities in the value chain to offer the market a value chain guarantee on CO₂ footprint reductions. This finding supports the literature found previously to the research (Carbon Trust, 2006).

The cases indicated a clear difference between companies that **voluntarily** improve CO₂ emissions and those who participate **involuntarily**. This relates to the way of ‘image building’ that has become necessary to larger competitors in industries in the short term: otherwise they will be out of business. Companies have, in case of involuntary participation, a tendency towards certificates. Several certificates have requirements that can be met in ways that do not really positively change the situation. In cases of voluntary reductions, most often the opinion is that the in-house records provide satisfactory evidence and are sufficient to convince clients. Voluntarily participating companies are more concerned with the durability of the firm (as compared to short-term goals). This long-term orientation fits with the value chain approach. This leads us to the **key role of transparency**. Certificates can only be ‘misused’ if there is no transparency regarding the company using them. By misuse it is meant that company activities in reality differ from the official statement the company makes. Transparency should be practised throughout the supply chain in order to guarantee healthy emissions in the whole value chain of a product. The value chain approach offers several advantages, such as innovations, increased feedback and the ability to work closely together on efficiency. Transparency can also enhance communication: it becomes evident whether companies that have built an image of sustainability are really significantly involved in CO₂ reduction and sustainability measures. After examination of a company’s activities it is sometimes revealed that they do not really commit to clean energy resources (and reduced CO₂ emissions) and they take only limited

actions towards building a sustainable company. Transparency therefore provides evidence if a company will keep their promises, which decreases the level of uncertainty (shut out the difference in what companies say and what they really do). Summarizing, transparency emphasizes openness and significant sustainable involvement during transactions and enhances the level of trust. The transaction costs of a transaction will thereby be lower as compared to less transparent transactions (Williamson, 1979). A reduction in transaction costs results in a better negotiating position for the supplier firm (Porter, 1985b).

6.2 Discussion

Starting from the perspective that CO₂ footprint might be a supplementary characteristic in the Transaction Cost Economics, this subsection will discuss if that relation was indeed clearly established. Two subsections will separately discuss scientific implications and managerial implications. Further research is discussed in the next subsection.

6.2.1 Scientific implications

This research came across several suggestions regarding the role of CO₂ footprint during order acquisition. Below we will discuss what relations with the Transaction Cost Economics were put forward and in what ways they support and differ from the literature and what the implications of those suggestions are.

Production efficiency lowers the transaction costs, CO₂ emission reduction is a ‘side effect’.

The relation between CO₂ reduction and production efficiency is evident: higher production efficiency is defined as using less resources to produce the same output (Slack, Chambers & Johnston, 2007). A reduction in energy consumption will reduce the burning of fossil fuels, which decreases the CO₂ footprint. Production efficiency in itself influences the cost price of the product and thereby the selling price margins and this is highly influential on the total costs of a transaction (Williamson, 1979).

From this perspective there is a role for CO₂ emission reduction in the Transaction Cost Economics. From the literature: if a company starts reducing carbon emissions, it will generally become more efficient (Carbon Trust, 2006). By measuring CO₂ emissions companies can identify present slack in the production process, because it identifies high energy consuming area's, and cut out this slack from the process. Higher production efficiency that follows from the CO₂ emission reduction lowers the transaction costs.

This study confirms the presented literature in the respect that cost reduction (higher production efficiency) supports a better bargaining power for suppliers (Porter, 1985b). A better suppliers' negotiating position is obtained by the reduction in transaction costs (Williamson, 1979). The proposition states that CO₂ emission reduction is identified as a ‘side effect’. This research contributes to the literature by indicating that CO₂ emission reduction should be mentioned during negotiations as it is the initiator of higher production efficiency, which leads to a better negotiating position.

CO₂ footprint decreases the level of uncertainty.

The Coffee industry, Paper industry and the Carpet industry all indicate high importance to history or the long lastingness of relations. History decreases the level of uncertainty and increases the level of information one has in a negotiation. The CO₂ footprint might have a similar role, that is, it decreases the level of uncertainty. By discussing carbon emission reductions, a company is sharing information. It has to share the vision regarding their business and the world (People, Profit, Planet balance) and this raises the issue if a company can be

trusted.

From the perspective that CO₂ footprint reduction influences uncertainty, there is a significant role for it in the Transaction Cost Economics. The Transaction Cost Theory mentions the quality of available information as an indicator of the level of uncertainty (Williamson, 1979). This study indicates that significant CO₂ emission reduction strongly relates to the concept of trust, which lowers the level of uncertainty. The concept of trust is previously related to the transaction cost economics by Noorderhaven (in Groenewegen, 1996), but the relation between CO₂ footprint and uncertainty is currently absent in the literature.

CO₂ footprint changes the context of the negotiating process.

Each company unites two concepts: People in a company versus the industry that supports and supplies it. In various cases we have seen that interaction aspects between agents are involved in negotiations. Personal involvement can be regarded to as the context of a negotiation, or as the context in which the transaction costs come to being. This study shows that the CO₂ footprint discussion raises the issue between the individual people in a company and the industry behind the company as translated to the ‘People, Process, Product’ balance. A reduction in CO₂ footprint can only fully serve a company if it is slowly introduced and equally spread and integrated throughout the company. This can be learned from previously integrated sustainability initiatives (e.g. the FSC certificate in the Paper industry), as observed by the participating companies in this research. From this perspective, the CO₂ footprint changes the organizational structure of an entire company, which again influences the setting during negotiations.

If reduced carbon emissions influence order acquisition negotiations via the organizational structure of companies, this adds a new dimension to the footprint investigation. Organizational psychology and agency theory were a not part of this research, but the outcome of this research suggests that it should be in future research. The transaction cost economics discusses bounded rationality and opportunistic behavior (Williamson, 1979), which are both mentioned from the perspective of individual salesmen and purchasers separately. Interaction between these two agents is currently not described in the literature as an influential factor when it comes to transaction costs. Thereby the above proposition gives new insight to the theory.

CO₂ footprint needs proper certification to gain trust.

This study shows that certification might tend to give the incentive that less trust is needed in a company. Significant involvement might sometimes be difficult to prove. And a company not always gets the chance to tell its full story if it has a proof, using in-house records. Certificates can reduce this problem, because they set a common standard that can be relied on. As it was also stated above, the level of trust that is needed in a negotiating partner is lower, and from the beginning of a negotiation the level of uncertainty is artificially lower.

The concept of trust is introduced in the literature by Noorderhaven (in Groenewegen, 1996). The above proposed relation is a contribution to the literature and as a consequence CO₂ footprint has an impact on the Transaction Cost Economics: in current literature it is stated that trust lowers the level of uncertainty and the transaction costs of cooperation and specialization in general (Hill, 1995). This study provided evidence that confirms this relation. Proper certification might also change the dynamics in the Value Net, as it is described by Brandenburger and Nalebuff (1996). The level of interaction with competitors and complementors is subject to available information in the market. CO₂ footprint certification might alter the content of shared information.

CO₂ footprint impacts through image building.

The observed increasing market demands, from both end consumers and retailers, can stimulate companies to build a sustainable image. For larger TC cases this mechanism works through

legislation. The legislation increases the visibility of company actions. This study showed that CO₂ footprint reduction can also increasingly serve as a competitive advantage towards one of Porter's Five Forces: the threat of substitutes (Porter, 1985b).

From this perspective the CO₂ footprint can not be related to the Transaction Cost Economics. The concept of Image Building might influence directly on the position during negotiations. Only maybe later on, if a better image is established, the frequency of transactions might increase, which again influences the costs of a transaction. This vision is supported by the literature, where reputation is considered a competitive advantage in itself (Barney and Hensen, 1995 and Lindenberg in Groenewegen, 1996). The theory currently does not give insight in how reputation is related to the Transaction Cost Economics.

Summarizing, this study shows that **CO₂ footprint reduction is a valuable addition to the TCE model**. It lowers the transaction costs involved in transactions in general via trust and decreases the level of uncertainty during negotiations because of intense information sharing and increased transparency. CO₂ emission inventory might furthermore be the initiator of decreased production costs, which are a significant part of the transaction costs.

Besides that, it is suggested by the case study evidence that a value chain approach to CO₂ footprint reduction results in financial improvements to companies. The CO₂ footprint is an addition to the Closed Loop Supply Chain models, as CO₂ is a product of waste. Similar to cost reductions by reusing waste, CO₂ emission reduction (and carbon emission reuse?) leads to financial improvements.

Furthermore, the value chain analysis described by Porter (1985a) is indicated as very important by businesses. From previously introduced value chain guarantees it can be learned that the market appreciates these initiatives. Given the current political climate and the increasing CO₂ footprint awareness in the market, the CO₂ footprint value chain guarantee is very likely to play a key role in future product development.

And there is one remarkable finding in this research. Previous to the research it was assumed that the innovative character described by Porter & van der Linde (1995) and the Carbon Disclosure Project (2009) would be of significance importance to the transaction cost economics. The study indicated that companies value this characteristic, but it is not

6.2.2 Managerial implications

Currently governments do not force all companies into CO₂ inventory programs, the Emission Trading Scheme monitors only 5000 companies across Europe. In December this year (2009) during the Copenhagen Climate Conference stricter regulations will be decided upon, which will start to apply from the year 2012. Thereby it will be impossible to imagine business without Corporate Social Responsibility, including CO₂ reduction.

This study identified that most companies in the market are aware that CO₂ emission reduction becomes increasingly important from an environmental perspective. But not in all segments of the market the added value for companies is recognized yet. The reason to this is that management teams are or have not yet been able to figure exactly how this relation is established. As soon as managers succeed in establishing the mechanism that creates a link between CO₂ footprint reduction and financial improvements for the company, there will be no doubt about it and it will become in the mainstream of business at rapid pace.

Relevant to the establishment of this relation is that already production efficiency is linked to both euros (cost reduction) and CO₂ emission rates. Cost reduction programs are widely integrated in companies, they know exactly which costs are made at what locations in the company. CO₂ emissions should be monitored as closely as costs throughout a supply chain. After all, measuring CO₂ emissions results in knowing what resources are consumed in which stages of the production process. Most importantly the amount of energy consumption becomes

evident for separate production phases.

As it was indicated above, the current political climate allows companies to sit back and wait. As long as the consequences of CO₂ emission reduction remain vague, for companies it is easy to wait and observe others. This is the reason why the balance showing CO₂ emission reduction and financial improvements is very important. So far, when cost reductions were involved, companies could just take their financial losses when not participating in cost reduction programs. But for CO₂ emissions it is different: the environmental consequences of not participating in CO₂ reduction programs are irreversible.

Summarizing, there is an *intrinsic motivation* to reduce CO₂ emissions among industries. Companies are not yet certain if and how financial improvements to individual companies can be established, but there is the opinion that to participate in CO₂ emission reduction is an advantage. Particularly if the quantification records are really explicit.

So, CO₂ emission reduction programs will be integrated in companies throughout the market. This has implications on two levels: for the company itself and for its value chain. For the individual company that reduces CO₂ emissions firstly this will result in higher production efficiency and financial improvements. In identifying emissions levels companies find in which production processes high amounts of fossil fuels are consumed. Lower consumption of fossil fuels increases efficiency, and as a consequence less man-hours and other resources are needed. During order acquisition negotiations lower cost price increases the bargaining power of the supplier, which positively influences its negotiating position.

Secondly, with emission reduction companies 'claim' a certain position in their supply chain and in the value chain of products. The supplier has the possibility during order acquisition to emphasize the intended value chain approach. By discussing CO₂ footprint measures and Life Cycle Assessment approaches during negotiations suppliers influence the transaction costs of a transaction. The context of the negotiations changes, an increased level of transparency is established. Trust is more easily developed and uncertainty decreases: lower transaction costs enhance the negotiating position of the supplier.

The question remains, however, what the best way is to introduce CO₂ emission reductions: certificates or in-house records. This study identified different opinions across different industries and even across supply chains. Therefore it is relevant to identify based on what actions companies are allowed to claim they are committed to sustainability. Regarding certificates and in-house records, it may be that for each value chain different mechanisms will occur, or that both will still be considered valuable over the next years. And it may be that industry standards will be set in the near future.

6.3 Limitations and Future Research

This research was designed in a way that pressed supply chain involvement. A consequence was that a limited amount of companies was involved, as by being bound to supply chains there is a higher difficulty with participation.

But due to this design, high quality information was gathered from participating companies. Two out of three cases were in-depth case studies, allowing the reader to find mechanisms that may have remained hidden if a different approach was chosen. These cases gave the opportunity to observe various characteristics and some kindly ask for further research and in-depth explorations. Further examinations might for a starter involve a larger spread of cases among different industries, and will be very valuable.

There might be a difference in trends or a difference in speed of acceptance across different industries. Some parts of the market are yet receptive to CO₂ emission reduction, other parts

are not. End consumers might exert pressure in various strengths. Is CO₂ footprinting maybe related to the percentage of the cost price that represents energy consumption during production?

The signs and references towards organizational psychology kindly ask for further research. Not only the concept of trust influences the transaction costs, there is a possibility that the entire context in which a negotiation takes place changes under the condition that sustainability measures are introduced. As long as direct financial benefits remain unproven or uncertain to certain industries, personal involvement becomes increasingly important. Mechanisms behind these suggestions can be investigated in future research.

Is it possible that an influencing mechanism might be related to the emotional or psychological behavior of people? This follows from the relevance and irrelevance of certificates. The relevance of some certificates indicates that people do not value the effectiveness of means for emission reduction. There is a tendency to easily believe sustainability claims.

On the other hand, the irrelevance of certain certificates states the opposite: that people only just value effective means of emission reduction. Certificates are in that case insufficient because they do not provide sufficient proof of involvement in sustainability measures. In this respect sustainability might be an advantage during personal negotiations, while it is of no importance to tenders presented on paper.

Sub-question (d) of this research was ‘If companies do not use their improved emissions, why do they not?’ and was answered in the Conclusion. It should be noted however that the companies participating in this research all did use their improved emissions during order acquisition negotiations. The answers presented to this sub question are based on case study evidence gained by discussion downstream relations with participating companies. Future research could elaborate on this question involving companies that do not currently use their improved emissions.

Companies might have multiple salespersons, especially larger companies. Furthermore, companies have individuals or separate divisions that are experts on sustainability and CO₂ emission reduction. Those persons might be knowledgeable on industry trends and market trends, while they are not the ones involved in negotiations. More in depth and elaborate case studies may give the opportunity to look into this limitation.

The following is presented for consideration:

The three cases involved companies that were involved in CO₂ measurement prior to the execution of the interviews. Was it in the line of expectation that those companies admitted the importance of carbon footprint reductions?

A note concerns global warming and corresponding initiatives. It is important to stress once more that in this report nothing is stated regarding the assumed environmental advantages that follow from a reduced CO₂ footprint. The supposed link between CO₂ emissions and global warming remains uncertain.

Finally, it may be interesting to further discover a different approach to CO₂ emissions. Instead of the so-called Cradle-to-Grave approach, the perspective from which this report is written, the Cradle-to-Cradle principle could offer different options. We touched upon the subject by discussing Closed Loop Supply Chains and their zero-waste approach. Cradle-to-Cradle is based on a change to effectiveness, while Cradle-to-Grave is based on improving efficiency.

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Measurement Tools

This appendix gives additional information on CO₂ emission measurement tools, to get a feeling for the complexity of the measurement of those emissions. It shows the variety of present measurement models and one in particular. Discussed is what categories in models exist and the selection criteria how to distinguish and select a suitable model per situation. This section is provided as background information.

A.1 Measurement Tools

Life Cycle Assessment (LCA), which is also known as cradle-to-grave analysis or end-of-pipe, is the study of the environmental impacts that a product or service causes by its existence. That is, starting from a combination of raw materials, counting the emissions caused by production (resources and energy use), distribution, consumer use and disposal (or recycling). It is designed to compare all damages, both ecological and social, of a product through its complete product life cycle. A more accurate result is achieved if an LCA is executed for a series of processes.

There is a clear similarity between LCA and CO₂ measurement tools. Crown & Carbon Trust (2008) present such a model, related to LCA. PAS 2050, which describes how a carbon footprint of a product (good or service) should be calculated according to five elaborate steps: building a flow chart, checking the boundaries, collecting data, calculating the footprint and checking uncertainty. The article clearly states that different product footprints are not accurately comparable unless the same data sources are used, and boundary conditions and other assumptions are identical.

A.2 Pas 2050

Crown & Carbon Trust (2008) present PAS 2050, a model that describes how a carbon footprint of a product (good or service) should be calculated in five steps:

- Build a process map or flow chart: Choose a functional unit for the product and break it down into its constituent parts. A functional unit reflects how a product is actually consumed by the end user.
- Checking boundaries and prioritization: Determine the relevant boundaries for the carbon footprint analysis. Preferably this is done according to PCRs. These consistent, internationally accepted Product Category Rules are a set of requirements and guidelines defining a product's life cycle.
- Collecting data: Two types of data are necessary to calculate a carbon footprint: activity data and emission factors. Activity data refers to the amount of material and energy of a product's life cycle. Emission factors convert these quantities into the resulting GHG emissions: the amount of greenhouse gases emitted per 'unit' of activity data.

- Calculating the footprint: *Carbon footprint of a given activity = Activity data (mass/volume/kWh/km) Emission factor (CO₂e per unit)*
- Checking uncertainty: optionally one can measure and minimize uncertainty in the footprint calculation and improve confidence in comparisons (and decisions that are made based on the footprint).

The article clearly states that different product footprints are not accurately comparable unless the same data sources are used, and boundary conditions and other assumptions are identical.

A.3 Categories

According to Kenny and Gray (2009), various other models have been developed to measure the CO₂ footprint of a company, e.g. Carbon Footprint and Resurgence (UK Models), or the Safe Climate model (World Resource Institute, 2007). The GHG Protocol Initiative alone has developed sixteen cross-sector and sector-specific calculation tools (Daviet, 2006).

Four major categories can be distinguished in emission models (Daviet, 2006). The first is based on activity data, such as the one described above. The equation is again $E \text{ (emissions)} = A \text{ (activity data)} \times EF \text{ (emission factor)}$. A second measure is the Mass or Material Balance Method, which follows the mass flow of a chemical element through a process. The chemical reactions that an element undergoes should be accurately identified. The general equation used is $Input = Output \text{ (all output that is not emitted)} + Emissions$.

A Predictive Emissions-Monitoring System (PEMS) develops the numerical relationship between a unit's operating parameters and a pollutant gas. This way of using mathematical models uses a combination of continuous monitoring and a stack test. Finally, a Continuous Emissions-Monitoring System (CEMS) directly measures a gas's concentration or emission rate.

A.4 Selection

'Tiers' are used to help decide which methods are most appropriate in certain circumstances, also indicating the complexity and accuracy of a model. Definitions to tiers do vary:

- According to IPCC (2006) a tier is a level of methodological complexity. Tier 1 is the basic method, tier 2 is intermediate, and tier 3 is the most demanding regarding complexity and data requirements. Tiers 2 and 3 are higher-tier methods and are thereby believed more accurate.
- The EU ETS commission (2006) defines specific methods for determining variables as tiers: 1. activity data, 2. emission factors, 3. composition data, and 4. oxidation and conversion factors. The highest tier is always preferred.
- Additionally INGAA (2005) classifies: tier 1 is a general estimate with minimal inputs, tier 2 uses based on facility-level data and emission factors, tier 3 requires data based on a site's process operation.

B

Research Introduction

This letter was sent to persuade companies into participating in an interview.

Willian van Slooten
Jacoba van Beierenlaan 25
2613 HW Delft

Intelligence for Business
Electronenlaan 6
3903 KJ Veenendaal

Delft, 11th of May, 2009

Subject: Interview on CO₂ footprint and negotiations

Dear Sir, Madam,

as a result of the graduation project students have to pass before getting their Msc. title, together with Intelligence for Business I would like to ask you to participate in a one hour interview.

My name is Willian and in 2003 I started to study Applied Mathematics at TU Delft. After my Bachelor's degree I started a Master in Management of Technology, which gave me the opportunity to study company behavior and economics.

There is a positive relation between a company's CO₂ emission and its financial performance: a company will generally become more efficient when lowering its emissions. It is interesting to know whether a lower CO₂ footprint can additionally be an advantage beyond the company's direct profits. That is, if and how the mandatory CO₂ footprint of a company can be used to a competitive advantage during negotiations.

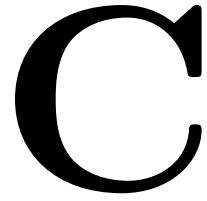
This case study research is based on interviews, thereby preferably also studying **two negotiations** your company was involved in, a larger and a smaller one. Additionally I would like to invite **two** of your company's **suppliers** or **customers** to participate in a separate interview. A first suggestion would be to try and meet between the **2nd and 5th** of June. I am looking forward to hearing from you.

Yours faithfully,

Willian

Phone: +31 (0) 6 24144409

E-mail: *w.m.c.vanslooten@student.tudelft.nl*



Interview Questions

This appendix gives an overview of the interview questions. Note that the interviews were semi-structured. These questions served a guideline or storyline to follow during the conversations.

i) Describe generally how a deal negotiation takes place. Could you indicate the differences between the high Transaction Costs (TC) case and the low TC case?

(Possible follow-up) Elaborate on how the initial introduction is developed. What are the main differences between long lasting relationships and new customers?

ii) In this case, how many competitors were involved?

(Follow-up) How often are multiple candidates involved?

iii) We would like to know more about strategic advantages during negotiations. Which characteristics were figured strategic advantages during the transaction you were part of? E.g. for this product, which volumes are usually transferred? How much does the client know about your product? (How many substitutes can be found on the market?)

(Follow-up) What role do earlier collaborations play during a deal negotiation? Do you work closely together to serve the customers needs and preferences regarding product, service and packaging? How important long established relations and stability?

iv) How is CO₂ embedded in the company? E.g. what role do subcontractors play regarding CO₂ and what list of demands does your company have regarding transport?

v) During negotiations, is the CO₂ emission rate of a company ever mentioned? Do you mention it and how? Is there a difference between our two cases (high/low TC)?

(Follow-up) Do you think it is worth mentioning? Can you 'sell' sustainability to your client, and can your client's client sell it to the customer?

(Follow-up) And then, would you mention with small clients (low TC) or larger clients (high TC)?

vi) In what ways is it worth to introduce CO₂ footprint in a transaction or in the negotiating process? How do you introduce it? E.g. certificates, image improvements, real

progression? So, is it reality or is it something companies eventually would do, which only makes it speculative?

vii) If a discussion about the CO₂ footprint in itself could act as a strategic advantage, is it possible that the CO₂ footprint would be better embedded in the company? How would it be embedded?

(Follow-up) It has been proven indeed that introducing and improving the CO₂ footprint together with one's suppliers, results in clear content concerning feedback to both parties and it stimulates and enhances innovation within the supply chain and within the company. Would this be an incentive for both you and your suppliers to introduce the CO₂ footprint in deal-negotiations?

viii) (Optional) Can you imagine how the Emission Trading Scheme might influence negotiation processes in the future?