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Sustainability reporting with an environmental focus

– a comparative analysis from the logistics industry –

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Summary

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Five Key Words:	Sustainability reporting, sustainability management, sustainability controlling, stakeholder expectations, systems-oriented theories
Purpose:	The aim of this master thesis was to analyze sustainability reporting in order to discover <i>what</i> companies report on environmental sustainability management. Based on this purpose, possible motivations concerning disclosures in sustainability reporting were discussed.
Methodology:	Qualitative content analysis
Theoretical perspectives:	After a short introduction to the concept of corporate sustainability, a sustainability management framework is developed based on a combination of the outside-in and inside-out perspective of sustainability management. Based on this, a literature review on sustainability reporting is provided and possible motivations for sustainability reporting are presented, which involved both the consideration of external expectations such as stakeholder requirements, guidelines and rankings as well as internal benefits such as an improved corporate image. Finally, the internal processes of strategy-derived sustainability controlling are outlined.
Empirical foundation:	Documentary research was applied to analyze the sustainability reporting of the five major companies in the logistics industry in terms of net and gross revenue as well as ocean freight and airfreight volumes (Deutsche Post - DHL, Kühne & Nagel, DB Schenker, Panalpina, UPS). This included all information that is published externally by those companies concerning sustainability (e.g. annual reports, sustainability reports, corporate website, environmental policy, etc.).
Conclusions:	The sustainability reporting of the analyzed companies in the logistics industry tends to be rather transparent. It was found that external expectations are considered by the various companies and that in response to these expectations companies engage in activities to reduce their impact on the environment. With respect to content, it was revealed that most information is published concerning strategy-related topics. Besides, evidence of inclusion of sustainability controlling practices in the sustainability reporting was found. The reporting in general can be viewed as a social control tool to gain a legitimate status in society. Lastly, it was considered unethical by the authors that subcontractors' emissions are mostly not part of the targets set by the logistics companies to reduce CO ₂ -emissions.

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1 Introduction

The awareness of sustainability is increasingly gaining weight in the international debate. The world population already exceeds seven billion, while concerns about climate, water, land and habitat preservation do not stop growing. At the same time, the economic progress of developing countries opens up new markets for goods and services. These movements lead to new possibilities for companies to alter their business methods as to how to engage suppliers, operate facilities or service customers (Fiksel et al., 1999). Those examples describe efforts companies can make to contribute to the sustainability of the planet which is commonly referred to as corporate sustainability (CS) (Schaltegger et al., 2006).

However, for many CS is still a so-called *buzzword* and only concerns a trend that organizations engage in some form of sustainability reporting (e.g. via annual reports or separate sustainability reports) in order to *gain legitimacy* from society and stakeholders. Therefore, *skepticism* is widespread as to what is behind this sustainability approach and it is often considered only a marketing and PR tool to hide the real motivations of the company which is mainly perceived as increasing its profits (Welford, 1997; Gray & Bebbington, 2000). As depicted by the following cartoon, business innovations often only aim at providing better technological solutions while only insufficiently considering the impact on the environment (Airboat Africa, 2010):



Nevertheless, from an ethical point of view companies bear a *responsibility towards society* and due to their major impact on their surroundings, it is essential that companies take this responsibility seriously of which CS is a part. Be it out of business-oriented reasons, i.e. to increase profits, or out of ethical considerations, many companies have recognized the importance of sustainability in a business context and it has become part of their *strategic agenda* (Heikkurinen, 2011).

1.1 Problem statement

Even though the number of sustainability reports continues to mount, it is difficult for external users to take a look ‘behind the scenes’ to see how sustainability issues are truly incorporated in the daily business of the company and what significance it has for the operations of the company. Concerns persist that the reporting is very selective and that information with adverse impacts on the environment stays undisclosed (Adams & Frost, 2007). In this context, *transparency* on a company’s sustainability management depends on the amount the company chooses to publish externally. Previous research showed that social and environmental information is increasingly communicated through annual reports, stand-alone reports or on the corporate website (Adams & Frost, 2004; Adams & Zutshi, 2004; Guthrie & Parker, 1989; Unerman & Bennett, 2004). However, the content and extent of these disclosures differ per company since there is a lack of a common set of mandatory reporting standards concerning sustainability reporting on a global level (White, 2005). This represents a challenge for external stakeholders when trying to compare the sustainability performance of globally operating firms.

1.2 Aim

The aim of this master thesis is to analyze sustainability reporting in order to discover *what* companies report on environmental sustainability management. Based on this purpose, possible motivations concerning disclosures in sustainability reporting will also be discussed.

1.3 Disposition

In short, the master thesis starts with an introduction to the broader understanding of sustainability management, which is subsequently illustrated by means of examples from the logistics industry.

After the following motivation of the applied methodology (Chapter 2), the master thesis is structured as follows:

In Chapter 3, *A definition approach to Corporate Sustainability (CS)*, the broader setting of CS, the distinction from Corporate Social Responsibility (CSR) and the different dimension of CS are discussed. Chapter 4, *Sustainability Management Framework (SMF)*, highlights that both the external and internal perspective of sustainability management need to be addressed by a comprehensive sustainability management. Next, the framework is broken down further and Chapter 5, *Literature review on sustainability reporting*, deals with issues concerning the content of sustainability reporting. This is closely followed by Chapter 6, *Motivation for sustainability reporting*, which discusses reasons for sustainability reporting as well as guidelines, regulations and rankings for sustainability performance. Chapter 7, *Strategy-derived sustainability controlling*, deals with the importance of controlling as ‘bridge’ between strategy and reporting, with a funnel

approach to arrive from Sustainability strategy, Sustainability Performance Measurement to Environmental Management Accounting (EMA) and to more specifically Carbon Accounting. Moving to the empirical part of the master thesis, Chapter 8, *Analysis of sustainability reporting concerning environmental sustainability management*, involves an analysis of the sustainability reporting of the five major companies in the logistics industry under the headings of the SMF. Next, Chapter 9, *General findings*, brings the main analytical insights to a more general level. Finally, Chapter 10, *Concluding remarks*, summarizes the key learning points of this master thesis and provides suggestions for future research.

2 Methodology

This section describes the research methodology that was undertaken for this master thesis. It will present the research strategy, research method as well as the type of data analysis. This will be followed by a thorough argumentation for the industry and companies chosen, and lastly validity and reliability are addressed.

2.1 Research strategy

In general, one can distinguish between two main research strategies for academic research: quantitative and qualitative research (Bryman & Bell, 2011; Easterby-Smith et al., 2008). There exist numerous differences between the two approaches but the most significant one relates to the collection and analysis of data; whereas quantitative research focuses on data expressed in numerical terms, i.e. mathematical figures, qualitative research is concerned with data in forms of words (Easterby-Smith et al., 2008).

For this thesis, the authors decided to apply a qualitative research method since it offered the possibility to focus on the written material that is published by companies in terms of sustainability management. This was considered appropriate to address the aim of this master thesis in a comprehensive way, which involved the analysis of sustainability reporting in order to discover what companies report on environmental sustainability management.

In this context, it should be mentioned that the authors were aware of the fact that qualitative research concentrates on descriptions and the context of setting (Bryman & Bell, 2011). This knowledge enabled the authors to construct and subsequently conduct the research in a more conscious manner. Finally, the choice for qualitative research was influenced by the greater flexibility this method offers and thus it is better equipped to result in findings that are interesting (Bryman & Bell, 2011). In the authors' opinion, this benefit of the method was considered to outweigh the disadvantages of qualitative research, which has been criticized for being too subjective, difficult to replicate, problematic to generalize and not transparent (Bryman & Bell, 2011).

2.2 Research method

The research method of this master thesis involved both literature and documentary research. This combination was considered appropriate in order to address the aim of this master thesis.

2.2.1 Literature research

Literature research was conducted to provide the theoretical background knowledge that was needed to get a proper understanding of the concept of sustainability management. The sources used

mainly consisted of books as well as academic journals. The authors managed to find fairly recent books that were useful for framing the research. Furthermore, both authors had previously engaged in writing a review paper with a focus on ‘Social and Environmental Disclosure’, which helped to explore the topic of sustainability reporting with an environmental focus at an early stage. The following stages of the literature research were suggested by Saunders et al. (2007).

Planning the literature research

Firstly, the parameters for the literature search were agreed upon, which are shown in the following table.

Parameter	Narrow	Broader
Language	English	English, German, Dutch
Subject Area	Sustainability reporting, Sustainability controlling, Sustainability management, Sustainability strategy	Sustainability accounting, Corporate sustainability, Green disclosures, Sustainability balanced scorecard
Business Sector	Logistics industry	Industries involving heavy CO ₂ -emissions (airlines)
Publication Period	Last 5 years	Last 5 – 15 years
Literature Type	Current journals and books	Journals and books

Table 1: Elements of literature planning

Secondly, after brainstorming and screening relevant articles and books, the subject matter was defined and appropriate key words for further research were selected, which involved:

sustainability reporting, sustainability controlling, sustainability management, stakeholder expectations, performance measurement, systems-oriented theories

Conducting the literature research

As stated by Saunders et al. (2007, p. 79), “any research will find only some of the relevant literature.” Therefore, browsing and screening was applied to the literature, that was found with the help of the keywords above in order to identify which books and articles were in fact relevant for the theoretical part of the master thesis. Eventually, main authors in the field of sustainability management appeared to be S. Schaltegger, R.L. Burrit and C. Deegan. Consequently, most of the theoretical part of this master thesis is based on their findings.

2.2.2 Documentary research

This research focused on the logistics companies ‘Deutsche Post-DHL’ (further DPDHL), ‘Kühne & Nagel’ (further K&N), DB Schenker, Panalpina and UPS with regard to their sustainability management. The empirical data was obtained by documentary research (Saunders et al., 2007), which involved an examination of the sustainability reporting of the companies. It should be noted that when it is referred to sustainability reporting in this master thesis, it involves all information that is published externally concerning sustainability (e.g. annual reports, sustainability reports, corporate website, environmental policy, etc.). The inclusion of *various* communication tools was chosen in order to be able to analyze in a comprehensive manner what companies report on environmental sustainability management.

2.3 **Data Analysis**

In fact, there exist multiple methods for the analysis of qualitative data. For this master thesis, a qualitative content analysis was chosen since it offered the opportunity to analyze the sustainability reporting of the companies in a systematic way.

2.3.1 Qualitative content analysis

It should be noted that content analysis and qualitative research are indeed two separate approaches. Therefore, at first the definitions of these different methods are provided before the combined classification of the approach is presented. Since the authors Bryman & Bell (2007, p. 730) elaborately discuss the concept of qualitative content analysis, it has been decided to use the definitions of these two authors: “*content analysis* can be described as an approach to the analysis of documents and texts that seeks to quantify content in terms of predetermined categories and in a systematic and replicable manner.” It is therefore a prominent tool for quantitative research due to its flexibility and wide range of applicability. As indicated by the definition above, the major process of content analysis involves the coding of the collected data in order to develop a quantitative data set for analysis.

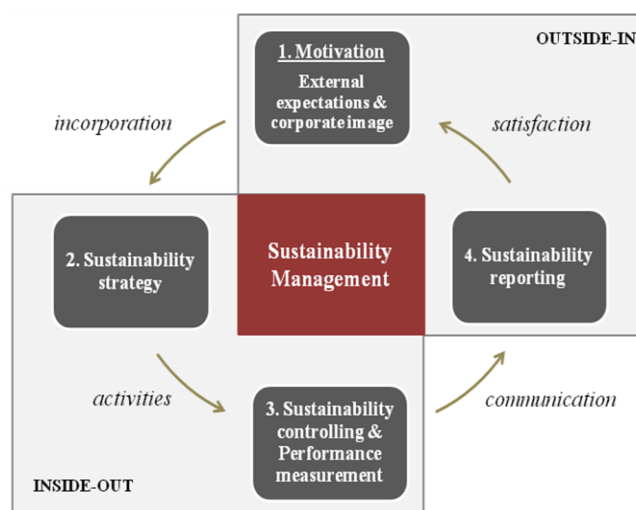
By contrast, Bryman & Bell (2007, p. 730) describe *qualitative research* as “the emphasizing of words rather than quantification in the collection and analysis of data.” Combining these two approaches leads to the concept of *qualitative content analysis* which is referred to as “an approach to documents that emphasizes the role of the investigator [...] There is an emphasis on allowing categories to emerge [...] for understanding the meaning of the context in which an item being analyzed appears.” To clarify, even though the focus of content analysis is primarily on quantitative research, it is increasingly used for qualitative data, thus being referred to as qualitative content analysis (Hsieh & Shannon, 2005). It involves “subjective interpretations of the content of text data through the systematic classification process of coding and identifying themes or patterns” (Hsieh

& Shannon, 2005, p. 1278). In this context, it should be highlighted that the process of coding in qualitative content analysis involves the creation of content categories in order to be able to analyze the many words of text in a better way (Elo & Kyngäs, 2007).

With regard to this master thesis, the previous paragraph describes the main attributes of the method applied for the data analysis. By means of a categorized analysis of the content of the sustainability reporting and through a text analysis which involved the emphasizing of words within the reporting, it was considered a suitable approach to understand the meaning of the context of sustainability management. The first step in this process involved the development of adequate categories, which is describes in the following.

2.3.2 Categories based on the Sustainability Management Framework (SMF)

The empirical part of this master thesis was analyzed by means of the different categories based on the following sustainability management framework (SMF) (see graph 1).



Graph 1: Sustainability Management Framework (SMF)
(own development, based on Schaltegger & Wagner, 2006)

This framework was chosen for the selection of the main categories since it represents an ideal approach for companies to engage in sustainability management. Therefore, the authors considered it an appropriate tool to analyze the content of the sustainability reporting of the logistics companies. To clarify, the authors used 'box four: sustainability reporting' to discover what the companies report on the other aspects of the framework, including 'box one: motivation', 'box two: sustainability strategy' and 'box three: sustainability controlling'. By means of the SMF, the authors considered it possible to categorize and interpret the sustainability reporting in a systematic way. The relevance of the numbering of the boxes will be further considered in Chapter 4.

Next, it was decided to subdivide the main categories based on the SMF into more specific subcategories in order to be able to analyze the content of the sustainability reporting in a more detailed way (see table 2).

Motivation for Sustainability Reporting	Sustainability Strategy	Sustainability Controlling
<ul style="list-style-type: none"> • Stakeholder engagement • Application of guidelines • Rankings 	<ul style="list-style-type: none"> • Business strategy & environmental policy • Customer carbon footprint • Carbon-neutral products • Focus areas of sustainability strategy 	<ul style="list-style-type: none"> • Sustainability activities • Measurement of carbon emissions (emission factors)

Table 2: Subcategories based on the SMF

Moreover, through categorizing the content of the reporting in this way, a useful outline for further research was constructed, hence addressing to what Bryman & Bell (2007, p. 726) perceive as “a systematic and replicable manner.”

2.3.3 Presentation of analytical findings

The analytical findings for each of the subcategories presented above were placed in a traffic light spectrum depending how transparent the companies reported on the respective subcategory, i.e. companies that reported in a detailed way on a certain category were assigned to the green area (right), companies that reported a mediocre amount were assigned to the orange area (middle) and companies that provided little to no information on a certain category were placed in the red area (left) of the spectrum.



Lastly, a summarizing table was constructed that combined the results of all the separate traffic light spectrums by providing a clear overview of how often each company appeared in the red, orange or green area of the spectrums for the various subcategories. In this way, it was possible to draw more general conclusions concerning the transparency of the sustainability reporting. Furthermore, it was decided to create a ranking in order to judge the individual company’s specificity on environmental sustainability management provided by its sustainability reporting.

2.4 Choice of Industry and Companies

The choice of companies for this thesis is closely related to the choice of industry. The companies DPDHL, K&N, DB Schenker, Panalpina and UPS are all part of the logistics industry, hence due to their core business, their ecological impact is high in terms of fuel consumption and thus CO₂-emission output. This makes an investigation in the logistics industry a reasonable choice as the focus of this thesis is an *ecological* one, and does not look into social sustainability in more detail.

2.4.1 Industry

The logistics industry serves in our opinion as a valid choice to describe sustainability management and the related external reporting processes due to the following two reasons.

Legitimacy through sustainability reporting

As can be read later in this thesis, sustainability reporting serves for a company, amongst others, the purpose of gaining legitimacy from society for its operations, by publishing all the (presumed) actions they carry out to operate sustainably with regard to their employees, suppliers, customers, environment and society as a whole (Deegan, 2010). If one would not know better, then the impression is roused that without these companies the world would even be a worse place to live in. The logistics industry is in that respect interesting to look at, as their core business is closely related to the pollution of the environment and thus one can expect extensive sustainability reporting on the topic to gain acceptance from society for these actions. By focusing on the companies' sustainability reporting, it is possible to see to which extent these companies report on their activities to gain this legitimacy and where differences arise. As the sustainability reporting of the companies takes on different shapes, it will be interesting to see how and why this is caused.

The relationship between fuel consumption and costs

Since reducing fuel consumption and hence CO₂-emissions serves in the best interest of both the companies and their stakeholders (e.g. investors) in terms of cost efficiency (DeSimone & Popoff, 2010), it was expected to find information regarding this topic in the sustainability reporting. Next, the relationship between fuel consumption and costs was also considered interesting from the viewpoint of societal pressure put on the industry to be sustainable and innovative concerning the reduction of the fuel consumption. The side effect of this pressure could result in cost reductions for the companies. To sum up, it was expected to find information on this topic in the sustainability reporting because companies have the incentive to report on measures concerning the reduction of fuel consumption either to please investors due to cost reductions or to please stakeholders that are more concerned with the environment.

2.4.2 Companies

In order to analyze sustainability reporting to discover what companies report on environmental sustainability management, the first five companies from a ranking published by Armstrong & Associates, Inc., a recognized leader in supply chain market research and consulting, were selected (Armstrong & Associates, Inc., 2010). The ranking determined the 25 largest global freight forwarders by considering a combination of gross and net revenue as well as freight forwarding volumes in terms of ocean freight (TEU = Twenty-Foot Equivalent Unit) and airfreight.

	Net Revenue (\$ Dollar)	Gross Revenue (\$ Dollar)	Ocean TEUs	Airfreight Metric Tons
DPDHL	19,816	30,486	2,722,000	2,458,000
K&N	5,727	19,476	2,945,000	948,000
DB Schenker	9,120	18,999	1,647,000	1,225,000
Panalpina	1,423	6,887	1,241,000	892,000
UPS	6,022	8,670	700,000	862,000

Table 3: Top five global freight forwarders (Armstrong & Associates, Inc., 2010)

The focus on these companies was considered appropriate since simply relying on the five largest companies in terms of net or gross revenue would have been too narrow. Especially air transportation is responsible for the logistics industry's largest environmental impact (Deutsche Post AG, 2010), so this perspective should have also been taken into account when selecting the companies for this research. In the ranking by Armstrong & Associates, Inc. (2010), DPDHL, K&N and DB Schenker were the largest companies concerning gross revenue and all five companies were among the top five with regard to airfreight and ocean freight volumes.

To sum up, the relevance of the logistics industry concerns its evident impact on the environment, thus making it a logical choice for this master thesis on sustainability reporting with an environmental focus. Secondly, the companies are the largest within the industry and can be considered role models for smaller companies and in that sense have the potential of providing interesting and reliable insights in the sustainability reporting practices in the logistics industry. Both the industry and the companies fit in the research framework as it is assumed that the companies' activities are greatly related to sustainability issues and it is considered reasonable to investigate how they are used for sustainability management. Thirdly, as sustainability reporting is dealt with differently by the companies, it was considered a valid choice to take a deeper look at their reporting practices of the companies since it provided the opportunity to explore sustainability management in the logistics industry from different angles.

2.5 Validity & Reliability

On a final note, some comments regarding validity and reliability should be made. According to Bryman & Bell (2007), these terms can be transformed into credibility and transferability.

The credibility of the master thesis is asserted since the authors have properly understood the data collected through literature and documentary research. Since it was decided to analyze the sustainability reporting of *five* companies in the logistics industry, the credibility of the research results can only be asserted to a certain extent since the logistics industry comprises many more companies. However, by focusing on the five *largest* companies in the logistics industry in terms of net and gross revenue and global freight forwarding volumes, this drawback was addressed as it was considered that the larger the company's global freight forwarding volumes, the larger its environmental impact and consequently the greater the need of the company to gain legitimacy from society for its actions. Therefore, it was assumed that the sustainability reporting of those companies is more elaborate and of higher quality than the one of smaller logistics companies, which thus increased the possibility of finding truthful results.

The question of transferability concerns the fact that the same findings would also be found in different contexts (Bryman & Bell, 2007). Since the five largest logistics companies were taken for this research, a rather extensive insight is gained on how sustainability management is designed in the logistics industry. In this way, first generalizations can be drawn concerning the aspects that all companies have in common. Moreover, concerning transferability, the categorization of the content based on the SMF could also be used in further research concerning sustainability reporting in other industries.

3 A definition approach to Corporate Sustainability (CS)

'Sustainability' is a broad term which has been used with increasing frequency in academic discussions and in corporate practice. Due to multiple definition approaches in the literature, this chapter aims to alleviate the blurred picture of the term 'sustainability' by providing a clear and relevant description of the meaning of sustainability in a business context. Therefore, it is appropriate to start with the broad setting of CS, distinguish it from the concept of 'corporate social responsibility' (CSR) and subsequently provide details on the dimensions of CS with the help of the sustainability triangle.

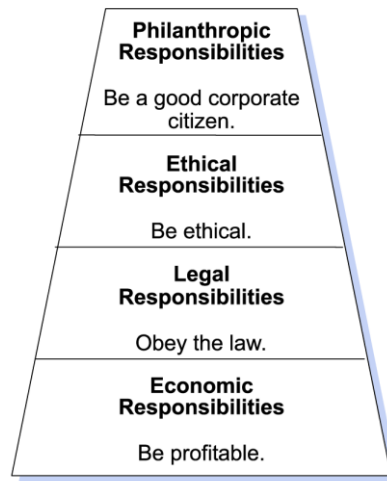
3.1 Corporate Sustainability (CS) as derived from the Brundtland Report

To begin with, the landmark definition of 'sustainability' in the Brundtland Report (WECD, 1987) also forms the basis for an adequate description of CS. It defines sustainable development as a "development that meets the needs of the present without compromising the ability of future generations to meet their own needs." Transferring this idea to the business level, CS can accordingly be defined as "meeting the needs of a firm's direct and indirect stakeholders (such as shareholders, employees, clients, pressure groups, communities, etc.), without compromising its ability to meet the needs of future stakeholders as well" (Dyllick & Hockerts, 2002, p. 131). Although this definition is rather abstract, it represents a good starting point.

3.2 Distinction from the term 'Corporate Social Responsibility' (CSR)

The above definition of CS exemplifies the close relationship between CS and corporate social responsibility (CSR) due to the integration and participation of relevant stakeholder groups in both concepts (Schaltegger et al., 2006). Even though CSR and CS are often used interchangeably in theory and practice, a short distinction between the terms seems appropriate in order to sharpen the understanding of CS.

The core of *CSR* can be described by an expectation of society that companies behave ethically and engage in some form of philanthropic activities exceeding economic responsibilities and legal compliance (see graph 2). Those activities that are solely performed on a voluntary basis include, for example, charity events, donations or sponsorship. In this way, CSR addresses societal issues required by stakeholder groups (Schaltegger, 2008).



Graph 2: CSR pyramid by Carrol (1999)

CS, by contrast, takes a broader perspective and refers to the management of economic, ecological and social activities in order to contribute to the sustainable development of both the company itself and the economy and society at large. It involves voluntary as well as compulsory actions which arise, for example, as a result of the need for legal compliance or due to pressures from NGOs or customers. Also, the motivation for CS is not necessarily stakeholder requirements, but companies rather have the opportunity to propose new, future oriented economic and social business models to stakeholders through CS (Schaltegger, 2008). To clarify, whereas CSR recognizes a difference between business and societal goals, CS focuses on the integration of business and sustainability. In this context, sustainability management is not regarded as a business accompanying activity, but rather penetrates the core business processes of the company in order to enable the company to contribute to the sustainability of society as a whole. Thus, CS should be regarded as a *business approach* in order to have the best possible effect on sustainability of society at large (Schaltegger et al., 2006). Nevertheless, this represents the ideal approach to CS.

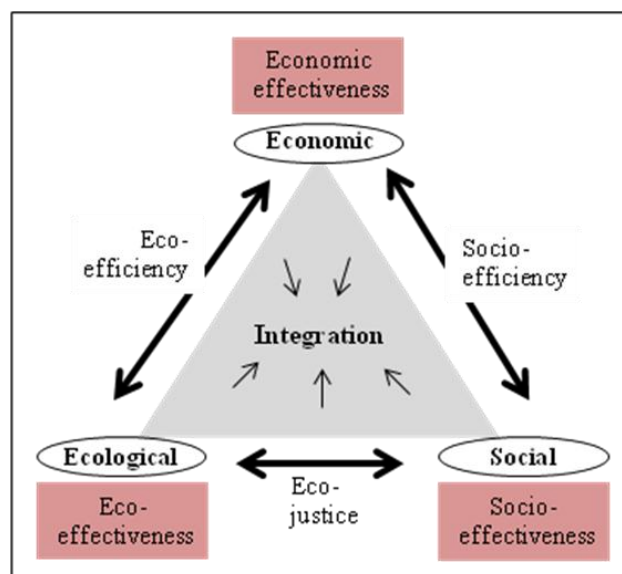
3.3 Critical viewpoints on CS

For many the term CS still represents a *buzzword* without deeper meaning. With regard to the environmental perspective, the term ‘greenwashing’ has become an established expression to describe a company practice which is characterized by two simultaneous behaviours: poor environmental performance coupled with a positive communication about the company’s environment-friendly activities (Delmas & Burbano, 2011). This behavior has been heavily criticized since it conveys a misleading perception of the company’s activities to external stakeholders. However, it remains challenging to distinguish between a company that is truly striving for CS and one that is just engaging in some form of ‘greenwashing’. Several scholars therefore condemn the feasibility of a business approach for sustainability in general and just view it as a trend on how the company can enhance its profits (see e.g. Gray & Bebbington, 2000;

Welford, 1997). This criticism is also a result of the existence of various terms describing approaches to sustainability. The frequent introduction of new and similar terms makes it even for experts hard to differentiate between the individual meanings of the various terms and has led to the notion of sustainability being an *umbrella term* comprising a large variety of approaches. Hence, several uncertainties arise which have damaged the image of CS. A stakeholder outside the company might ask himself: ‘How well is management informed or trained about sustainability issues? Is it ignorant towards sustainability or is it just engaging in some form of ‘greenwashing’?’ (Schaltegger & Burrit, 2006). To enhance the credibility of the company’s progress towards CS, it is therefore necessary to equip the term CS with further meaning and engage in a trustworthy reporting of sustainability performance.

3.4 The Sustainability Triangle

Economy, ecology and society represent the three cornerstones of CS and have also become known as ‘triple bottom line’ (Bennet & James, 1999). When CS is viewed in terms of the sustainability triangle, this not only includes a focus on the economic, ecological and social goals of CS, but also helps to visualize the interrelationships between these three dimensions (see graph 3). With regard to the sustainability triangle, Schaltegger et al. (2006) describe in depth the challenges and issues of CS which need to be addressed by a framework for sustainable management and thus sustainability controlling and reporting. Since the focus of this master thesis is on environmental sustainability issues, only the economic and ecological dimension of CS will be shortly introduced.



Graph 3: Sustainability triangle with challenges (Schaltegger et al., 2003)

3.4.1 The base: Effectiveness and Efficiency

Fundamental to the sustainability triangle are the two concepts of (1) effectiveness and (2) efficiency (Schaltegger et al., 2006).

Effectiveness – whether economic, environmental or social – concerns a single dimension and therefore refers to the corners of the triangle. It is measured with the help of absolute indicators, or figures.

Efficiency, by contrast, focuses on the relation between two different dimensions. In this context, ‘eco-efficiency’ concerns the environmental and economic dimensions and ‘socio-efficiency’ the social and economic dimensions. As a result, efficiency is measured in relative indicators or ratios.

3.4.2 The ‘Ecological Challenge’

Many corporate activities have an impact on the environment in particular due to CO₂ emissions but also due to the contamination of soil and water. Those represent examples for the excessive environmental burdens companies shoulder. The environmental challenge therefore confronts companies to make “substantial reductions in the absolute scale of environmental impacts of their production processes, products, investments, etc.” (Schaltegger et al., 2006, p. 9, see also e.g. Braungart & McDonough, 2002). Since it is difficult to determine a single metric on environmental impact, different specific metrics for eco-effectiveness are in place such as CO₂-emissions or CO₂-equivalents (e.g. Heijungs et al., 1992), business ecological footprints (Wackernagel & Rees, 1996), or simply the total quantity of materials mass involved in a product life cycle (e.g. Schmidt-Bleek, 1994). What they have in common is that all measure the *absolute environmental performance* (e.g. tones of CO₂ reduced in the last period) and offer the possibility to assess the success of the minimization efforts of environmental impact. Consequently, the different metrics for eco-effectiveness monitor how successfully a company is dealing with the ecological challenge.

3.4.3 The ‘Economic Challenge’

The focus of the economic sustainability challenge is to improve both eco-efficiency and socio-efficiency. In short, it means that effective environmental and social management should be performed with the least monetary means as possible. This differs from the traditional economic challenge which aims at increasing corporate and shareholder value along with the company’s profitability. However, also environmental protection and social commitment can contribute to these traditional aims by either increasing value, making a contribution to profitability or at least by minimizing costs. Since ‘eco-efficiency’ forms a task of sustainability controlling, it will be further considered in Chapter 7.2.

4 Sustainability Management Framework (SMF)

A trustworthy communication of sustainability performance requires a reporting approach that encompasses qualitative value statements and descriptions of future prospects such as those published in glossy reports. Instead, it is essential to also incorporate quantitative measures of environmental and social impacts (Schaltegger et al., 2006). Only in this way external stakeholders are able to trace the improvement achieved in terms of sustainability performance and the credibility of management efforts for sustainability is enhanced.

This ideal approach to sustainability management highlights the close relationship between sustainability controlling and reporting, which need to be integrated in a structured sustainability management framework (SMF) in order to yield valuable contributions to CS. This demonstrates that an effective SMF has to address both the external and internal perspective of sustainability management. This chapter introduces such a SMF, which was self-developed by the authors after a careful literature review.

4.1 Two perspectives on the development of a SMF

Either from an external ‘outside-in’ perspective or from a strategic ‘inside-out’ perspective, a framework for sustainability management can be structured. This highlights the two competing starting points for sustainability management that are found in practice.

4.1.1 Outside-in perspective

The basis of the ‘outside-in’ perspective form societal expectations, guidelines such as the ones provided by the Global Reporting Initiative (GRI) as well as environmental and sustainability ranking. Publicly-discussed concerns will be taken into account and the company’s contribution to solving these issues will have an impact on the external sustainability report. From this view, the (published) external expectations influence the contents of the sustainability reports. Based on the external information requirements, the internal controlling processes and information management system can be defined. In this way, sustainability controlling and performance measurement are designed or adapted to satisfy reporting requirements. Therefore, if a framework for sustainability management is created from an outside-in perspective, this approach is also referred to as reporting-driven (Schaltegger et al., 2006; Schaltegger & Wagner, 2006).

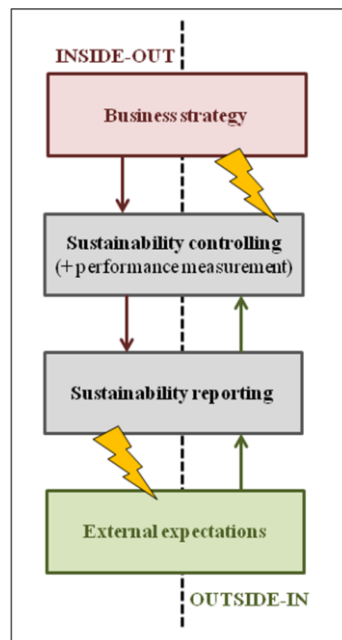
4.1.2 Inside-out perspective

At the center of the inside-out perspective stands the company’s sustainability strategy. Based on a close analysis of what environmental and social issues are of relevance to business success, the sustainability strategy is formulated and translated into key performance indicators (KPIs). It is now

the task of sustainability controlling to provide the necessary information to track the development of these KPIs to ensure an achievement of the strategic goals. The external sustainability reporting forms the last step of a framework for sustainability management structured according to an inside-out perspective. Corporate developments concerning sustainability issues are communicated externally with the help of the strategically derived KPIs. Consequently, this approach for the creation of a framework for sustainability management can be described as strategy and controlling-driven (Schaltegger et al., 2006; Schaltegger & Wagner, 2006).

4.1.3 Combination of perspectives as most fruitful in practice

As it is the case with most opposites, both the inside-out and the outside-in perspective have their strength and weaknesses (see graph 4) and a combination of the two is most efficient for a comprehensive SMF.



Graph 4: The outside-in and the inside-out perspective

On the one hand, a solid sustainability strategy has to respond to external expectations and requirements and cannot be separated from reporting demands. Thus, a successful SMF has to take into account the societal and environmental business context (Schaltegger et al., 2006).

On the other hand, a good external sustainability reporting requires performance results on sustainability improvements. Those can only be determined reliably when internal sustainability controlling processes are introduced to provide relevant, comparable and understandable information about the company's sustainability performance. A clear connection to the company's sustainability strategy has to be apparent.

Hence, an ambitious company striving for CS needs to integrate the strengths of both perspectives. It depends, however, on the company's situation and on whether societal expectations are relatively strong or weak, which perspective is more influential (Schaltegger et al., 2006).

4.2 The relevance of the business environment and societal expectations

Depending on the business environment and the derived societal expectations, a company's individual approach to sustainability management can be either more reporting-driven (outside-in perspective) or more strategy-driven (inside-out perspective). With increasing external expectations, the demands on a clear and reliable connection between sustainability controlling and reporting become more extensive. Schaltegger et al. (2006) distinguish between a 'trust me', 'tell me', 'show me' and 'prove to me' business environment in which sustainability controlling and reporting play different roles (see table 4).

Business environment	Predominant perspective	External Expectations*	Sustainability Reporting	Sustainability Controlling
Trust me	Inside-out	None	Only internally	Internal efficiency improvements
Tell me	Outside-in	Communicate	Highly expected from external stakeholders	Information creation for highly visible and formally required issues
Show me	Outside-in (+ inside-out)	Communicate and illustrate	Complemented with information about actual activities concerning sustainability	Information creation for an overarching picture of sustainability performance
Prove to me	Inside-out + outside-in	Measure, account for, communicate and illustrate	Aims to create trust from external stakeholders	Basis of sustainability performance measurement Basis to create transparency Basis for verification

* stakeholder requirements

Table 4: Business environments

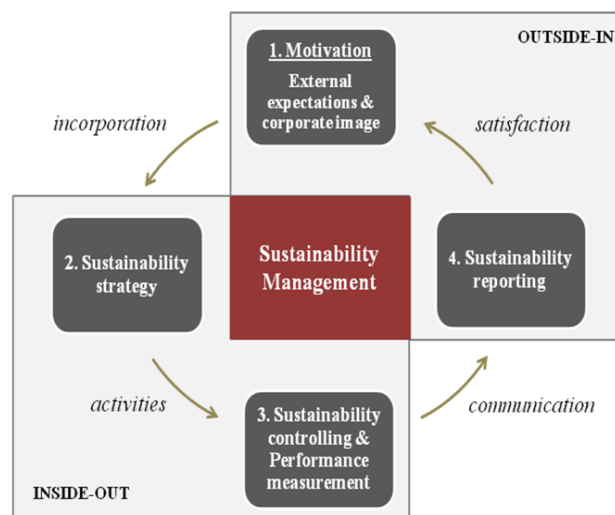
- In a *'trust me' world*, societal expectations for external reporting are not existent. Sustainability controlling and performance measurement are only performed in order to achieve internal efficiency improvement e.g. in terms of material use.
- In a *'tell me' world*, companies are provoked to communicate their response to highly visible and formally required issues to society. Thus, sustainability controlling only provides the necessary information to enable the company to do so.
- In a *'show me' world*, external sustainability reporting is expected to be supplemented by information on actual activities to enhance the veracity of the contents being communicated. In this way, the tasks of sustainability controlling are further enlarged as compared to the 'tell me' business environment by illustrating comprehensively the sustainability performance.

- In a *'prove to me'* world, stakeholders require transparency of substantial management efforts towards CS. Sustainability controlling is essential to track the improvements of sustainability activities, whereby quantitative measures are also communicated to the outside. The verification of the sustainability improvements becomes possible. The core activity is to gain trust from stakeholders.

Obviously, the most extensive and thus challenging approach to sustainability reporting and controlling is required in a *'prove to me'* business environment. A framework for sustainability management in such a setting aims for “creating transparency, involving and communicating with stakeholders in a trustworthy manner, and accounting for and revealing sustainability performance improvements on the basis of best practice measures” (Schaltegger et al., 2006, p. 19). Due to the paramount importance of satisfying stakeholder demands for business success and the company’s strive for CS (see Chapter 3.1), a SMF based on a *'prove to me'* world represents an ideal approach if the company is both committed to make progress towards CS and willing to communicate their developments on sustainability performance to the outside at the same time.

4.3 Description of the derived framework

Even though the following framework describes an approach to sustainability management based on a combination of the inside-out and outside-in perspective in a *'prove to me'* business environment (see graph 5), the core processes are derived from the inside-out perspective since it is believed that a company can only successfully implement a sustainability management system if the sustainability strategy provides the necessary direction.



Graph 5: Sustainability Management Framework (SMF)
(own development, based on Schaltegger & Wagner, 2006)

Also, a circular construction is chosen for the framework because it demonstrates that an ongoing exchange between the external business environment and the internal performance measurement

processes is needed. Therefore, this framework represents an appropriate tool to analyze sustainability reporting in order to discover what companies report on environmental sustainability management.

The benefits of a circular approach become more apparent through a short description of the different steps of the framework:

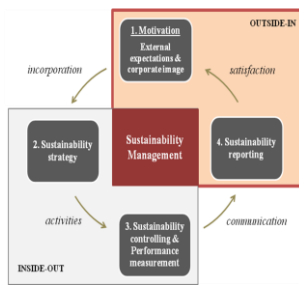
The *motivation* for sustainability reporting form external expectations for a more sustainable business approach and internal considerations such as the possibility to gain competitive advantage through a better corporate image. With regard to external expectations, stakeholder requirements play a vital role since their relationship with the company can have a direct impact on business success. Also, guidelines and sustainability rankings which formulate commonly accepted views on sustainability performance measurement represent a motivation for sustainability management since compliance with their requirements increases the company's chances to gain legitimacy from society (Schaltegger & Wagner, 2006).

Sustainability strategy is directly derived from the motivations for sustainability management. This involves a close analysis of the external expectations in order to spot those environmental and social issues that are of strategic relevance, i.e. have a bearing on the firm's business success and enable the company to gain competitive advantage. The formulation of a sustainability policy helps to communicate both externally and internally the company's commitment to sustainability (Schaltegger & Wagner, 2006).

Sustainability controlling and performance measurement has the aim to bridge the sustainability strategy with external reporting. The link to sustainability strategy is established through the selection of adequate KPIs that are designed to ensure an effective achievement of sustainability-related goals. Measurement methods have to be defined in order to produce the necessary performance information to trace sustainability improvements. The focus of the performance measurement is therefore on the company's sustainability activities that are implemented in the progress towards CS (Schaltegger & Wagner, 2006).

Sustainability reporting takes into account the internally-derived sustainability KPIs for external and internal communication. The aim of the reporting is to provide information on sustainability issues that was initially expected from outside the organization. In this way, external demands are satisfied and a trustworthy relationship with stakeholders can be established which provides an opportunity to enhance corporate image and thus business success (Schaltegger & Wagner, 2006). In this way, sustainability reporting represents an opportunity for managers to position the company in society and the market by communicating achievements (Burrit & Schaltegger, 2010).

5 Literature review on sustainability reporting



Since the sustainability reporting forms an important aspect of the SMF concerning the description of content of sustainability management, it is ought to be in the interest of the reader to firstly gain a better insight into observations concerning sustainability reporting found in earlier studies. By means of a modest literature review it is aimed to provide a better understanding regarding the different challenges sustainability

reporting faces, thereby going into more detail concerning the topic of extent and content raised in the problem statement. The following will briefly describe the approach of previous content studies, the difficulties with reference to analyzing sustainability reporting and findings concerning the content of these reports.

5.1 Previous content studies

Previous studies regarding sustainability reporting have been focusing on questions concerning ‘how much is reported’, ‘where is it reported’, and ‘what type of information is reported’. These studies have mainly been conducted in the 1970s and 1980s, and they concentrated on page counts, sentence counts or word counts concerning the amount of sustainability disclosures in annual reports (Mathews, 1997). This approach was criticized by Unerman (2000) who stated that areas for future research should focus on analyzing a wider range of sustainability reporting and should expand beyond word counts and sentence counts to arrive at a more comprehensive understanding of sustainability reporting. More recently, Skouloudis et al. (2010, p. 844) suggested that rating systems for analyzing sustainability reporting should “concentrate on the breadth and depth of the topics discussed to allow a convenient comparison between different reporting practices.”

5.2 Challenges of sustainability reporting concerning content

Whereas the utility of sustainability reporting is looked upon in various ways, i.e. ranging from a proxy for innovative management or a means of creating long-term shareholder value (Australian SAM Sustainability Index, 2010), it is generally agreed upon that sustainability reporting deals with certain difficulties in terms of assessing its veracity, transparency, completeness, usefulness of data and the issue of meeting stakeholders expectations (Marshall & Brown, 2008).

A first point is revealed by Kolk (2003), who affirms that sustainability reporting mainly discloses information about ‘concerns, intentions and policies’ rather than illustrating concrete behavior of companies and the outcomes of this behavior. In this respect, Laufer (2003) found that the reports are presenting misleading information that provides a flawed picture of the company’s sustainability performance itself and the commitment to sustainability goals. Hubbard (2009) typifies this further

by arguing that examples on sustainability rarely go into detail, often describe weak methodologies or provide performance information regarding sustainability that is of little importance for external stakeholders.

Another concern is raised by Marshall & Brown (2008), in the sense that most reports are descriptive by nature and provide only few targets or other information for benchmarking. This is in line with the issue that sustainability reporting consists of a lack of aggregated information due to a reporting style typified by categorizing among product, country, or type of business (Hubbard, 2009). On the same note, concerns are raised by Dando & Swift (2003, p. 31), who state that sustainability reporting “includes a failure to provide information about the systems, processes and competencies which lie underneath the information provided.” This concerns the fact that sustainability reporting only provides little information on internal sustainability controlling processes. Related to the topic of disclosures regarding internal processes, this subject matter is touched upon by Zambon & Del Bello (2005), who point out that a company can choose to report on every single activity carried out, or only on the completed activities, or solely on the successful activities. On the reason for disclosing these activities, Patten (1991) has found that these disclosures could be interpreted as evidence that companies in this way try to seek legitimacy for their actions.

In respect of performance measurement of these activities, Clarkson (1995) refers to the challenge of subjectivity in the application of different performance measurements standards, and the difficulty to assess the quality of the information derived from these standards in the sense of transparency and clearness. A study performed by Tilt (2001) regarding annual report analysis, found that there is an absence of reporting against targets, and in this respect she suggested this information could be found elsewhere in the sustainability reporting.

A last important finding relating to the challenges of sustainability reporting was discovered by Hodge et al. (2009) who found that the wording of the reports was mostly done in a positive form, which is also confirmed by Guthrie and Parker (1990) who revealed that most information disclosed is about positive actions, and rarely negative information is released. This connects with the pronouncement of Kolk (2003), that there are many occasions where sustainability reporting is not much more than a glossy statement of intentions, where real data is missing.

5.3 Issues concerning the various communication tools of reporting

With reference to corporate annual reports, Choudhuri & Chakraborty (2009) found that more and more sustainability management practices are mentioned in the corporate annual reports, which is due to a paradigm shift of societal expectations. These authors also discuss the relevance of

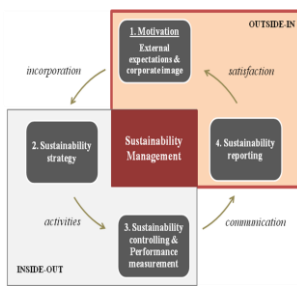
integrating sustainability data with financial data accordingly, to represent an accurate performance of the company, and hence the need for companies to merge these two related types of reporting into *one* distinct report.

Zambon & Del Bello (2005) add to this discussion the choice companies face concerning the structure of the different channels to report on sustainability. The reporting could for example be organized by relevant areas of business operations, by stakeholders, or by a mix of these two.

Lastly, concerning the content of annual reports, Frost et al. (2005, pp. 94-95) found that the annual report is the “least valuable source of information on corporate sustainability in terms of the number indicators observed and the diversity of the information provided (other than environment and labour, very little sustainability information is provided).” Those authors also indicated that many annual reports refer to stand-alone reports for more detailed information and those more discrete reports made cross-references to the corporate website.

Closing this brief exposition of important previous findings in the literature, it can be recapitulated that the main concerns regarding sustainability reporting are related to issues of consistency, transparency, truthfulness, completeness and usefulness.

6 Motivation for sustainability reporting



Referring to the SMF, the main reason of sustainability reporting is to satisfy external expectations. Because of the relationship to outside stakeholders and the social environment, companies are challenged to provide the external environment with information about their sustainability performance. This means that information flows have to be developed that are in line with the communication requirements made by the most important stakeholders (Herzig & Schaltegger, 2006). Besides, internal incentives for sustainability reporting will be presented.

6.1 External expectations

Societal expectations and pressures play an important role in the management of sustainability performance within organizations. Legitimizing the company's activities as well as ensuring the supply of resources are some of the major reasons why external sustainability reporting is conducted. More specifically, through external reporting companies aim to maintain the acceptance of operations by pressure groups and key stakeholders like the government, employees and media. It could be used as a tool to create transparency concerning the company's activities, whereby the level of transparency increases the likelihood to gain approval from society. In this section, the drivers of sustainability reporting are presented in further detail by means of the systems-oriented theories that try to explain a company's behavior concerning social and environmental disclosures. In addition, a short introduction to guidelines, regulations and rankings is provided in order to highlight their connection to external expectations and sustainability reporting.

6.1.1 Systems-oriented theories

The systems-oriented theories which developed in the academic field of accounting provide a reasoning for the choices companies make with regard to their sustainability reporting. According to Gray et al. (1996, p. 320) these theories include "a view on the organization and society that permits us to focus on the role of information and disclosure in the relationship(s) between organizations, the state, individuals and groups." This view is illustrated by graph 6, which depicts the organization as part of a greater social system.



Graph 6: The organization as part of a wider social system (Deegan, 2010)

Thus, the systems-oriented theories provide an elaborate view on the purpose of sustainability reporting and shed a broader light on the deeper motives of *why* companies use external reporting. In the following, two systems-oriented theories will be further described: political economy theory and institutional theory.

Political Economy Theory

Political economy theory perceives accounting reports as social documents that serve as a tool to contribute to the company's private interests. Both legitimacy theory and stakeholder theory are drawn from this theory, and the main idea is that "disclosures have the capacity to transmit social, political, and economic meanings for a pluralistic set of report recipients" (Deegan, 2010, p. 322). This perspective embraces the thought that economic issues can only be meaningfully investigated by considering the social, political and institutional framework in which the economic issue takes place. In this respect, systems-oriented theories suggest that the firms should disclose their information in coordination with its various stakeholders. Furthermore, according to Guthrie & Parker (1990, p. 322) sustainability reporting cannot be seen as neutral or unbiased documentation, but it is rather a product of "the interchange between the corporation and its environment and attempt to mediate and accommodate a variety of sectional interests."

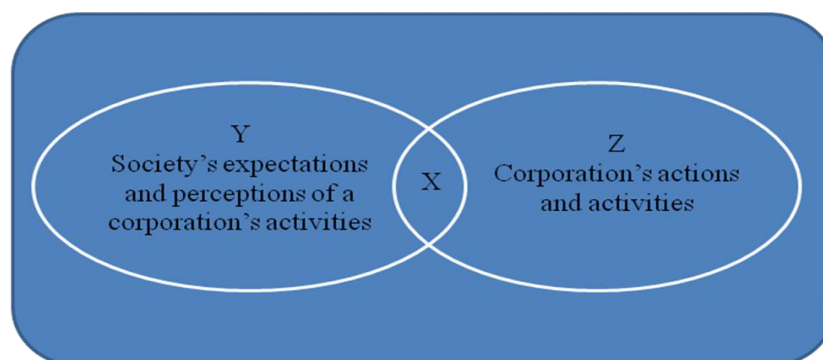
Legitimacy theory provides a broad perspective on social and environmental disclosures, and in that sense also on sustainability reporting, as it accepts that companies operate in a so-called *agreement* with the social environment around them: they perform socially desired actions and in return their actions and objectives are approved, which confirms the continuous existence of the firm (Deegan, 2010; Guthrie & Parker, 1989). Thus, companies attempt to make sure that the activities they engage in are perceived as legitimate by external parties. As a matter of fact, gaining legitimacy is a resource needed for a company to survive. This legitimate status is achieved by means of legitimation strategies – strategies that aim to gain, maintain or repair legitimacy – and could include specifically chosen disclosures or collaboration with other stakeholders who have already

gained their legitimate status in society. As argued by Gray et al. (1995) and Hooghiemstra (2000), this theory explains to the largest extent why companies disclose sustainability information as it is a method to continuously get approval from the society to keep performing. The aim of disclosing certain practices is to manage strategically the company's relations within the wider system in which it operates.

Stakeholder theory views the explicit expectations of the various stakeholder groups within the society as determining the social disclosure practices. In that sense, sustainability reporting is seen as a tool to *manage the needs* of these stakeholder groups (Deegan, 2010). The theory is different from legitimacy theory in that sense that the focus is on how a company interacts with a particular stakeholder, whereas legitimacy theory discusses the interaction with the wider societal context in one piece. Hence, stakeholder theory assumes that, due to the varying needs of the different stakeholder groups, different approaches to manage the various stakeholder groups have to be developed.

Stakeholder theory consists of two branches: the ethical and the managerial branch. The ethical perspective argues that every single stakeholder has the right of a fair treatment by a company, regardless of the amount of power the stakeholder possesses. On the other hand, the managerial perspective argues that a company's top management will most likely attend to the expectations of the most powerful stakeholders, and hence the different stakeholder groups receive diverse attention from the organization (Deegan, 2010).

Both stakeholder theory and legitimacy theory recognize the social system as influencing external reporting. In this respect, the incongruence between a company's actions and the expectations of society represent a legitimacy gap (Deegan, 2010), which is visualized in graph 7 by the areas Y and Z, that represent the dissimilarities between a company's actions, and what these actions ought to be according to society. The aim of a corporation is to make the area of X as large as possible, thus decreasing illegitimacy and increasing the acceptance of its activities by society.



Graph 7: Issues/events and corporate legitimacy (Deegan, 2010)

Institutional Theory

A complementary perspective to legitimacy theory and stakeholder theory is provided by institutional theory, as it links the organizational practices like sustainability reporting to the ethics of the societal environment the company operates in and the need to get approval for its organizational practices. It explores at a more extensive level how certain organizational forms might be taken up to get to the status of legitimacy. Moreover, the theory explains that organizational practices tend toward homogeneity in terms of their organizational and reporting structure, with the aim to conform to what influential stakeholder groups and society in general consider as normal (Deegan, 2010). In other words, institutional theory shows how the choices of a company to align with perceptions from society are institutionalized in some organizations.

Two main dimensions exist in institutional theory: isomorphism and decoupling. Isomorphism is defined as “a constraining process that forces one unit in a population to resemble other units that face the same set of environmental solutions” (Powell & DiMaggio, 1991, p. 149). Concerning sustainability reporting, this view argues that the construction of external reports changes and adapts over time since it is an isomorphic process. On the topic of sustainability reporting, this theory could explain why certain practices (e.g. the distribution of sustainability reports or the use of the guidelines of the GRI) are conducted by a large amount of companies, as complementary explanation next to legitimacy theory or stakeholder theory. Alternatively, decoupling means that apparent practices (developed due to institutionalized pressure) may in fact differ very much from actual practices and are merely empty words in order to be regarded as reliable and legitimate next to competitors in the same industry (Deegan, 2010).

An Empirical Illustration

In light of the theories described above, interesting study results were found by Bansal & Roth (2000) which illustrated the interconnectedness between legitimacy theory, stakeholder theory and institutional theory. A major finding of their study was that “firms motivated by legitimation were focused on the stakeholders most influential in prescribing or articulating legitimacy concerns” (Bansal & Roth, 2000, p. 727). The same study revealed that mimetic isomorphism was found by companies concerning compliance with institutional norms “in order to establish their legitimacy and to avoid sanctions for noncompliance” (Bansal & Roth, 2000, p. 728). However, most illustrative of the connection between the various theories is the finding that “legitimation was directed toward complying with institutional norms and regulations” (Bansal & Roth, 2000, p. 728), with the main stakeholders as formulators of these norms.

6.1.2 Guidelines

Guidelines constitute formulated external expectations which companies can voluntarily comply with. Over the past decades, several different institutions have tried to provide guidance for managers and have aimed to increase the standardization of sustainability reporting by publishing various guidelines and standards. Guidelines are non-binding and form the basis of the certification of certain procedures. In this respect, they aim for more harmonization and easier comparisons (White, 2005).

Examples that are currently in place involve the guidelines of the Global Reporting Initiative (GRI), the Greenhouse Gas Protocol (GHG) and the standards of the ISO 14000-family.

Global Reporting Initiative (GRI)

Since 1999, the GRI provides a comprehensive Sustainability Reporting Framework, with the Reporting Guidelines as cornerstone. Over the past years, GRI's Framework became one of the main standards in sustainability reporting due to the comparability and consistency it offers. The GRI Framework consists of a few distinctive features, of which a multi-stakeholder input and independence are examples. Moreover, the number of companies adopting the GRI guidelines has been growing rapidly, with a yearly increase of currently 58% (GRI, 2012). The GRI has been referenced by the UN World Summit on Sustainable Development in 2002 in their Plan of Implementation, which shows the widespread acceptance and recognition of these guidelines. The existence of the GRI is secured by funding from different sources: companies, foundations, supporters and governments, which means that both users and contributors share the development costs of the reporting guidance. The guidelines of the GRI list indicators for the following: economic performance (1), environmental performance (2), social performance (3), human rights (4), and society (5), and every company is free to choose the combinations of indicators it wants to make use of (Jasch, 2009).

International Organization for Standardization (ISO)

ISO is one of the largest developers in the world of International Standards. It is a non-governmental organization, with more than half of its member organizations having their roots in the private sector like industry associations. The ISO board consists of one member per country which applies the ISO 14000-set. This ISO 14000-set is concerned with environmental issues, and below the most relevant standards for this thesis are briefly discussed:

ISO 14001: this standard sets requirements for environmental management systems that should serve as a tool for a company to:

- identify environmental impact activities, products and services and control these
- improve environmental performance on a continuing basis
- implement a systematic approach for achieving environmental targets

As can be read on the organization's website, "the intention of ISO 14001:2004 is to provide a framework for a holistic, strategic approach to the organization's environmental policy, plans and actions" (ISO, 2011b). It gives generic requirements that have the effect of a common reference on the communication of environmental management issues. The company has to provide evidence that it fulfills the requirements of the standard which can be audited and certificates are granted if the company's environmental management system is operating effectively in accordance with the standard.

ISO 14063: gives guidance to an organization on the topic of internal and external *environmental communication*, focusing on strategy, activities, general principles, and policy. This guideline is applicable to all types of organizations, regardless of having an environmental management system in place or not (ISO, 2011b).

ISO 14064-1: specifies at the organizational level requirements and principles for *quantification and reporting of greenhouse gas emissions*. Requirements for the design, management and verification of the greenhouse gas inventory of an organization are given (ISO, 2011a).

ISO 14031: offers support concerning the *evaluation of environmental performance*. Amongst others, it concerns the selection of adequate performance indicators and the generated information can be used as a basis for the internal and external communication of environmental performance (ISO, 2009). Therefore, it provides guidance for sustainability controlling and is further addressed in Chapter 6.1.

The Greenhouse Gas Protocol (GHG Protocol)

The GHG Protocol developed by the World Resources Institute (WRI) and the World Business Council for Sustainable Development (WBCSD) is an international accounting tool for businesses and governments to quantify and manage greenhouse gas emissions. The GHG Protocol provides accounting frameworks for the various GHG standards, and is actively working together with businesses, environmental groups and governments to tackle issues concerning climate change.

Additionally, the GHG Protocol Corporate Standard gives guidance for organizations to manage their emissions inventory. It was designed with the objective to help companies to depict fairly its emissions, to increase consistency and transparency regarding accounting and reporting for

greenhouse gasses, and to provide businesses with internal information to manage and reduce the emissions. The Protocol is build on knowledge of more than 350 experts from the business world and it has the vision to “harmonize GHG accounting and reporting standards internationally to ensure that different trading schemes and other climate related initiatives adopt consistent approaches to GHG accounting” (GHG Protocol, 2011).

In this context, it should be noted that the ISO, WRI and WBCSD signed a Memorandum of Understanding (MoU) in 2007 under which they declared to jointly advance the ISO 14064 and the GHG Protocol standards. The two standards are consistent and compatible with each other and it is suggested to apply them as complementary tools. Whereas the “ISO 14064 details internationally agreed requirements on what needs to be done in GHG accounting and verification efforts”, the GHG Protocol is more specific on how to undertake GHG accounting and reporting (WRI, 2007).

To sum up, guidelines fulfill two important functions as they can be applied to meet both internal and external objectives of the company. The following information was provided on the website of ISO (ISO, 2009) but in the authors’ opinion also holds true for other certificates such as the one provided by the GRI.

Concerning *internal objectives*, all guidelines offer assistance to manage environmental impacts. In particular the ISO 14064 and the GHG Protocol are helpful for measuring CO₂-emissions. Additionally, the certification of the ISO standards or the GRI confirms to management that it is in control of organizational activities that influence the environment and it shows to employees that they have a job at an environmentally responsible organization.

With regard to *external objectives*, the certification of the ISO standards and GRI provide assurance to external stakeholders that the company has set up an internal management system to deal with its environmental impact. In this way, it grants credibility to the company’s claims and communication of environmental policies, plans and actions by showing conformity. Consequently, the certification is an important tool to demonstrate that the company lives up to external expectations on sustainability management.

6.1.3 Regulations

As opposed to guidelines, companies are forced to comply with regulations. However, there are no generally accepted rules on how to account for sustainability, unlike for example generally accepted accounting principles (GAAP) (White, 2005).

In general, regulations have the aim to reduce costs and time for stakeholders by decreasing the information asymmetry that have arisen by different reports on sustainability by companies. The outcomes of these regulations are not always as desired, when for example companies without a distinctive environmental policy will provide these reports with as little costs as possible to meet the

regulatory requirements. Schaltegger (1997) claims this will lead to a situation where bad information quality influences the perception of the quality of good information, where the outcome is that environmental statements become of no value to stakeholders. Herzig & Schaltegger (2006) mention that the positive effects of regulations will only show when the company has a satisfactory sustainability management control in place, so that accurate, relevant and reliable information can be assured.

6.1.4 Rankings

Next to the influence of guidelines and regulations on a company's sustainability reporting, rankings which developed to measure how well a company discloses information on the different topics of sustainability also have an impact on the sustainability reporting of companies. The main examples of rankings that are of importance for the logistics industry are the Carbon Disclosure Project (CDP) Leadership Index, the Dow Jones Sustainability World Index (DJSI), the Dow Jones STOXX Sustainability Index and the ranking of Sustainability Asset Management. The importance for companies of being a member of a ranking is twofold: on the one hand, it enhances visibility in society when a company is placed high in a certain ranking, and on the other hand it provides companies with benchmarks as to how other companies are measuring and performing, since membership is normally required to be part of a certain ranking (White, 2005). Taken together, a company receiving a high place in such a ranking can be assumed to manage sustainability activities in a reliable manner since their practices are accredited by an external organization.

6.2 Internal reasons

Besides external expectations that serve as incentives for companies to report on their activities, sustainability reporting is also undertaken due to internal reasons. The most important ones according to Schaltegger & Herzig (2006) are presented in the following.

Improving the company's reputation and competitive advantage

A major goal of sustainability reporting is the enhancement of the corporate reputation by dealing with social and environmental issues. Especially the reporting of successful social and environmental projects that are non-related to market activities is a tool for improving corporate image. Additionally, companies that perform high with regard to market activities and social and environmental issues face fewer problems in their business relationships with e.g. public authorities and suppliers. Stakeholders compare sustainability performance between companies by means of their reporting activities, as these are perceived as indicators for sustainable performance (regardless of whether this is a reliable way of looking at a company's activities). As this is known by corporations, they are aware of the fact that proper sustainability reporting could also improve

the competitive advantage of the company, especially in comparison with companies who do not report on their sustainability activities, or who do not communicate these effectively enough. Exceptionally good reports even appear in rankings with the chance of being awarded, which improves both the competitive advantage and a company's reputation even more.

Comparing and benchmarking against competition

Sustainability reporting is standardized more and more, which was discussed in the previous section concerning guidelines like the ISO standards, the GHG Protocol and the GRI. This increased standardization provides the opportunity to compare and benchmark sustainability performance of other companies over time.

Increasing transparency in the company

In most cases, benchmarking is linked with increasing transparency in a company which requires data collection, data analysis and consequently internal communication to middle and top management. Thus, sustainability reporting is often an important driver to create more transparency concerning responsibility and accountability for activities.

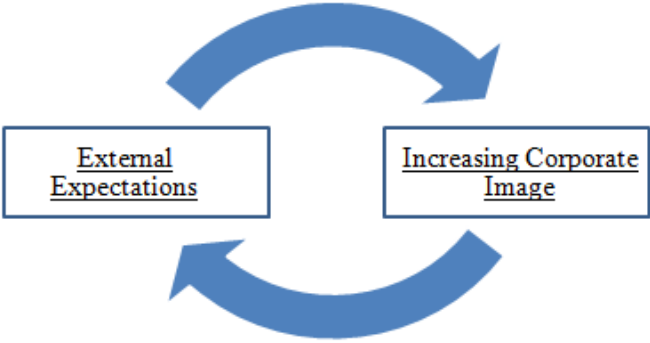
Moreover, stakeholders are more and more interested in investigating profits and the activities that create them, since these processes are influenced by the values of a company concerning the environment and human capital (White, 2005).

Supporting employee motivation and the internal control process

Lastly, both middle management and employees could be motivated to deal more seriously with sustainability issues, thus *external reporting* is also an official internal reason for companies to deal with sustainability performance. Hereby, awareness, new routines, higher transparency and the support of internal information and control processes could be initiated.

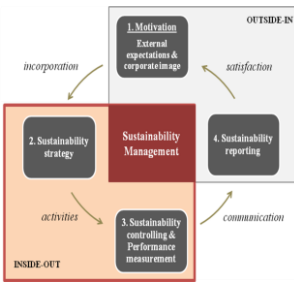
On the emerging relevance of sustainability reporting, an important indicator in this respect is the recent involvement of public accounting firms and their offered services. To provide an example, KPMG in the UK is involved in services like advice on popular issues like climate change and the assurance of environmental management systems (White, 2005).

On a final note, it should be recognized that there exists a fine line between the external expectations on sustainability reporting and the derived internal benefits such as increased corporate image (see graph 8). For example, if the company works towards implementing the guidelines of the GRI, this could be justified by the arguments of legitimacy, stakeholder and institutional theory, but also by reasons of the more internal benefits to gain a better corporate image and thus a competitive advantage.



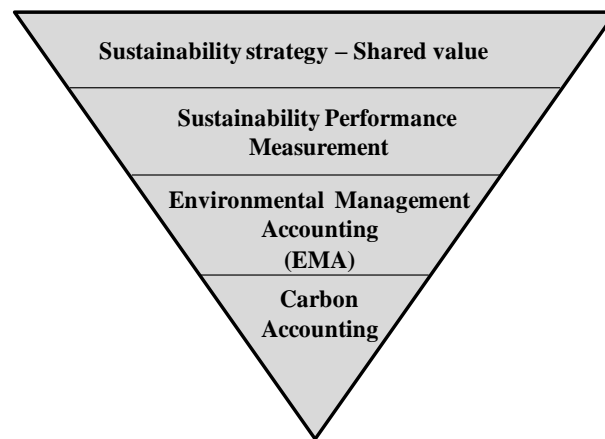
Graph 8: Relationship between external expectations and increasing corporate image

7 Strategy-derived sustainability controlling



As demonstrated in the SMF, sustainability controlling operates as an important ‘bridge’ between sustainability strategy and reporting. It fulfills the crucial function to introduce “new information management and accounting methods that aim to create and provide high quality information to support a corporation in its movement towards sustainability” (Schaltegger et al., 2006, p. 15).

In the following, a funnel approach is chosen to arrive at an understanding of sustainability controlling with an environmental focus in the logistics industry (see graph 9). Starting from the broad perspective of sustainability strategy and the concept of shared value, sustainability performance measurement and environmental management accounting are introduced next. Finally, the basic contents of carbon accounting are presented which represents the most important aspect of sustainability controlling in the logistics industry.



Graph 9: Funnel approach to specify the sustainability controlling tasks in the logistics industry

7.1 Sustainability strategy – Shared value

To begin with, the major aim of the formulation of a sustainability strategy is to bring the motivations of sustainability management to a more practical level. This involves the close monitoring of external expectations on the company’s sustainability management as well as a consideration of the potential business-related benefits that can be gained from a credible approach to sustainability management.

In this respect, strategy is always concerned with choices and a strategy for a successful approach to sustainability management is not different in that respect. It entails making choices on which social and environmental issues to focus on. Considering the large amount of potential social and environmental impacts, companies are required to identify the particular set of societal or environmental problems that it is best equipped to help resolve. At the same time, the company

should be able to gain a competitive benefit from combating those issues. Consequently, both sides – the company and the society/environment – benefit. The importance of this connection was recognized by Porter & Kramer (2006) who proposed a new approach to corporate social responsibility referred to as *shared value*. It entails that economic value is generated in a way that also creates value for society by addressing its needs and challenges. In this way, it represents a new strategy to achieve economic success.

In essence, the shared value concept represents the basis of CS (see Chapter 3.1) since it asks companies to rethink their core business processes and product offerings in order to design them in a more sustainable manner. This is considered a way to differentiate from competition, to gain legitimacy and at the same time reduce costs or enlarge profits. Concerning the latter, the company's value chain unavoidably affects numerous societal issues, such as natural resource and water consumption, packaging of products and greenhouse gases. Those are not just costly to the environment but also costly to the business and reducing both benefits both parties. Also, the proposal of environmental-friendly product alternatives can be considered a strategic decision to enhance profits by minimizing the effect on the environment (Porter & Kramer, 2011).

7.2 Sustainability Performance Measurement

“If you can't measure it, you can't manage it.” (P. Drucker)

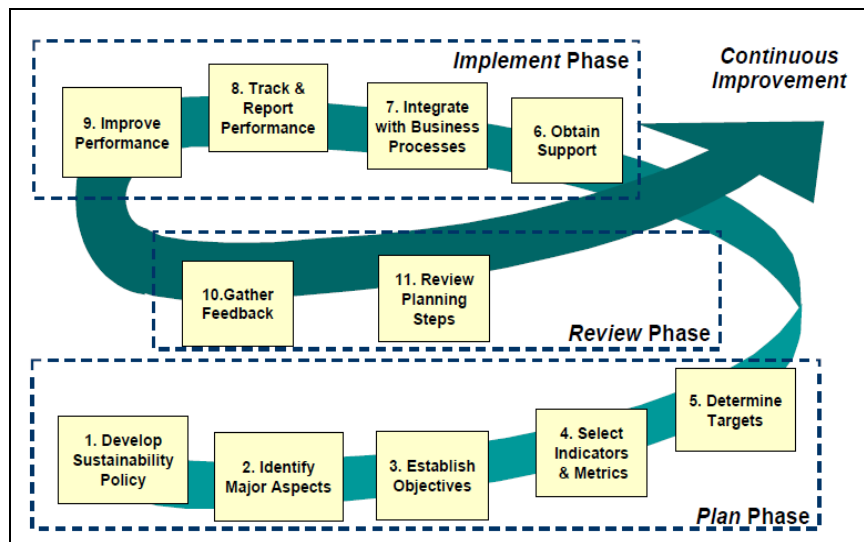
This well-known saying stresses the importance to provide quantitative information on business activities in order to be able to plan and monitor their contribution to the achievement of strategic goals and thus business success. With regard to sustainability, performance measurement still represents a complex and challenging task for many companies. This is due to several distinctive characteristics of sustainability performance measurement which are different to conventional performance measurement (Fiksel et al., 1999):

- It is a very industry-specific, sometimes even company-specific task, due to differing business strategies, environmental impacts and organizational structures.
- It includes a wide area of topics from ‘habitat conservation, to energy consumption, to stakeholder satisfaction and financial results’.
- It exceeds the borders of a single company and has to take account of the sustainability activities of both upstream supplier and downstream customers in the value chain.

An effective performance measurement of the selected sustainability activities has to be based on an ongoing process in order to achieve meaningful and useful results. The following sustainability performance measurement process represents an exemplary management cycle for sustainability activities involving a plan, implement and review phase (Baker, 1999; Fiksel et al., 1999). This

approach is in compliance with the ISO 14031 framework for Environmental Performance Evaluation.

As depicted in graph 10, each phase involves several steps, whereby the crucial decisions concerning the sustainability performance measurement process are taken in the plan phase. Thus, the description of the process places emphasis on this phase.



Graph 10: Sustainability Performance Measurement Process (Fiksel et al., 1999)

7.2.1 The Plan Phase

During the plan phase it is determined how to track the improvements of the sustainability activities. Also, the scope of measurement has to be agreed upon which can range from very narrow, e.g. a specific product, to very broad, e.g. the entire company (Fiksel et al., 1999).

Step 1: The *Sustainability Policy* is based on the sustainability strategy and specifies the sustainability targets of the company. It is a public statement which communicates the company's commitment to sustainability and protection of the environment. (Fiksel et al., 1999).

Step 2: *Major sustainability-related aspects* of the company have to be selected which involves an evaluation of the company's products, services and activities and their usefulness for CS (Fiksel et al., 1999).

Step 3: The *establishment of objectives* for the significant sustainability aspects (step 2) comprises mostly an annual or longer-term time frame. Where practical, the objectives should be quantified. Examples include (Fiksel et al., 1999):

- Eliminating usage of toxic materials
- Decreasing CO₂-emissions
- Reducing the costs of waste management activities
- Developing inherently clean and safe technologies

Step 4: The *selection of indicators and metrics* is the most challenging but at the same time most important task since it transforms the sustainability policy into actionable targets.

Performance indicators describe a measurable dimension of the company's business performance that is related to sustainability. Leading indicators (or business process indicators) are used to improve future outcomes (e.g. use more environment-friendly cars to reduce CO₂-emissions) whereas lagging indicators (or outcome indicators) focus on the results of the company's business processes (e.g. reduction in CO₂) (Fiksel et al., 1999; Brown, 2000).

Performance metrics go one step further and are used to measure and track a performance indicator. For each performance indicator usually a great variety of metrics can be selected. For example, the performance indicator 'CO₂-emissions' can be tracked by metrics such as annual volume (tons/year) or annual improvement (% reduction) (Fiksel et al., 1999).

Step 5: The *determination of targets* completes the plan phase and involves performance targets and milestones for short-term and long-term sustainability improvements (Fiksel et al., 1999).

7.2.2 The Implement Phase

After the plan phase, the implement phase follows which involves obtaining support, integrating with other business processes, tracking and reporting as well as initiating improvement efforts. The challenges for performance measurement become apparent since the exact measurement of several metrics is often difficult to achieve in practice. For example, the quantity of CO₂-emissions during the life cycle of a product might provide valuable information for decision-making, the quantification of this indicator might be highly complicated in practice (Fiksel et al., 1999).

7.2.3 The Review Phase

Finally, the review phase involves gathering feedback and reviewing the planning steps. This phase is particularly important as it provides valuable information on how to further develop and improve the existing sustainability performance measurement process. For example, sustainability reporting standards could develop or change which has an impact on the initial definitions during the plan phase (Fiksel et al., 1999).

7.3 Environmental Management Accounting (EMA)

While the sustainability performance measurement process has described the plan, implement, review cycle in more general terms, the following information on Environmental Management Accounting (EMA) aims to provide more detailed knowledge about the link between management accounting (or controlling) and environmental issues. It should be noted that this forms the basis of the shared value concept from an environmental perspective.

7.3.1 The two components of EMA

The purpose of EMA is to trace both environmental costs and physical environmental flows for internal management use (Burrit & Saka, 2006; Savage & Jasch, 2005). For each of these tasks, separate accounting subsets have been established which are referred to as Monetary Environmental Management Accounting (MEMA) and Physical Environmental Management Accounting (PEMA).

These two dimensions of EMA can be best described by considering how the economy (i.e. companies) and the environment influence one another (Burrit & Saka, 2006; Burrit et al., 2002). Those can be depicted as:

- a. Environmentally-related impacts on the economic situation of companies → MEMA
- b. Company-related impacts on environmental systems → PEMA

Firstly, the major aim of *MEMA* is to provide monetary information of environmental impacts on the economic condition of the company. This involves all environment-related costs, earnings, and savings that the company incurs due to environmental influences (e.g. measures expressed in expenditure on cleaner production; cost of fines for breaching environmental laws; monetary values of environmental asset). Concerning the methods applied by MEMA, the basis forms conventional management accounting which is widened and adjusted to also include environment-related costs, revenues, investments, etc. Due to the expression of the information in monetary units, MEMA forms a central tool for internal decision-making (Burrit et al., 2002; Savage & Jasch, 2005).

Secondly, *PEMA* concerns the influence that business activities have on the environment. Information on material or energy amounts is provided in physical units such as kilograms, cubic meters or joules (e.g. kilograms of material per customer served; joules of energy used per unit of product) (Burrit et al., 2002). Due to the expression in absolute terms, it constitutes the basis for tracking the success of eco-effectiveness, the ecological challenge described in the sustainability triangle (see Chapter 3.5).

7.3.2 Eco-efficiency

A further connection to the sustainability triangle (see Chapter 3.5) concerns the measurement of ‘eco-efficiency’ since both reliable MEMA and PEMA information is required for a successful calculation. In fact, depending on how the company defines the dimensions of ‘eco-efficiency’, the EMA system has to be adjusted to supply the necessary information inputs (Burrit & Saka, 2006).

The following definition of eco-efficiency visualizes the cross-efficiency between the economic and the ecological dimension – the economic-ecological efficiency – as the ratio between the change in monetary value added and change in environmental impact added.

$$\text{Eco-efficiency} = \frac{\text{Monetary Value Added}}{\text{Environmental impact added}}$$

The word ‘eco’ thereby indicates that both *economic* and *ecological* issues are concerned while ‘efficiency’ indicates that both should be addressed in the most optimal way. Therefore, resource productivity is a key aspect of eco-efficiency and ‘doing more with less’ brings the basis of eco-efficiency to the point. It involves the better usage of inputs which leads to a more environment-friendly impact on the surroundings, while at the same time reducing costs through, for example, using fewer energy (DeSimone & Popoff, 2000).

Consequently, the exact focus of EMA is very industry-specific depending on how the dimensions of eco-efficiency are defined (United Nations Division for Sustainable Development, 2001). For example, in the logistics industry a measure for eco-efficiency involves the costs per ton of emitted CO₂. This implies that the company needs to introduce adequate carbon accounting processes.

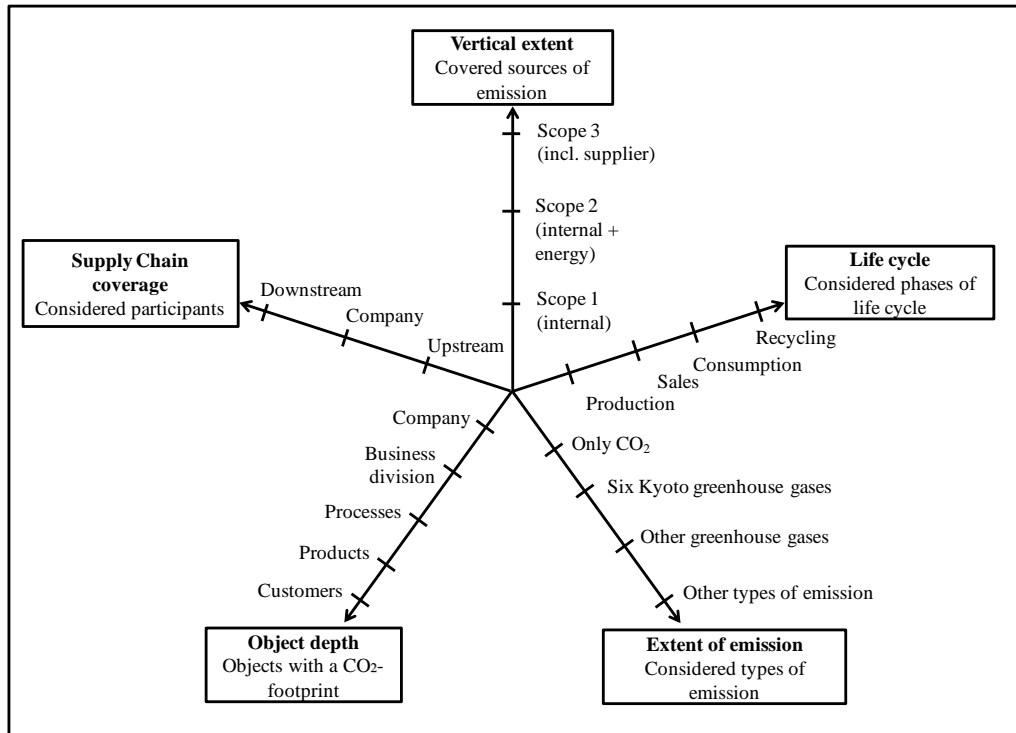
7.4 Carbon Accounting

Out of a variety of possible environmental topics, the performance indicator ‘CO₂-emissions’ is chosen to provide insights on how a particular environmental issue can be approached in practice. Also, it concerns the core business of the logistics industry which is closely examined in the empirical part of this thesis. Carbon Accounting involves the collection of necessary information on the CO₂-emissions of the business activities, which also includes the measurement of CO₂-emissions.

7.4.1 Dimensions of Carbon Accounting

The most important success factor of a positive achievement of the sustainability strategy and the thereof derived targets for the reduction of CO₂-emissions represents the introduction of an efficient carbon accounting system. With its help, management can make the impact of its decisions transparent and understandable. The biggest challenge from an internal viewpoint concerns the set-

up and implementation of such a carbon accounting system. This is partly due to the high complexity concerning the relevant content but also due to problems to measure CO₂-emissions (Eitelwein & Goretzki, 2010). Decisive for a successful carbon accounting system is a detailed definition of the relevant dimensions which have to be addressed by the system (see graph 11).



Graph 11: Dimensions of Carbon Accounting (Eitelwein & Goretzky, 2010)

The *vertical extent* defines which emissions sources are captured by the carbon accounting system. The most common approach for the classification of greenhouse gases is based on the three different scopes of the GHG Protocol. Since this is in direct relation to how the actual measurement CO₂-emissions is performed, it will be further considered in the next section (7.4.3).

Also, the different phases of the *product life cycle* have to be decided upon. Depending on the business model, different approaches are relevant which can vary considerably due to their extent and complexity to measure CO₂-emissions. A company can choose to focus solely on CO₂-emissions released during the production and sales process, or additionally include CO₂-emissions from the actual usage of the product or *even* include CO₂-emissions released during the rest of the life-cycle until the production of a new product. Different *types of emissions* can be considered by the carbon accounting system, for example, only CO₂-emissions or additionally other types of greenhouse gases. Concerning the *object depth for a carbon footprint*, the decision has to be made if the measurement of CO₂-emissions concerns the whole company, separate management units, processes, products or customers. The *supply chain coverage* describes to what extent the whole supply chain is considered. Companies need to decide if they only include their own supply chain or

also add the emissions of the supply chain of downstream customers or upstream suppliers (Eitelwein & Goretzki, 2010).

7.4.2 Measurement of CO₂-emissions

Since the measurement of CO₂-emissions forms an integral part of carbon accounting, the following information aims at outlining the most important aspects that have to be considered in the measurement of CO₂-emissions.

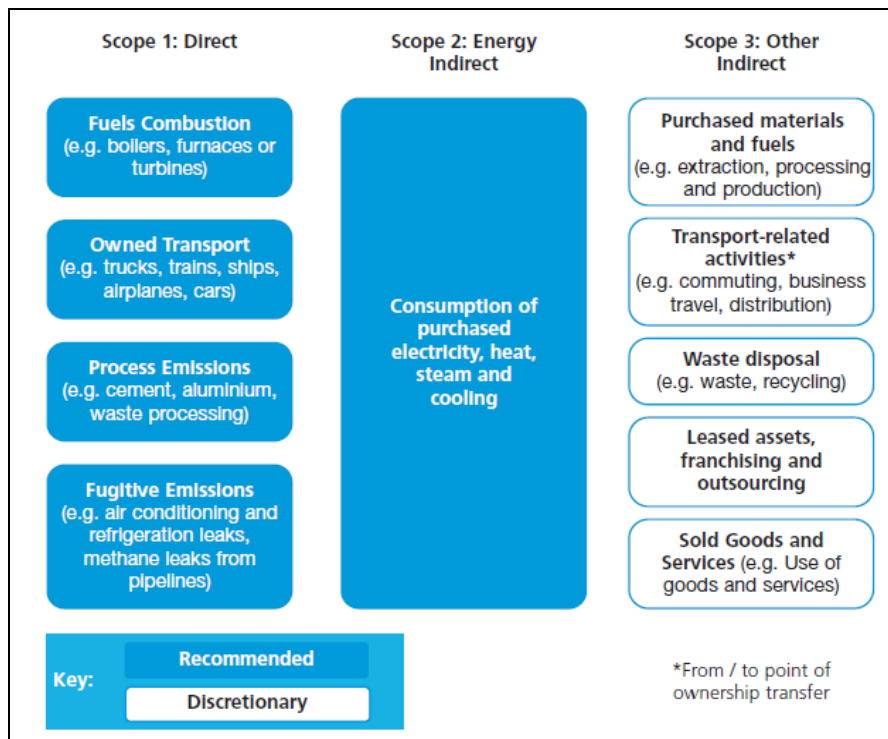
The scopes of emissions calculation

Firstly, the calculation of CO₂-emissions involves the identification of activities that are responsible for CO₂-emissions being released in the atmosphere. According to the GHG Protocol (2011), those can be assigned into three groups referred to as scopes:

- Scope 1 (Direct emissions): Emissions from activities owned or controlled by the reporting company.
- Scope 2 (Energy indirect): Emissions due to consumption of purchased electricity, heat, steam and cooling. Termed as ‘indirect’ since released by organization’s activities but occur at sources not under the control of the reporting company.
- Scope 3 (Other indirect): Emissions that are a consequence of organization’s actions which occur at sources not controlled by the organization and are not classified a scope 2.

In this respect, scope 1 and 2 concern emissions which are under the direct control of the reporting company and therefore concern the minimum requirements for acceptable GHG reporting (Defra, 2009). With regard to scope 3, the exact measurement is more difficult since those activities are often not under the control of the parent company and thus information needed for the exact measurement of carbon emissions is often lacking. According to the Defra (2009) guideline, it represents therefore a discretionary activity. However, this could be considered different for logistics companies since they usually engage a large amount of subcontractors and the measurement of scope 3 emissions is therefore essential if the company wants to reduce its company carbon footprint.

To illustrate the various emission-releasing activities in each scope, graph 12 provides a good overview:



Graph 12: Main types of emission sources under each scope (Defra, 2009)

Calculation of emissions

In general, one can differentiate between a direct and indirect method for calculating CO₂-emissions.

The *direct method* applies actual consumption data of fuel or electricity purchased on corresponding emissions factors to determine the related CO₂-emissions. Due to the availability of consumption information in the finance system, i.e. information found on bills, invoices and receipts, this method is mostly used for emissions released by own operations (scope 1, 2) as the company needs to have control over those processes in order to have access to the relevant information (Deutsche Post AG, 2010).

The *indirect method*, by contrast, is mostly applied for scope 3 emissions of subcontractors since actual consumption data is often not reported by them. The estimation of the consumption data is therefore based on information on activity data such as transport undertaken, vehicle used (e.g. type of aircraft, van, truck, rail, barge, container vessel, etc.) and the average load factor. Together with an appropriate emission factor, the estimated CO₂-emissions can be calculated. Even though it is less exact than the direct method, this is currently seen as internationally recognized practice (Deutsche Post AG, 2010).

For both methods, emissions factors are used in order to transform the activity data into CO₂-emissions (see for example Defra, 2009). Those factors are published by various international organizations such as the:

- Intergovernmental Panel on Climate Change (IPCC)
- International Energy Agency (IEA)
- Network for Transport and Environment (NTM) → specific for air transport
- Clean Cargo Working Group (CCWG) → specific for ocean transport
- Handbook Emission Factors for Road Transport (HBEFA)
- World Business Council for Sustainable Development (WBCSD) & World Resources Institute (WRI)
- Emission factors from government sources (e.g. UK Department for Environment, Food and Rural Affairs (Defra), United States Environmental Protection Agency, etc.)

8 Analysis of sustainability reporting concerning environmental sustainability management

Concerning the aim of this master thesis, this chapter analyzes the sustainability reporting of the logistics companies DPDHL, K&N, DB Schenker, Panalpina and UPS in order to gain insights into what they report concerning environmental sustainability management. After a short introduction to the companies' approaches to environmental sustainability management, the structure is based on the SMF which is considered an appropriate tool to illustrate the companies' sustainability management. For each of the components of the SMF, the empirical findings of the companies are contrasted in order to clearly demonstrate in what aspects the companies' reported approaches to sustainability management differ or look alike respectively. It should be kept in mind that all the information in this Chapter was retrieved from the sources listed in table 5 and hence no separate references to the individual sources will be made. This was considered appropriate since the information in those sources was mostly overlapping.

8.1 Basis: Companies' approaches to environmental sustainability management

Before taking a deeper look at the companies' sustainability management, a short introduction to their environmental programs is provided.

DPDHL

DPDHL's corporate responsibility (CR) program 'Living Responsibility' comprises three initiatives – GoGreen, GoHelp and GoTeach.

GoGreen is the company-wide environmental protection program aiming primarily at combating climate change which is recognized by DPDHL as the logistics industry's most significant environmental impact due to the release of CO₂ through its business operations. Its main focus is therefore to improve carbon efficiency but also other environmental issues such as natural resources, waste and water are addressed.

K&N

The management of environmental issues is an integral part of K&N's corporate social responsibility program, which aims at high standards concerning quality, safety, health and environment (QSHE). Thus, it should be recognized that K&N does not have a separate environmental program for environmental sustainability issues. It is more the aim of the environmental component of the QSHE program to support the development of environmentally sound, sustainable and innovative supply chain solutions through, for example, a specialized program on 'carbon intelligence' and various activities on energy efficiency. The corporate QSHE statement consists of ten statements which are binding for every employee in the company around the world. The 9th statement is concerned with the company's environmental impact and states:

“Our dedication to preserve and protect the environment contributes to sustainable development and includes the systematic reduction of any negative impacts caused by our business.” (Kühne + Nagel, 2011)

DB Schenker

The environmental program at DB Schenker is called “Taking Responsibility. Providing Solutions”, and comprises the following three strategic goals: (1) to help to protect the climate through energy efficiency in operations and production, (2) to reduce the dependency on fossil fuels while at the same time increasing the proportion of renewable energy and (3) the use of green products to reduce the damage on the environment. It is part of the Climate Protection Program 2020, which is the focus of the Eco Program of the DB Group. Since DB Schenker is a business division of the DB Group, the Eco Program influences all the environmental activities at DB Schenker in order to achieve the group-wide aim to reduce CO₂-emissions by 20% by 2020.

Panalpina

The environmental program at Panalpina is called PanGreen, which is a globally certified program developed at executive board level and consists of four major pillars: (1) global certification, (2) an internal CO₂ monitoring system, (3) the measurement of CO₂-emissions globally generated by subcontractors and (4) the measurement of CO₂-emissions released by customers’ transactions. Two in-house policies were developed to attain to these four pillars – Eco-Consumption and Eco-Transport. Eco-Consumption consists of goals aiming at reducing electricity and water consumption, paper usage, business air travel and the management of waste. Eco-Transport, on the other hand, is concerned with stimulating eco-friendly transportation from a world-wide perspective.

UPS

The management approach of environmental issues at UPS is based on making responsible business decisions to arrive at accurate and comprehensive information concerning the use of natural resources, fossil fuels and the byproducts that are generated by the business processes. And so, UPS does not work with a separate environmental program, plus the company aims more at the optimization of natural resources and strives for leadership with emphasis on the accuracy of carbon reporting. This is illustrated in the Environmental Policy of UPS, with the introduction of Environmental Guidance Statements addressing environmental compliance, air emissions, resource conservation, waste management, petroleum storage systems, pollution prevention, training and sustainability.

8.2 Sustainability reporting

Even though sustainability reporting represents the end point of the ideal SMF, it was decided to provide an overview of the externally published information first in order to familiarize the reader with the sources that were used for the analysis. In this respect, all externally communicated information is considered and table 5 on the following page provides an overview about the various communication channels used by the companies. The major source of information is thereby shown against a highlighted background. A short overview of each of those sources is provided in the following.

Annual Report

Every company only dedicates a small part of its annual report to sustainability management.

Sustainability Report

This report is the major source of information for all companies, except K&N and Panalpina who do not have a separate source to communicate their sustainability efforts. Even though DB Schenker does not refer to it as sustainability report, its environmental brochure can be regarded as a sustainability report since it is updated annually with the most recent developments. In this sense, DPDHL and DB Schenker deliver the most extensive sustainability reports in terms of pages, followed by UPS standing out in terms of specificity.

Corporate Website

In general, the corporate websites provides a short description of either the sustainability program in place, and in case of K&N it covers the information that is published in the annual report. Again, UPS stands out as it is the only company delivering a separate website exclusively dedicated to sustainability issues.

Environmental Policy

The environmental policies of all companies consist of either one or two pages, and describe mostly general goals with regard to the environment, like ‘generating value’, ‘environmental improvement’ and ‘creating transparency’.

Other Documents

Other documents concern additional sources of information published by the company, next to the ones mentioned above. In this respect, both DPDHL and Panalpina turned out to be most extensive, including e.g. presentations on the company’s carbon footprint or movies about the environmental program. Both UPS and DB Schenker publish the least additional information.

	DPDHL	K&N	DB Schenker	Panalpina	UPS
Environmental Program	GoGreen	-	Taking responsibility. Providing solutions.	PanGreen <ul style="list-style-type: none"> • Eco Transportation • Eco Consumption 	-
Annual Report	Covers the key developments of the GoGreen program	Dedicates 1 page to environmental initiatives and performance	no separate annual report as part of DB Group, which only addresses company-wide environmental issues	Dedicates 2 pages to environmental initiatives and performance	Dedicates 1 page to ecological sustainability
Sustainability report	Corporate Responsibility (CR) report includes section on GoGreen program (50 pages)	-	Environmental Brochure (59 pages)	-	Sustainability Report includes section on environment (28 pages)
Corporate Website	Short description of what is covered on the GoGreen program in CR report	Covers mostly the same information as the Annual Report	Short description of what is covered in Environmental Brochure	Short description of what is covered in the PanGreen Brochure	Separate website covering the same content as the Sustainability Report
Environmental Policy	<u>2 pages with subheadings:</u> <ul style="list-style-type: none"> • Achieve transparency • Improve operational efficiency and minimize environmental impact • Generate value • Demonstrate leadership • Mobilize employees 	<u>1 page without subheadings</u>	<u>1 page with subheadings:</u> <ul style="list-style-type: none"> • Who are we? • What is our goal? • How do we achieve this? 	<u>1 page with subheadings:</u> <ul style="list-style-type: none"> • Customer • Training & Development • Awareness • Responsibility • Environment, Improvement, Business Policy 	<u>Half a page on sustainability website without subheadings</u> <u>1 page in Sustainability Report, with subheadings:</u> <ul style="list-style-type: none"> • UPS Environmental Policy Statement • Environmental Guidance Statements
Other	<ul style="list-style-type: none"> • GoGreen Facts & Figures • GoGreen Brochure • Movie on website 	<ul style="list-style-type: none"> • Corporate QSHE statement • QSHE targets 2012 	<ul style="list-style-type: none"> • Separate information documents on EcoOptimizer, EcoPhant • Movie on website 	<ul style="list-style-type: none"> • GRI Content Index • Panalpina's Carbon Footprint • Environmental Presentation 2010 • PanGreen Brochure 	-

Table 5: Sources of sustainability reporting

8.3 Motivation for sustainability reporting

According to the SMF, motivations for sustainability management mainly concern external expectations. Those can be derived from stakeholder requirements, which mostly constitute unwritten requirements, or guidelines or rankings which concern published expectations due to the transmittance of commonly accepted views on sustainability management. The internal reasons for sustainability management such as increased corporate image will not be addressed in the following since this is difficult to detect by only examining externally published information.

8.3.1 Stakeholders

The following table shows the companies' stakeholders that are mentioned in their external reporting and how the companies engage with them.

	DPDHL	K&N	DB Schenker	Panalpina	UPS
Main stakeholders					
Customers	X	X	X	X	X
Investors	X	X	X	X	X
Employees	X	X	X	-	X
Other	<ul style="list-style-type: none"> • suppliers • unions • NGOs • policy makers • members of the general public 	<ul style="list-style-type: none"> • also other relevant stakeholders 	<ul style="list-style-type: none"> • suppliers • local communities • governments • NGOs 	<ul style="list-style-type: none"> • sub-contractors 	<ul style="list-style-type: none"> • community leaders • universities • public officials
Identification of stakeholder expectations	Yes, through various channels	-	Yes, through customer survey	-	Yes, through various channels

Table 6: Stakeholder engagement

First of all, by looking at the table above, it is clear that a division of the companies into two different groups is possible concerning their response to the expectations of stakeholders.

The first group consists of DPDHL, UPS and to a large extent also DB Schenker, with the following similarities in place: DPDHL and UPS are similar as they report to engage on a continuous basis with various stakeholders through different information channels. Thus, the companies recognize their stakeholders' expectations by means of the needs and demands communicated by these parties. Both companies provide a list of various stakeholders that are communicated with, next to an overview of the different channels used to obtain stakeholder information. For example, DPDHL organizes special CR Days, conducts an extensive yearly online survey, and direct meetings with stakeholders and conferences take place to engage with the external parties. As a result from the

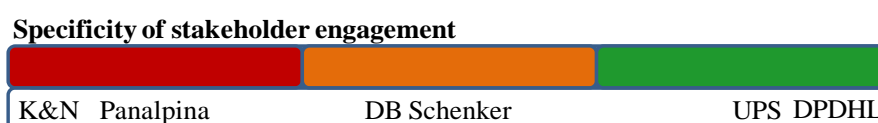
online survey with 1,500 participants, the company detected that external stakeholders expect the company to have an *environmentally friendly fleet and networks*, a *sustainable energy management* and a *climate protection program* including comprehensible measures. Similar to DPDHL, the company UPS engages, for example, in dialogues with unions, conducts internal surveys and organizes focus groups. Thereby it was revealed that external stakeholder expectations concern putting forward *comprehensive reporting* for which GRI-standards are the minimum requirements, *fuel conservation*, *addressing climate change* and *investments in alternative energy*.

DB Schenker states that it works in close collaboration with various interested parties, like customers, suppliers, local communities, governments and NGOs, and in that sense claims to engage with its various stakeholders. However, the only example of stakeholder engagement is given by a survey that is undertaken amongst its main *customers*, and thereby the company differs from DPDHL and UPS with regard to the level of details and specificity concerning the engagement with stakeholder groups. The results of this survey show that external expectations concern a *clear calculation of customer carbon footprint*, *internal environmental targets*, *involvement of subcontractors* in these targets and *environmentally friendly product solutions*.

To sum up, it can be concluded that all three companies discovered mainly the same stakeholder expectations concerning environmental sustainability management.

The second group that can be distinguished concerns Panalpina and K&N, as these companies indeed do report *who* their stakeholders are, nevertheless it is neither reported *what* these stakeholders expect from the company nor *how* information concerning external expectations is obtained.

Based on the advice of Skouloudis et al. (2010), it was decided to develop a rating system in form of a traffic light spectrum in order to have a convenient method for comparison of the different reporting practices. The spectrum below depicts the level of transparency provided by the companies with regard to their stakeholder engagement. The left side of the spectrum represents the companies that have been less transparent in their reporting (K&N and Panalpina), whereas the right side of the spectrum shows the companies that have made more effort in providing transparency on how stakeholders are engaged with (DPDHL and UPS). The company that reports mediocre compared to the ‘green companies’ is placed in the middle of the continuum (DB Schenker).



8.3.2 Guidelines

The following table shows the guidelines that are mentioned in the companies' external reporting.

	DPDHL	K&N	DB Schenker	Panalpina	UPS
ISO					
ISO 14001	X	X	X	X	X
ISO 14063	-	-	-	-	-
ISO 14031	-	-	-	-	-
ISO 14064	X	-	X	-	X
GHG Protocol	X	-	X	X	X
GRI	X	-	-	X	X

Table 7: Application of various guidelines

The recognized guidelines mentioned in the table are helpful for classification and measurement of key performance indicators and quantifications concerning environmental sustainability management. A remarkable similarity is that all companies report to make use of ISO 14001 as well as the GHG Protocol (except K&N). It should be noted that the companies additionally provide a certificate when the requirements of ISO 14001 are fulfilled.

Concerning ISO 14064 and the GHG Protocol, these are both recognized guidelines for classification and internal measurement of greenhouse gas emissions. Since those standards are complementary, it could be assumed that the companies reporting to use both standards probably have a more comprehensive system for the measurement of greenhouse gases in place. Thus Panalpina's approach to the measurement of CO₂-emissions is probably less extensive since it only reports on the GHG Protocol. Concerning K&N, it does not mention any of these measurement guidelines in its external reporting which makes it difficult to judge from an external perspective how it measures greenhouse gas emissions.

A remarkable finding was the fact that none of the companies report on the usage of ISO 14031 or 14063, even though both standards are concerned with environmental sustainability management and would have offered indications on how internal processes concerning sustainability are constructed.

Lastly, the most important difference concerning the incorporation of guidelines in the companies' operations concerns the fact that only three out of five companies operate with certified GRI guidelines. These include Panalpina, which fulfills the requirements of application level C, as well as DPDHL and UPS who both fulfill the requirements of the higher application level B+. All

companies show the obtained certificate in their external reporting and hence as an external user it is relatively uncomplicated to see where the company stands in fulfilling the requirements of the GRI framework.

Concluding the topic of the application of guidelines, the following spectrum depicts how much is reported about its usage by the various companies. Again, it can be concluded that K&N can be placed on the left side of the spectrum since it only reports on the application of the ISO 14001 standard. As K&N and Panalpina only report on the application of three guidelines, they are assigned to the orange area; similarly, UPS and DPDHL report on the usage of four guidelines and are therefore placed in the green area.



8.3.3 Rankings

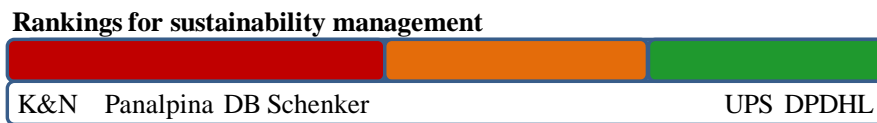
The table below indicates to what extent the companies provide information on their listing in rankings.

	DPDHL	K&N	DB Schenker	Panalpina	UPS
DJSI World	X (World, Europe)	-	-	-	X (North America)
CDP Leadership Index	X	-	-	-	-
FTSE4Good	X	-	-	-	-
Sustainability Asset Management	X	-	-	-	-
Climate Counts	-	-	-	-	X
Corporate Responsibility Magazine	-	-	-	-	X

Table 8: Rankings of sustainability management

Since DPDHL and UPS are the only companies that report on their placements in rankings, it can be concluded that they spent significant efforts to acquire a listing in these rankings and also that their environmental sustainability management fulfills a relatively high standard. Additionally, as the quality of the sustainability management of DPDHL and UPS has been accredited by the GRI with a B+, it is therefore not surprising that these are also the two companies that appear in rankings.

Once more, DPDHL and UPS are placed on the right side of the spectrum since these companies report on their placement in rankings, as opposed to K&N, DB Schenker and Panalpina, who therefore get a place assigned on the left side.



8.4 Sustainability strategy

In an ideal approach to sustainability management, external expectations are analyzed at first in order to identify those social and environmental issues that are of strategic relevance. Those are then incorporated in the company's sustainability strategy and thus translated into strategic goals.

The analysis of the companies' approaches to sustainability strategy embraces the following aspects:

	DPDHL	K&N	DB Schenker	Panalpina	UPS
Specifics on sustainability strategy					
Environmental protection part of business strategy	X	-	X	X	X
Environmental policy	X	X	X	X	X
Business approach					
Reduction of customer carbon footprint	X	X	X	X	X
Carbon-neutral products	X	-	X	-	X
Strategic focus on (incl. targets)....					
CO ₂ -emissions from transportation	X	-	X	-	X
CO ₂ -emissions from facilities	-	X	-	X	-
Other environmental impacts	-	X	-	X	-
Subcontractors are...					
..engaged with	X	X	X	X	X
..included in CO ₂ -reduction targets from transportation	X	-	X	-	-

Table 9: Sustainability strategy

8.4.1 The connection to business strategy and environmental policy

Due to the general external expectation for companies to engage in environmental protection, it was examined in the first instance if the companies make environmental protection part of their overall *business strategy*.

As can be seen in table 9, all companies except K&N report to incorporate environmental protection in their business strategy. However, this is done in various ways.

For example, DPDHL's Group Strategy 2015 – to become *the* postal service for Germany and *the* logistics company for the world – integrates all three 'living responsibility' programs. By means of the GoGreen program, DPDHL directly responds to external stakeholders' expectations to have a climate protection program in place which was revealed by its online survey (see Chapter 8.3.1).

DB Schenker's mission statement displays that the company considers "acting responsibly" as a means of achieving its goal of becoming the world's leading passenger and logistics company. This entails commitment to social responsibility and a portrayal as "pioneer of climate friendly and environmentally sustainable transportation" (DB Schenker, 2012).

As for Panalpina, three corporate values direct its business strategy and are at the core of its daily operations – performance, integrity and professionalism. The performance value demonstrates that the company's commitment to long-term sustainable development is seen as way to out-play competition.

Lastly, UPS underlines that business strategy and corporate responsibility strategy are substantially the same: "to increase the economic vitality and environmental sustainability of the global economy by aggregating the shipping activity of millions of businesses and individuals worldwide into a single efficient logistics network" (UPS, 2012a). Also, the company's mission entails to make a difference in the communities it serves and the recognition of commitment to long-term sustainability.

To sum up, it can be stated that all companies consider sustainability an important tool to enhance business success by making it part of their overall business strategy.

In connection to this, it was investigated if the companies have an environmental policy in place since this is a common tool to demonstrate commitment to sustainability and lays out the strategic goals concerning environmental sustainability. Whereas an environmental policy was found for all companies, the closer analysis revealed that the environmental policies of DPDHL, DB Schenker, K&N and Panalpina are rather similar as opposed to the one by UPS.

However, even though DPDHL, K&N, DB Schenker and Panalpina address the same environmental issues in their environmental policies, Panalpina differs slightly from the other three companies by *not* formulating specific environmental goals. In this respect, DPDHL, DB Schenker and K&N include the following environmental goals in their policies, whereby the exact formulation only slightly differs from the individual environmental policies:

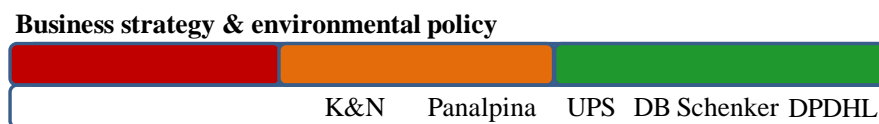
- Compliance with all relevant environmental legislation and regulation
- Supply of environmentally sensitive product / service alternatives

- Effective implementation of programs and procedures in a best practice approach (e.g. development and maintenance of an environmental management system in compliance with ISO 14001)
- Close collaboration with suppliers, customers and employees to minimize environmental impacts
- Encouragement of employee participation in improving environmental performance (or provision of appropriate environmental training)

Whereas all three companies stress the measurement of its environmental impact, only DPDHL and DB Schenker provide long-term targets concerning the reduction of CO₂-emission (see table 10).

By contrast, UPS only publishes a very brief environmental policy which states that the company accepts its responsibility for keeping its environmental impact small and “evaluates improved technology and seeks opportunities to improve environmental performance.” (UPS, 2012c) However, UPS also provides an Environmental Guidance Statement and a Corporate Climate Change Statement which both form the starting point for more specific environmental goals and possible measures to reduce CO₂-emissions.

Based on the inclusion of environmental protection in the business strategy and the specificity of environmental goals in the environmental policy, the companies can be placed differently in the spectrum. DPDHL, DB Schenker and UPS respond to both aspects to a full extent and are therefore placed on the right side. By contrast, K&N and Panalpina are only assigned to the orange area since K&N does not include environmental protection in its business strategy and Panalpina does not provide details on environmental goals in its environmental policy.



8.4.2 Business approach

In order to make progress towards CS (Schaltegger et al., 2006), it is important that companies recognize that their core business processes have to be addressed by their sustainability management. Consequently, sustainability efforts should be directly addressed to keeping CO₂-emissions from transportation to a minimum. From a profitability point of view, the minimization of CO₂-emissions is also reasonable since it leads to cost reductions for fuel. In this way, eco-efficiency – doing more with less – is addressed since it involves the more efficient usage of fuel and thus fewer costs while at the same time the impact on the environment is minimized (DeSimone & Popoff, 2010; Burrit & Saka, 2006).

Next to reducing costs, companies have gone one step further by offering green services that not only reduce CO₂-emissions but at the same time aim at increasing the profits of the company by attracting environmental sensitive customers.

In this respect, logistics companies have started to calculate *customer carbon footprints* which offer transparency to customers on how much CO₂ is emitted during a chosen transport route. Consequently, consulting services are provided to choose the transport route that releases the least CO₂ but at the same time meets other requirements of the customer such as speed, costs, etc. In this way, both the customer and the company carbon footprint are reduced.

By analyzing the external sustainability reporting of the five companies, it was revealed that all of them have introduced IT-tools to calculate the carbon footprint of their customers.

In this respect, K&N's carbon management is worth pointing out since it does not only include CO₂-emissions from transportation but also the ones released by facilities. By contrast, the other four companies only focus on CO₂-emissions from transportation.

Also, DB Schenker's EcoTransIT system deserves further attention since it is available free of charge on the internet (www.ecotransit.org). The company also introduced a label for the measurement of CO₂ in the form of an elephant called Eco₂Phant, which represents 5t of CO₂, the same weight as an elephant. In this way, it is made transparent for the customer in an illustrative manner how much CO₂ they can save by selecting a specific mode of transport – air, road, rail or ocean.



Consequently, all companies except K&N can be placed in the orange area as they only consider CO₂-emissions from transportation in the calculation of the customer carbon footprint:



Besides, the introduction of *carbon-neutral products* is another possibility to combine the reduction of CO₂-emissions with positive aspects on profitability. It represents an environment-friendly product alternative by which the company supports projects that combat climate change in order to offset the CO₂ emissions released during transport activities.

Only DPDHL, DB Schenker and UPS report externally that they engage in carbon offsetting. All three companies refer to these products as carbon-neutral shipments which can be misleading for an external stakeholder since carbon emissions are still released during the transport activity. Therefore, it represents a way to ease the customers' conscience by buying those products.

In this context, it seems important to point out that DB Schenker is actually able to suggest a product alternative that is truly carbon neutral or more clearly carbon free since it involves rail transport that is 100% sponsored by electricity from renewable energy sources. This is probably due to the fact that DB Schenker is a business division of the DB Group – the main rail provider in Germany –and therefore relies especially on rail transportation. The other logistics companies have

to engage subcontractors for rail transportation which makes it more difficult to offer carbon-free rail transportation since it can only be achieved in collaboration with subcontractors.

Based on the analysis above, the companies can be placed in the spectrum in the following way:



8.4.3 Focus areas of sustainability strategy

After the detailed analysis of the companies' external reporting information, the companies can be assigned in two different groups depending on if the strategic focus of their sustainability efforts is on minimizing the CO₂-emissions from transportation, or merely on CO₂-emissions from facilities and other environmental impacts. The following analysis also takes into account the various targets set by the companies which are summarized in table 10 on the following page.

DPDHL, DB Schenker and UPS set their strategic focus on the reduction of the CO₂-emissions from transportation. For this, all three companies communicate *long-term targets*.

Concerning DPDHL and DB Schenker, they also include subcontractors in their long-term carbon reduction targets. Whereas DPDHL only has one overall reduction target on CO₂-emissions from transport activities and energy usage within facilities, DB Schenker publishes long-term carbon reduction targets for each of its business divisions and one for energy usage within facilities. In this respect, DB Schenker is even more detailed than DPDHL.

UPS, on the other hand, does not include subcontractors in its long-term carbon reduction target. Additionally, the company also sets reduction targets for its aircraft and ground fleet, whereby the target year is however not communicated. This decreases the credibility that the company is truly dedicated to work towards these goals.

	DPDHL	K&N	DB Schenker	Panalpina	UPS
Long-term targets	<p><u>From 2007 to 2020</u> Improvement of carbon efficiency of own operations and those of subcontractors, by 30%</p> <p><u>From 2009 to 2015</u> Replace at least another 15 % of remaining air fleet with more fuel-efficient models</p>	-	<p><u>From 2006 to 2020</u> DB Group: Reduction of CO₂-emissions by 20 %</p> <p><u>From 2006 to 2020:</u> Reduction of CO₂-emission by transport mode: <ul style="list-style-type: none"> • Rail: 19 % • Road: 26 % • Air: 25 % • Ocean: 15 % </p>	-	-
CO₂-emissions from transportation		-		CO ₂ -reduction (no year mentioned)	<p><u>From 2007 to 2017:</u> Transportation Index (Scope 1,2 & UPS Airlines): 5 %</p> <p><u>From 2005 to x:</u> Air: 20 %</p> <p><u>From 2000 to x:</u> Ground fleet: 20 %</p>
CO₂-emissions from facilities	<p><u>From 2011 to 2020</u> Increase electricity generated from renewable energy sources (green electricity) to more than 60%</p>	-	30% reduction (no baseline and year are mentioned)	-	-
Other environmental impacts	-	-	-	-	-
Short-term targets (Annual)	<p><u>By 2012</u></p> <ul style="list-style-type: none"> • Increase transparency on the CO₂ reduction targets and carbon efficiency of road carriers • Implement carbon accounting processes and IT systems for scope 3 emissions reporting for all transport modes 	<p><u>By 2012</u></p>	-	<p><u>By 2011</u> Other: Business flight travel reduction by 5%</p>	-
CO₂-emissions from transportation	<ul style="list-style-type: none"> • Increase transparency on the CO₂ reduction targets and carbon efficiency of road carriers • Implement carbon accounting processes and IT systems for scope 3 emissions reporting for all transport modes 	-	-	Vehicle purchases must reflect a 5% improvement in CO ₂ efficiency	-
CO₂-emissions from facilities	<ul style="list-style-type: none"> • Power from low-carbon sources must be reduced by 2,5%. • Reduction of CO₂-emissions by 2% p/FTE and 2% p/m². • Awareness program executed to responsibly use/reduce and monitor <i>water</i> consumption • Increase recorded <i>recycled waste</i> by 10% 	-	-	Electricity reduction by 5%	-
Other environmental impacts	-	-	-	<ul style="list-style-type: none"> • Water reduction by 5% • Paper reduction by 10% 	-

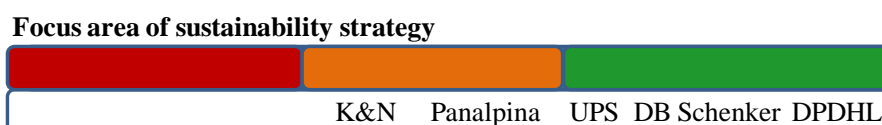
Table 10: Targets for sustainability management

Another point that all three companies (DPDHL, DB Schenker, UPS) have in common is that none of them communicates company-wide targets concerning other environmental impacts such as water consumption or waste creation. This could be due to the fact that the companies do not consider it necessary as their strategic focus is on the minimization of CO₂-emissions from transportation. DB Schenker, however, mentions an IT-tool for the reporting of environmental data on water, energy, waste and carbon emissions for all new and existing facilities. This is similar to the Global Facility Carbon Calculator (GFCC) of K&N which is designed to monitor the success of measures for decreasing energy, fuel and water consumption as well as the volume of waste and CO₂-emissions. By contrast, DPDHL states that reporting such data on the company-level would constitute an unequal relation between effort and benefit and therefore the company leaves the management of other environmental impacts to the individual facilities. It should be noted, however, that all three companies indeed engage in activities to minimize their CO₂-emissions from facilities and other environmental impacts, but they do not set reduction targets on a company level.

By contrast, the strategic focus of K&N and Panalpina is solely on the reduction of CO₂-emissions from facilities and other environmental impacts. Nevertheless, concerning the targets for facilities, only short-term targets concerning CO₂-emissions and other environmental impacts such as water consumption and waste creation are set.

For instance, K&N employs its GFCC in order to track the progress towards the achievement of annual targets. However, the external reporting provides no transparency about the development of the achievement of these targets over the years which makes it difficult for an external stakeholder to judge the success of its environmental performance. Concerning Panalpina, the company also communicates annual targets and results. However, no specific IT-tool is mentioned in the external reporting as well as the possibility to track annual results is limited.

The traffic light spectrum below contrasts K&N and Panalpina with DPDHL, UPS and DB Schenker. Since the latter group makes an effort to minimize its entire carbon footprint including CO₂-emissions from subcontractors, it shows that the companies try to account comprehensively for their environmental impact. As for K&N and Panalpina, it has been decided to place them in the orange area since these companies do not publish targets for transportation activities. Hence, they are assumed to only partly account for their carbon footprint.



8.5 Sustainability controlling

In the SMF, sustainability controlling is responsible for the performance measurement of activities derived from strategic targets. The generated information can be used for a trustworthy external communication.

8.5.1 Sustainability activities

By reporting on activities a company demonstrates that the targets set are not only empty words but the company also shows commitment to achieve them.

The following table depicts the different types of activities the companies mention in their sustainability reporting:

	DPDHL	K&N	DB Schenker	Panalpina	UPS
CO₂-emissions from transportations					
Capacity optimization through...					
Intermodal transport concepts	X	X	X	X	X
Efficient capacity use	X	X	X	X	X
Fleet management (air and road) through....					
Investment in more energy-efficient fleet	X	-	X	X	X
Educating drivers	X	-	X	-	-
Supporting research for alternative fuels	X	-	X	-	-
CO₂-emissions from facilities					
Energy-efficient solutions for...					
Lighting	X	X	X	-	X
Heating	X	X	X	-	X
Air conditioning	X	-	X	-	X
Renewable energy sources	X	-	X	X	X
Green Building standards	X	X	X	-	X
Other environmental impacts					
Reduction of water consumption	X	X	X	X	X
Reduction of waste	X	X	X	X	X
Increase of recycling of paper, materials, etc.	X	X	X	X	X

Table 11: Sustainability activities

Concerning activities to reduce CO₂ emissions from transportation, they can be assigned into two different categories: capacity optimization and fleet management.

As it can be seen in the table, all companies engage in activities for *capacity optimization*. Those consist of activities involving ‘intermodal transport concepts’ and ‘efficient capacity use’.

Intermodal transport concepts concern activities to shift between transport modes, i.e. air, road, rail and ocean, with the aim to find more environment-friendly transportation routes. In this respect, it is the main activity linked to reduce the customer carbon footprint. For the sustainability controlling this entails that the measurement of carbon emissions should be conducted for all different transport modes in order to be able to calculate and recommend the least pollutant transport route. This will be further considered in section 8.5.2. On the surface this activity appears to be in place for environmental reasons but on the other hand, the authors believe that it is also an activity to attract customers.

Efficient capacity use is mainly conducted by companies to reduce costs since less fuel consumption is achieved through activities like the reduction of empty runs, smart route planning and the bundling of goods and flows. However, these activities also aim at reducing CO₂-emissions at the same time.

With regard to *fleet management*, all companies except K&N report on investments in more energy-efficient fleet, which mainly involves vehicles and aircraft. It is reasonable that K&N does not mention this type of activity since the company does not hold its own fleet and only engages subcontractors for its transportation. Both DPDHL and DB Schenker are most extensive in their reporting by supplementing their sustainability efforts with activities like educating drivers and supporting research for alternative fuels. Since UPS generally engages in fairly specific reporting, it is slightly surprising that the company is less detailed than DPDHL and DB Schenker concerning activities for fleet management.

Referring to CO₂-emissions from facilities, the table shows that all companies except Panalpina report on activities to become more energy-efficient with regard to lighting, heating and air conditioning. In this respect, K&N provides the highest number of examples on these activities to reduce CO₂-emissions from facilities. This could be explained by the fact that K&N does not hold its own fleet and therefore can only report on these types of activities to reduce its environmental impact.

Finally, all companies engage in various activities to reduce other environmental impacts such as water consumption, waste creation and paper usage. This is not considered remarkable since next to having a positive impact on the environment, those activities also reduce costs. As for K&N and

Panalpina, reporting on these activities can also explained by the fact that the reduction of environmental impacts is part of their strategic focus as can be seen in table 9 in section 8.4.

Regarding their specificity on activities reported, the companies can be assigned in the spectrum in the following way:



8.5.2 Measurement of CO₂-emissions

Whereas the measurement of water consumption and waste creation is a fairly simple process since it is already conducted by external organizations to which the company has to pay a fee depending on the level of usage, the measurement of carbon emissions is far more complex since there is no external party that measures the output of CO₂-emissions. In this sense, it is the company's own responsibility to measure CO₂-emissions in order to be able to reduce them. Only in this way, the success of the activities described in the previous section can be followed up by the company.

For the calculation of their CO₂-emissions, the companies apply emission factors published by different organizations. Those can be categorized according to the scope 1, 2 and 3 emissions.

	DPDHL	K&N	DB Schenker	Panalpina	UPS
Scope 1 & 2					
Intergovernmental Panel on Climate Change (IPCC)	X	-	-	X	-
International Energy Association (IEA)	X	-	-	X	-
CEN standard	-	-	X	-	-
GHG Protocol	-	-	-	-	X
Scope 3					
Network for Transport and the Environment (NTM) (Air)	X	-	-	-	-
Clean Cargo Working Group (CCWG) (Ocean)	X	X	-	-	-
Handbook Emission Factors for Road Transports (HBEFA) (Road)	X	-	-	-	-
CEN standard	-	-	X	-	-
GHG Protocol	-	-	-	-	X
Defra (UK department)	-	-	-	X	-

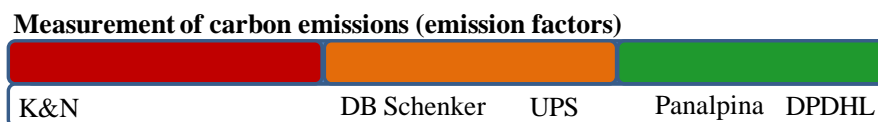
Table 12: Emission factors

In general, DPDHL, DB Schenker, Panalpina and UPS are rather extensive in the information they supply concerning the emission factors used for the calculation of their carbon emissions.

As can be seen in table 12, DPDHL provides most information concerning the application of emission factors for scope 3 emissions, including three different data sources for emission factors for the different transport modes air, road and ocean. Also, DB Schenker is eager to demonstrate an advanced level of calculating its carbon footprint by referring to the application of the pending CEN standard by the European Committee of Standardization, which will only come into force until end 2012 (Schmied, 2010). In this way, it is stated that the company wants to demonstrate its pioneer role in the area of sustainability performance measurement. As for Panalpina, the company provides a complete separate presentation in order to explain to external stakeholders how the company calculates its carbon footprint. And finally, even though UPS only refers to emission factors published by the GHG Protocol, it is rather elaborate on its description on how that specific standard is applied to calculate CO₂-emissions.

The only company that is less transparent in its application of emission factors is K&N who only reports on being a member of the Clean Cargo Working Group (CCWG) who aims at developing a common methodology for the calculation of CO₂-emissions from ocean freight. In this way, it is related to scope 3-emissions.

The spectrum below provides an overview on how transparent the different companies report on emissions factors applied for the calculation of carbon emissions.



9 General findings

The purpose of this Chapter is to present an overview of the general findings of this master thesis with regard to what companies report on environmental sustainability management. Whereas Chapter 8 provided specific results according to the different dimensions of the SMF and the respective subcategories, this Chapter aims to alleviate those findings from a company focus to a more general level. The analysis lead to the uncovering of four different themes involving an overall 'tendency towards transparency', 'major communication tools', the 'consideration of external expectations' and the 'the practical reply to those external expectations'. When appropriate, the findings of this master thesis will be compared with the results of previous studies. Furthermore, possible motivations for the content of sustainability reporting will be addressed.

9.1 Tendency towards transparency

The first general finding relates to the theme of transparency. In this respect, the findings of the previous analysis will be considered in further detail.

It should be noted that the companies appeared in different numbers in the traffic light spectrums designed for each of the subcategories under the main headings of the SMF. The respective subcategories were selected to enable a comprehensive analysis of each of the main categories of the SMF and thus the reporting practices regarding the sustainability management of the companies. In this respect, the traffic light spectrums served as a helpful tool to visualize the transparency of the companies' sustainability reporting with regard to the respective subcategories.

Table 13 illustrates how often each company appeared in the red, orange or green areas of the spectrums for the various subcategories. Since we analyzed nine subcategories in total, each company received a total of nine points.

				Sum
DPDHL	0	2	7	9
K&N	6	2	1	9
DB Schenker	1	4	4	9
Panalpina	3	5	1	9
UPS	0	4	5	9
Sum	10	17	18	45

Table 13: Summary of analytical findings

For the interpretation, the meaning of the different colored areas should be kept in mind; the green area implies very specific information in the sustainability reporting, the orange area quite specific

information and the red area suggests that no or only very little information is provided. Based on this, a finding of this master thesis is that the analyzed logistics companies are in general very specific concerning the sustainability reporting on the defined subcategories. With an overall probability of 40% the company was placed in the green area of the traffic light spectrum which indicates a general trend towards transparency based on our analysis. This is closely followed by a 37% probability of being placed in the orange area. Consequently, it can be stated that this finding is in contrast to Marshal & Brown (2003) who state that sustainability reporting deals with the difficulty of transparency and so veracity.

Moreover, a ranking concerning the transparency of the different companies was established by means of assigning different points to the three colored areas; each placement of the company in the red area received one point, in the orange area two points and in the green area three points. Multiplied with the number of placements in the respective areas (see table 13), the ranking could be developed by determining the row total for each company (see table 14). For example, DPDHL received 21 points in the green area since it was placed there seven out of nine times concerning the different subcategories ($21 = 7 \times 3$) and in total 25 points (21 points from green area and 4 points from orange area).

				Sum (Rank)
DPDHL	0	4	21	25 (1)
K&N	6	4	3	13 (5)
DB Schenker	1	8	12	21 (3)
Panalpina	3	10	3	16 (4)
UPS	0	8	15	23 (2)

Multiplicator: 1 = red; 2 = orange; 3 = green

Table 14: Ranking of the logistics companies in terms of transparency in sustainability reporting

Since the average score is 19.6, DPDHL and DB Schenker as well as UPS appear to publish more specifically on their sustainability management than what is considered common in the sample of the five logistics companies. On the other hand, K&N and Panalpina have a score below average and therefore take the lower places in the ranking since these companies are less transparent in their sustainability reporting.

Since the authors considered it striking that two German companies – DPDHL and DB Schenker – appeared in the top three, it was found appropriate to investigate in further detail the reasons behind this. This led us to a study by Adams et al. (1998) who examined corporate social reporting practices in Western Europe. By conducting an empirical study including the largest 25 companies

in Germany, France, UK, Switzerland, Sweden and the Netherlands, those researchers found that German companies disclose on average the most while Swiss companies (K&N and Panalpina) are in general much less transparent.

Explanations for this phenomenon can be found when country-specific circumstances are taken into account. In this respect, Germany is the country with the most active Green movement in comparison to any country in Europe (Adams et al., 1998). Coupled with proportional representation and relatively powerful local governments, it shows that environmental pressure groups are relatively strong in Germany (Keating, 1993). Also, the German government pursues the aim to reduce carbon emissions by 40 % by 2020 (baseline: 1990) (The New York Times, 2008), which puts additional pressure on companies to publish commitment towards reducing carbon emissions in order to avoid mandatory regulations for the reduction of CO₂-emissions. Based on these country-specific circumstances in Germany, it can be concluded that German companies are expected to act socially responsible which is to be supplemented by an elaborate sustainability reporting in order to gain acceptance by society. It is thus an indication of *legitimacy theory*.

As for UPS, who received the second place in the authors' ranking, the explanation for the extensive disclosure by German companies might not hold true for an US-based company. Instead, it should be considered that companies in the US aim with their external reporting primarily at shareholders who represent the most significant source of capital in the US (Nobes & Parker, 2010). In this respect, the US is similar to the financing structure in the UK where it was found that UK financial executives primarily regard the role of the annual report as a mean to improve the corporate image (Gray & Roberts, 1989). Therefore, the argument of using sustainability reporting as a tool for advertising and thus attracting investors and customers seems appropriate to explain the extensive reporting of UPS (Schaltegger & Herzog, 2006).

To sum up, the analysis showed that a considerable high level of transparency on the content of sustainability management is found in the sustainability reporting of the logistics companies in Germany (DPDHL and DB Schenker) and in the US (UPS). With reference to the problem statement and the aim of this master thesis, *what* companies report on environmental sustainability management is not only company-specific but also influenced by country-specific circumstances.

9.2 Major communication tools

Concerning the theme of communication, it was analyzed *what* companies report in which types of communication tools. In this respect, the major sources concerning information on environmental sustainability management appeared to be the sustainability report and the corporate website.

Table 15 illustrates the main categories and subcategories of the SFM that were used in the analysis in connection to the respective communication tool. The first row represents how many out of the five companies used this communication tool for disclosures concerning sustainability management (see table 5). The numbers in the main area illustrate how many companies reported on the specific categories through the respective tool. If each company reported on all categories through the respective communication tool, the column total would equal 45 (i.e. 5 x 9 categories). However, considering that the subcategories ‘rankings’ and ‘carbon-neutral products’ are only dealt with by two and three companies respectively, the column total can only reach 40 points at the highest. However, this is only true when five out of five companies used the specific communication tool, which is only the case for the corporate website and the environmental policy. By contrast, the annual report and the sustainability report are only used by four and three companies respectively, so the column total for the annual report is therefore only 33 and for the sustainability report 26.

	Annual report	Sustainability report	Corporate Website	Environmental Policy
Availability (no. of usage)	4/5	3/5	5/5	5/5
Motivation for Sustainability Reporting				
Stakeholder engagement	1	3	3	3
Guidelines	2	3	4	3
Rankings (only 2 companies in total)	1	2	2	-
Sustainability strategy				
Connection to business strategy	2	3	3	2
Customer carbon footprint	4	3	5	4
Carbon-neutral products (only 3 companies in total)	1	3	3	2
Focus areas & targets	3	3	3	2
Sustainability Controlling				
Activities	1	3	5	1
Measurement of CO ₂ -emissions	2	3	4	-
Sum of numbers / Column Total	17/33	26/26	32/40	17/40
Percent (%)	52%	100%	80%	43%

Table 15: Sources of sustainability reporting

Concerning the *annual report*, it can be seen that in general only half of the subcategories is published there. What stands out is that information on the company's efforts to calculate a customer carbon footprint is reported by four companies in the annual report. Also, the focus area of the sustainability strategy and the respective targets are mostly mentioned.

By contrast, the *sustainability report* includes all information concerning sustainability management that each of the three companies decides to publish. Thus, it represents the most comprehensive source of information. This finding adds to the results of Frost et al. (2005) who found that the annual report is the least valuable source of information on corporate sustainability and the sustainability report is usually more extensive.

Furthermore, it should be noted that all five companies dedicate a part of their *corporate website* to environmental issues, whereby information on all subcategories of the SMF was found. In this context, an important finding relates to the fact that all companies mention the calculation of the customer carbon footprint on their websites. This is considered due to the awareness that potential customers mostly use the corporate website first in order to inform themselves about the company. Stating the benefits for customers on the website is therefore regarded as a tool to attract customers and thus to increase corporate image. It seems as if the logistics companies have recognized the possibilities the internet offers for communicating sustainability issues. Nevertheless, the analysis revealed that the information content published on the corporate websites is still rather limited, indicating that the companies do not yet fully exploit the benefits of the internet specific capabilities for the communication of sustainability efforts.

If you look at the corporate website in relation to the sustainability report, it can be concluded that the corporate website is even used more often than the sustainability report since all companies employ this communication tool as opposed to three out of five for the sustainability report.

9.3 Consideration of external expectations

A theme that was found by the analysis concerns the consideration of external expectations. This includes findings concerning the awareness of stakeholders, the certification of the ISO standard 14001 and the similarities concerning the environmental policies.

Firstly, the analysis revealed that all companies mention their stakeholders in their external reporting, thus illustrating an *awareness of stakeholders*. Also, the companies often refer to the key stakeholders as customers, investors and employees. This can be viewed as an indication of the *managerial branch of stakeholder theory* that stresses the practice that management engages with its most powerful stakeholders who can affect the achievement of the organization's objective. Another important finding concerns the relationship between companies who report on the identification of stakeholder expectations and the specificity and extensiveness of their sustainability reporting. To clarify, it was found that companies who mention engagement with their stakeholders in their sustainability reporting *also* provided the most transparent information on their sustainability management.

However, companies also have the responsibility to address the general societal expectation to operate in a sustainable manner by reducing their CO₂-emissions from transportation. This relates to the *ethical branch of stakeholder theory*; even though the companies do not specifically state that the environment or society as a whole are part of their stakeholders, the fact that they engage in carbon reductive activities shows that the companies also address the implicit needs of these stakeholders in a broader sense. Also, the arguments of *legitimacy theory* could be used for explaining this behavior which illustrates that these two theories are overlapping (Bansal & Roth, 2000).

Secondly, the *certification of the ISO standard 14001* was found to be mentioned consistently by all companies. This can be contrasted with the major conclusion of Dando & Swift (2003) who state that sustainability reporting fails to offer insight into the internal processes of sustainability management. However, reporting on the application of the ISO 14001 standard *is* an illustration of an internal system in place by the companies.

Additionally, due to the fact that the requirements for ISO 14001 are generic by nature (ISO, 2011b), it is assumed by the authors that a certificate on its successful application is more easily obtained than e.g. a certificate for the ISO 14064 standard which is more specific in its requirements. Thus, the certification could be used by the company as a simply obtained tool to gain further acceptance by society for its operations since it shows that their environmental management system is accredited by an internationally recognized organization. In this way, it is a demonstration

of the main argument of *legitimacy theory* and enhances the credibility of the company's external reporting in general.

Furthermore, concerning the homogeneity of the reported application of the ISO 14001 standard, *institutional theory* could be used as an explanation since it is an indication of isomorphism, meaning that companies feel pressured to resemble each other. To clarify, it is considered by the authors that not reporting on the application of ISO 14001 could damage the corporate image and thus lead to a loss of trust from stakeholders.

This is another illustration that the different systems-oriented theories are complementing each other, which was also revealed by Bansal & Roth (2000).

Thirdly, the analysis showed that all companies provide similar *environmental policies*. In this way, it is an indication that the companies try to imitate each other concerning environmental goals. This could be due to the fact that none of them wants to have a disadvantage for competition and therefore all of them take into account what is perceived as normal in the industry. Again a combination of *institutional theory* and *legitimacy theory* can be used to explain this behavior, which is in line with the findings by Banal & Roth (2000). Those researchers even concluded that the actual purpose of the environmental policy was to reduce the risks of noncompliance in order to maintain the trust of stakeholders.

9.4 Practical reply to external expectations

In general, companies are expected to reduce their environmental impacts. Thus, the last theme concerns the practical reply to this major external expectation which involves findings related to activities to reduce their environmental impacts and the service of calculating the customer carbon footprint.

Firstly, it was shown by the analysis that all companies publish *activities* concerning their sustainability efforts. From an external point of view, the reporting on sustainability activities enhances a company's credibility to take sustainability management seriously by illustrating what activities are implemented in order to achieve the sustainability goals. Providing an extensive list of sustainability activities increases transparency into business operations and in that way could reduce a stakeholder's skepticism regarding the credibility of sustainability reporting. In this way, it can be viewed as an illustration of *legitimacy theory* since the companies are eager to be regarded as taking their strategic goals seriously and thus transmit the image of a trustworthy business partner. In this way, the company is able to obtain its 'license to operate'. Hence, a company that does *not* report on its sustainability efforts faces the risk of being regarded as an ignorant market participant with regard to environmental issues and in that way, corporate image is jeopardized. Consequently,

companies feel pressure to report on their sustainability activities, which is another illustration of isomorphism and thus *institutional theory*. Hence, this finding concerning the disclosure is in contrast to Kolk (2003) and Hubbard (2009) who both assert that sustainability reporting lacks examples of concrete behaviour of companies.

However, the authors of this thesis believe that external stakeholders should be critical since the activities reported on could still be empty words and thus one cannot be sure if the company is sincere or only engages in some form of 'greenwashing' (Schaltegger & Burrit, 2006).

Therefore, the authors consider it essential that the sustainability reporting includes the depiction of transparent results over the years in order to demonstrate the success of the activities mentioned. Yet, the analysis in Chapter 8 revealed that only few companies provide this type of transparency and hence it cannot be assumed common practice in the logistics industry. This finding is in line with the study performed by Tilt (2007) who concluded that the overall reporting of performance against specific target is poorly undertaken in general. It is also in accordance with statement of Kolk (2003) that sustainability reporting is not much more than a glossy statement of intentions, where concrete data is missing.

Secondly, it was found in the analysis that all five logistics companies report on special consulting services to reduce the *customer carbon footprint*. This business approach concerns the core of sustainability and links to the *shared value* concept by Porter & Kramer (2006). Shared value is created since the company is able to attract increasingly more environmental-sensitive customers while at the same time the impact on the environment in terms of CO₂-emissions is reduced.

Again, this practice can be explained by all three systems-oriented theories. Firstly, with regard to *stakeholder theory*, companies directly reply to the customer need for an environment-friendly product alternative in order to reduce their own carbon footprint. Secondly, with reference to *legitimacy theory*, it can be stated that the logistics companies contribute to the overall societal target of reducing CO₂-emissions and thus gain approval from society. Finally, this finding can also be explained by *institutional theory* since pressure is put on companies to resemble each other in order to have the same basis for competition.

In relation to this, all companies provided transparency concerning the emission factors used for the calculation of the CO₂-emissions for the different transport modes and thus the customer carbon footprint. However, as could be seen in the analysis, most companies use different emission factors to determine CO₂-emissions, which in turn decreases comparability. This is in line with Clarkson (1999) who describes the challenge of subjectivity in the application of different performance measurement standards.

10 Concluding remarks

The aim of this master thesis was to analyze sustainability reporting in order to discover *what* companies report on environmental sustainability management. Based on this purpose, possible motivations concerning disclosures for sustainability reporting were discussed.

In this respect, the key learning points of this master thesis shall be presented in the following.

Firstly, concerning *transparency*, a key learning point relates to the fact that the sustainability reporting of the largest companies in the logistics industry tends to be rather transparent. This also reveals that this industry faces pressure to report on sustainability management due to its high environmental impact. Furthermore, by accident the authors stumbled upon the fact that country-specific circumstances could also affect the transparency of sustainability reporting.

Secondly, with regard to the *content of sustainability reporting* on environmental sustainability management it was found that most information was published concerning sustainability strategy-related topics. The least information was provided in terms of the incorporation of external expectations into strategy. With regard to sustainability controlling and performance measurement, all companies publish targets, activities and results and in this sense report on controlling practices. However, the relationship between them is not always clearly demonstrated. Concerning performance measurement, companies focus on providing insights into the methods of calculating CO₂-emissions by reporting on the emission factors applied.

Thirdly, the authors believe that based on the content of the sustainability reporting and the literature research concerning the possible motivations for sustainability reporting, the practice of disclosing information on sustainability management could be seen as a *social control tool* to manage the needs and expectations of the business environment. In this respect, it is a way to secure the company's 'license to operate'.

Fourthly, another learning point is that *subcontractors* are usually not included in *CO₂-reduction targets*. However, in the authors' opinion true dedication to reducing CO₂-emissions is only achieved by including subcontractors in the carbon reduction targets since in this way an effort is made to minimize climate change beyond company borders. This is essential because subcontractors' emissions account for the largest part of the company carbon footprint due to the high amount of subcontractors which logistics companies usually engage with.

On a final note, it should be considered that this master thesis solely relied on externally published information. Therefore, the conclusions drawn concerning environmental sustainability management can only be based on what the companies *claim* to do. This remains a challenge for external stakeholders when trying to evaluate the sustainability performance of a firm from an external perspective.

This leads to suggestions for future research, which could focus on analyzing sustainability management from an internal perspective. For example, through conducting various interviews with a respective company, a more comprehensive understanding of sustainability management in practice becomes possible. Concerning methodology, this would involve a case study approach. In this respect, the involvement of the department ‘corporate communications’ could be investigated in further detail since it is assumed that this department plays a major role in the decision about what internal sustainability information is published externally.

A major limitation of this master thesis was a sample size of only five companies from the logistics industry. In order to arrive at more reliable conclusions in general terms, it is suggested that future research should focus on a larger amount of companies.

Lastly, the authors suggest to conduct a country-specific study in order to reveal cultural influences on sustainability reporting.

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