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Article (Draft)

Original Citation:

Oberhofer, Peter and Dieplinger, Maria (2013) Environmental Management in the Transport and Logistics Sector: Findings from a Qualitative Study. *Business Strategy and the Environment*. ISSN 1099-0836

This version is available at: <http://epub.wu.ac.at/4028/>

Available in ePub^{WU}: November 2013

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Environmental Management in the Transport and Logistics Sector: Findings from a Qualitative Study

Keywords: environmental management, sustainability, transport and logistics sector, sustainable supply chain, Austria

1. Introduction

Sustainability has increasingly become a central focus of business in times where most societies are aware of the critical influence of industry on both the environment and human health. It is not only policy makers that demand pro-active performance from companies, but also various members within their supply chains who expect their business partners to reduce their negative impact on the environment and society. Furthermore, customers are becoming more and more conscious of environmentally-friendly and ethically-produced products and services. Companies, of course, are aware of this development and not only regard it as an opportunity for new markets and ways to distinguish themselves from the competition, but have also started to sense opportunities to improve their businesses' efficiency and effectiveness by means of sustainable measures. As they operate in a very competitive environment, firms are often forced to base their business behaviour, including decisions on sustainability issues, on economic factors. The road freight transport sector in particular is characterised by high competition and price sensitivity.

Transport, in particular on the road, is one of the greatest sources of CO₂ emissions. However, it is still unclear how the need, willingness and ability for environmental improvement are regarded in the transport sector. Austria offers an optimal framework for our research as the country is an integral part of the European Union, with its highly comparable legislation, a well-developed logistics network and environmental performance above the European average.

The aim of this paper is to analyse and evaluate the current situation of environmental management in the Austrian transport and logistics sector. We discuss the role of profitability, as well as other influencing factors. Moreover, we aim to identify the specific characteristics of the transport and logistics sector with regard to environmental protection. The study was based on multiple data sources by combining primary interview data and secondary data in a case-based approach.

The rest of this paper is organised as follows. Section 2 is a literature review of the research topic. Section 3 presents the methodological approach and data. In Section 4 we analyse the case studies and show findings. Finally, Section 5 discusses the findings and concluding remarks are given.

2. Literature Review

Sustainability

A widespread definition of sustainability was developed by the UN Brundtland Commission in 1987, which determined sustainable development as “[...] development that meets the needs of the present without compromising the ability of future generations to meet their own needs.” (United Nations, 1987). Starik and Rands specified the meaning further and reshaped the definition of sustainability to be “[...] the ability of one or more entities, either individually or collectively, to exist and flourish (either unchanged or in evolved terms) for lengthy timeframes, in such a manner that the existence and flourishing of other collectivities of entities is permitted at related levels and in related systems.” (Starik and Rands, 1995). In recent years, business and management literature has focused increasingly on the integration of social, environmental and economic responsibilities as a definition of sustainability. This is

broadly known as the triple-bottom-line approach and suggests a balanced interplay of the company's concerns. At their intersection, it is assumed that their activities not only positively affect the ecological or social environment but also result in economic benefits (Elkington, 1998, Elkington, 2004).

Not long ago, sustainability and corporate social responsibility was viewed as a way to improve a company's reputation and distinguish it from the competition – a branding tool. Today, however, it goes beyond branding. Sustainable actions have become a value-adding tool for companies by improving efficiency and saving costs (Semchi-Levi, 2010).

Environmental Management

The term “environmental management” (EM) refers to the environment-orientated management of a company (Müller-Christ, 2001). It involves all activities and decisions necessary to minimise the environmental pollution caused by the company (Baumann et al., 2005). At first, environmental management was hardly more than complying with the relevant rules and regulations, although it was later suggested that win-win situations (for the company on one side and the environment on the other) were possible (Walley and Whitehead, 1994).

Factors that influence the implementation of EM

The reasons for implement environmental management are widespread. The degree of environmental management implementation in a company can be described as a function of general, external and internal influencing factors (Fürst and Oberhofer, 2011, Wittstruck and Teuteberg, 2012).

General factors include firm size (Aragón-Correa, 1998, Brammer et al., 2011, Dahlmann et al., 2008, Hillary, 2004) and sector affiliation. Industries that include a high amount of unsustainable processes, such as the transport sector (European Environmental Agency, 2000) show a greater need to improve their sustainable and environmental behaviour (Roth and Kaberger, 2002). Moreover, the degree of market competition can influence environmental performance (Fürst and Oberhofer, 2012).

External parameters comprise regulations and stakeholder interests (i.e. the requirements of the society and the business' customers) (Alniacik et al., 2011, Gunningham et al., 2004). The environmental visibility of a firm often reflects the amount of pressure it experiences (Bowen, 2000). Additionally, the position in the supply chain can be a decisive factor. Companies with end-consumer contact act particularly sustainably and encourage suppliers to improve their environmental performance (Handfield et al., 1997, Walker et al., 2008). Finally, other companies in the supply chain, parent companies or NGOs can influence the environmental behaviour of a company (Delmas and Toffel, 2004).

In contrast, internal factors cover the decision-makers' attitudes (Ajzen, 1991, Ajzen, 2005, Fishbein and Ajzen, 1975, Fürst et al., 2011, Plaza-Úbeda et al., 2009, Sweet et al., 2003, Winn et al., 2012) and profitability. The profitability of environmental measures appears to be decisive as companies in competitive landscapes have to orient themselves towards profit maximisation (Hahn et al., 2012). Regrettably, costs and benefits in the context of environmental management are not easily quantifiable, which, however, should not lead to the conclusion that they do not exist. In fact, benefits will depend significantly on the company's environmental efficiency (Alberti et al., 2000). Consequently, a surplus can be generated through the realisation of opportunities for increased revenues and reduced costs (Ambec and

Lanoie, 2008). Boiral et al. (2011) showed that firms committed to environmental protection tend to record a better financial performance than other firms.

These factors influence the degree of implementation of environmental management, which has consequences on the company's overall and environmental performance, profit and thus (effective) sustainability. Note that at this stage, we define sustainability in a broad sense – including social, ecological and economic aspects – aiming at a viable integration of a company in the long run.

EM in the Transport and Logistics Sector

CO₂ can be defined as the most serious producer of greenhouse gas emissions (IPCC, 2007). Transport, in turn, is one of the greatest sources of CO₂. According to Eurostat, transport is responsible for 24% of the European CO₂ emissions, with Road Transport amounting to, on average, some 77% of all national inland transport in the EU-27 countries (Eurostat, 2011). As the transport sector involves numerous unsustainable industrial processes, it is necessary to bring the sector in line with sustainability criteria (Roth and Kaberger, 2002). However, it is still unclear how much need, willingness and ability for environmental improvement there is in the transport sector (Thornton et al., 2008).

Austria as research infrastructure

Austria offers optimal infrastructure for research as the country is an integral part of the European Union, with its highly comparable legislation and the Common Market. The World Bank rates Austria as a high-income country (World Bank, 2010). A logistic indicator of 3.89 also indicates a highly developed logistic infrastructure (World Bank, 2012). As a consequence of its central location in Europe, Austria has to take the burden of frequent transit transport (north–south and east–west) (Giorgi and Schmidt, 2005, Skjoett-Larsen, 2000). Nevertheless, in a European comparison, Austria is one of the most environmentally-friendly countries with CO₂ emissions clearly below the European average (World Bank, 2010). The Austrian transport sector is mainly dominated by small transport companies (by total numbers of companies), however regarding numbers of employees there are no significant differences between small and large companies (Statistik Austria, 2009). It is characterised by high competition and price sensitivity (Kummer et al., 2011, Kummer et al., 2009).

Hypotheses

On the basis of the findings from the literature review we hypothesise that

- among the various factors that influence the implementation of environmental management, the economic factor (profitability) is the most important for transport and logistics companies
- specific sector characteristics inhibit transport and logistics companies' behavior in terms of environmental protection

3. Method and Data

A case-based approach using multiple field studies and personal interviews to identify and evaluate environmental practices of transport companies, and to discuss the role of profitability among all influencing factors, was chosen.

Yin states that case studies can be exploratory, descriptive or explanatory. Because there is little evidence of tangible environmental practices in the transport and logistics sector and their impact on business performance, this study is both exploratory and explanatory in its nature. Furthermore, the case study approach is the best to capture the richness of individual settings (here: individual companies) that are too complex to be explored through survey or experiments (Yin, 2002). The case study approach with multiple cases is common in purchasing and supply management research (Dubois and Araujo, 2007). Personal interviews allow in-depth insights into decision-making processes and backgrounds. The fact that costs and economic consequences are sensitive topics for a company supports the choice of a qualitative approach.

In our research design, we followed Yin, who suggests defining five components for case study design (study questions, study propositions, unit of analysis, logic linking between data and propositions, criteria for interpreting findings). In order to achieve higher data validity and reliability, our study was based on multiple data sources by combining primary interview data and secondary data (Yin, 2002), such as company reports and information about sustainable strategies from corporate websites. In addition to a “within case analysis”, a cross-case study should further enhance validity (Yin, 2002). Yin (2002) argues that, in general, 6 to 10 cases provide evidence about supporting or rejecting hypotheses, while Eisenhardt (1989) recommends 4 to 10. Accordingly, our selection of six cases falls within these recommendations.

The primary data collection was carried out through semi-structured interviews. Based on findings of the theoretical approach an interview protocol was created.

[Insert Table 1]

An important step in case study research is sample selecting. This decision depends on the setting, people and social processes (Miles and Huberman, 1994). We targeted large Austrian transport and logistics companies that state they have implemented environmental management on their webpage. As a next step, an expert (e.g. sustainability director or environmental manager) from each company was identified and informed about the research project by phone. In order to for them to be prepared, the protocol was sent to the respondents in advance. The interviews were conducted in late 2011 and early 2012. They lasted between 45 and 90 minutes and were executed personally or by phone. They were recorded and completely transcribed into written text. Additional follow-up questions were sent by email in order to clarify the contents of the interview.

The data of each case study was analysed individually by company and using a cross-case analysis. As there is no standard format for case study analysis, the researcher has to choose from a selection of approaches (Eisenhardt, 1989). For organising the single case analysis we followed Yin’s (2002) “Relying on theoretical proposition”-strategy and designed the case analysis based on the reviews of the literature and our hypotheses accordingly. This involved a pattern-matching technique that compares empirically-based patterns with predicted ones (Yin, 2002).

For the cross-case analysis, we followed Eisenhardt's (1989) tactic of selecting groups of cases and listed the similarities and differences of each group. In a final step, the groups were evaluated in terms of their environmental behaviour and attitude. Due to its qualitative nature, this was based on argumentative interpretations (and not numeric tallies) (Yin, 2002).

4. Case Study Analysis and Findings

The "within-case" analysis was performed according to the following structure:

- Basic company description and development of environmental management
- Evaluation of different influencing factors: the role of the economical factor compared to other factors (regulations, stakeholder requests etc.)
- Illustration of specific examples of environmental measures and their effects on the business and environmental performance
- Problems and outlook

Company A

Company A, an internationally operating firm, is one of the leading providers of integrated transport and logistics services. Its core businesses are road, air and sea freight as well as comprehensive logistics solutions and global supply chain management from a single source.

Environmental management is of special significance for the company and has been integrated into its corporate identity for more than 20 years. Environmental activities are strongly supported by the Board of Directors, resulting in the stable and successful development of EM and a positive reputation in the long run. In consequence, the environmental activities of company A are regarded as pioneering projects in the transport and logistics sector. As a result of their environmental commitment, they have been able to observe monitor increased numbers of both customer inquiries and employee applications. Furthermore, they support various research projects on climate-neutral road and rail transport.

Profitability is the main argument for being sustainable. For cost-intensive and strategically important EM projects, the regular amortisation time can be exceeded. Nevertheless, regulations are also regarded as essential. These motivate Company A to invest in innovative measures, resulting in increased competitiveness in the long run.

Company A aims at reducing CO₂ by 20% by 2020 in Austria and South Eastern Europe. Accordingly, a number of measures have been implemented (see table 2):

[Insert Table 2]

Besides integrating sustainability into the company, they also aim at influencing their customers in being and thinking in a more environmentally friendly manner as they are mainly responsible for an eco-progressive supply chain.

Company B

Company B is a family-owned, world-wide operating freight forwarding company in Austria. Its core businesses are land transport, air and sea freight and logistics solutions. Initiated by customer requests in 2003 first steps towards environmental protection have been made. Since

then, the Board of Directors have been taken responsibility for sustainable issues. In 2007 sustainability was officially incorporated into the corporate identity. Integrated into the mission statement they aim at significantly reducing the company's resource consumption in order to take responsibility and be competitive in the long-run.

Profitability is by far the most important factor in terms of the implementation of environmental management decisions. Therefore, only measures that promise to be profitable in the long run are realised. Regulations (e.g. truck tolls or petroleum taxes) are regarded as essential and are commonly accepted. They will be tightened in the upcoming years.

Company B supports environmental protection in the fields of emissions, transport and logistics, energy and recycling. Detailed information is presented in table 3.

[Insert Table 3]

Although environmental management is regarded as very important, it does not reflect the core competence of company B. Nevertheless, demands for environmental protection from customers are increasing, resulting in pressure and complications as they are often not willing to pay for this additional value. As they are oriented towards profit maximisation, some projects for ecologically effective measures had to be rejected after an evaluation of the economics involved.

Company C

Company C is a former state-owned logistics service provider operating mainly in south-east Europe. Spinning off some years ago, they find themselves in a challenging period of transition adjusting the company to the framework of a free-market system. Although responsibility for the environment is listed in their mission statement, sustainability appears to be of minor concern at a time where they face a loss-making situation.

Nevertheless, an "environmental programme" was initiated four years ago, resulting in a number of supporting measures, though the economical factor was the exclusively decisive argument. Regulations are regarded as very important for improving the overall environmental situation. In the recent past, only some customer requests were monitored. However, they have been increased recently. According to company C the only determining argument for product offering and tenders is still the price.

Environmental measures are concentrated on two main areas: shifting transports from the road to the railway (for which company C is the market leader in Austria) and improving employee behaviour.

[Insert Table 4]

C's main problem concerning the implementation of environmental measures is the heterogeneity of the business group. Reaching a decision for the realization of projects is often an interminable process, especially in times where they face a difficult economic situation. Another basic problem is seen in the difficulty of measuring costs and benefits of environmental measures.

Company D

Company D is a globally operating family-owned company specialised in sea and air freight, trucking and warehousing. Sustainable aspects have been partly integrated into its corporate identity since 2008. Specific long-term goals are not defined.

Performance improvement that will result in cost benefits is the exclusive pivotal argument for integrating environmental measures. Additionally, a positive reputation is also a decisive factor for implementing environmentally friendly measures. Regulations are regarded as important and suitable for improving the overall environmental situation in the transport sector. Solution and products are aligned with specific customer requests.

Environmental protection measures supported by the company comprise emission reduction, conservation of energy and natural resources as well as staff motivation.

[Insert Table 5]

A major obstacle to realising a holistic environmental system is its cooperation with companies from countries where the development of environmental awareness is still immature. Furthermore, the difficulty of measuring costs and benefits has proved to be particularly problematic.

Company E

Company E is a family-owned freight forward company with 16 sites in Austria and CEE. The company is specialised in offering “innovative logistics solutions for specific sectors” and operates in various niche markets. Sustainability was integrated in the corporate identity rather late (2009), mainly as a consequence of a generation change of the management level. The Board of Directors strongly supports the sustainable orientation. One of the main goals of company C for the upcoming years is to incorporate principles of sustainable development and eco-efficiency into their business strategies in the long run.

Profitability plays a major role for implementing environmental measures. As a result, Company E exclusively implements profitable measures. Customer requests are a driving force as they demand environmentally friendly transport solutions. They participate in the creative processes of innovative solutions. The sustainable attitude is also increasingly transferred into tender offers. A decisive but necessary factor is the regulatory framework.

The environmental activities of company E are integrated into the fields of energy, emissions, transport, employees and waste reduction.

[Insert Table 6]

Company F

Company F is a globally operating, family-owned company specialised in transportation (sea, air and European road transportation), warehousing and integrated logistics solutions. Strongly supported by the CEO, the approach towards sustainable thinking was initiated in

2007. Since then, its importance has been increasing steadily, leading to the first publication of a Corporate Sustainability Report in 2010.

The economic aspect is the pivotal argument for integrating environmental measures. However, they differ from other companies by refusing to define concrete goals, instead considering environmental aspects for every investment decision. Additionally, the company's positive reputation is seen as equally important for implementing environmentally-friendly measures as they feel there is growing demand from its various stakeholders. Regulations are regarded as important as they are suitable for improving the overall environmental situation of the transport and logistics sector.

Environmental protection measures supported by the company comprise emission reduction, conservation of energy and natural resources as well as staff motivation.

[Insert Table 7]

Additionally, a number of environmentally-friendly measures are to be realised in the upcoming years (e.g. the construction of a low energy warehouse and the implementation of corporate Environmental Management System in all countries and subsidiaries until 2013).

The main obstacle to realising a holistic environmental system is the firm's cooperation with companies from countries where the development of environmental awareness is still immature. Furthermore, the difficulty of measuring costs and benefits has proved to be particularly problematic.

Summary of Cases

The following table illustrates an overview over key findings of the six case studies:

[Insert Table 8]

Cross case analysis

In order to compare single cases with each other we conducted a cross case analysis. To do this, we selected two groups of cases and listed the similarities and differences of each group. The groups were then evaluated in terms of their environmental behaviour and attitude.

- Group 1: "environmentally progressive transport and logistics companies" comprising companies A, B
- Group 2: "environmentally backward transport companies" comprising companies C, D, E, F

The companies were assigned to the group of "environmentally progressive" and "environmentally backward" companies according their overall environmental performance from the single case analysis. Company A and B clearly belong to the group of environmentally-friendly transport and logistics companies. They have had a holistic environmental orientation since many years. They have integrated a broad range of environmentally friendly measures covering several corporate fields. By comparing company size and turnover of both companies, it becomes clear that an environmental orientation is not necessarily correlated with size. Although company B is considerably smaller (regarding

employee number and turnover), its environmental performance appears to be progressive. Both companies started to respond to customer demand early and regard environmental protection as an important way of being competitive in the long run. As a result, sustainability has become a key component of their corporate identity.

The second group comprises those companies which appear to lag behind in terms of environmental protection activity. However, they can again be subdivided into environmentally “stagnated” and “ambitious” companies. Company C and D are stagnating somewhat as – considering their size (employee number and turnover) – environmental activity appears to be poor (e.g. number of measures or projects, unsatisfactory quality of sustainability reports). Furthermore, a long-term ambition to move towards increased protection of the environment is absent.

On the other hand, we could identify Companies E and F as very ambitious concerning their environmental behaviour. Although being – compared to the other companies analysed – relatively small (in terms of employees and turnover), they recently initiated their first steps towards a holistically orientated environmental management. This is strongly supported by their management boards and is closely related to customer and partner requests. Due to their limited resources they are not able to realise a broad range and large number of projects at once; however, they have introduced a strategic orientation that is based on a long-term perspective. Both recently published their first sustainability report.

5. Discussion

In this paper, we analysed the status quo of environmental management by looking at large companies in the Austrian transport and logistics sector, focusing on the importance of economic impacts on implementation. Moreover, we aimed to identify the specific characteristics of the transport and logistics sector relating to environmental protection.

In the review of the literature, we showed that environmental management can be seen as a function of various factors that influence the implementation of environmental measures. Those factors comprise firm size, sector affiliation, decision makers’ attitude, profitability, stakeholders and regulations. Following Carter and Rogers (2008) we could confirm that for all the companies analysed, the economic factor is *the* decisive factor. However, requests from various stakeholders (e.g. customers) are also seen as important. Moreover, regulations are regarded as essential to improve the overall environmental situation of the whole sector.

Findings from the multiple case study approach show that, in general, the awareness for the importance of sustainability is strong. However, significant differences between the companies analysed could be found. We were able to identify the very progressive firms with a strong environmental performance. These could serve as benchmarks in terms of the environmental behaviour of transport and logistics companies. The majority of companies analysed, though, appear to lag behind in their environmental behaviour. We found two companies with an ambitious orientation. The other companies were labelled as “stagnating” as their environmental behaviour appeared to be backward and no steps have been taken to change this situation.

Given the empirical nature of our study, it is necessary to highlight some limitations. First, we examined two industries, and thus generalisability is limited. Second, data was only collected from one (or two) source(s) inside the company: the environmental manager. Although this specific group of respondent is the most knowledgeable for our type of questions, it can cause problems of method variance. Third, the implementation of a greater range of environmental practices was the main criterion used to choose the respondents. This might lead to a bias in

responses and ultimately affect the results. Expert bias also limited the results since personal judgment might influence outcomes. Furthermore, despite the assurance of anonymity, respondents might be trying to protect the companies' reputation. Moreover, we clearly put a focus on large and very large companies and their environmental behaviour. As consequence, small firms were not in the focus of our project. However, due to their size their driving performance is limited and so is their environmental impact.

6. Conclusions

Although transport is regarded as one of the most serious causes of pollution due to its high CO₂ emissions (IPCC, 2007, OECD, 2010), many companies in the transport and logistics sector seem to lack environmental measures. As a result of our study, we can explain this 'mismatch' with two main reasons. First, the position of the company in the supply chain influences its environmental behaviour (Handfield et al., 1997, Walker et al., 2008). Companies with a direct contact to end-users have faced strong demands for many years. Consequently, they started to evaluate, implement and communicate sustainable behaviour a long time ago. However, transport companies seldom face this direct end-user contact. They mainly realised recently that sustainable performance does not always equal a 'necessary evil' but can result in an added value in the long run (Semchi-Levi, 2010).

Secondly, the general structure of the transport sector (not only in Austria) does not provide a framework that supports being extremely environmentally sustainable. The sector is dominated by small and middle-sized firms (Statistik Austria, 2011) that often lack the resources (financial capital, know-how, time, etc.) to address sustainability challenges. In addition, the sector is characterised by immense pricing pressure and small margins (Kummer et al., 2011, Kummer et al., 2009) resulting, as well as in a high number of bankruptcies (KSV1870, 2009), in a financial inability to invest in fields that do not reflect the transport companies' core business.

However, some companies show progressive and ambitious performance. One reason for this improved environmental behaviour might be the realisation of the importance of being energy efficient in the long run and being able to strengthen their competitiveness by adding value to products. Another approach to explain this development concentrates on the development of strategic supply chain management of powerful enterprises. Operating in a competitive environment and being exposed to social pressure, many large companies (of different sectors) have become very sensitive towards any kind of inadequacy in their supply chain that might endanger negative association with their brand. As a result, they have started to use their influence with both upstream suppliers and downstream partners to improve their sustainable performance and prevent the whole supply chain from being accused of not responding. Consequently, supplier management has also grown in importance and sustainable aspects are increasingly present in tender offers. This development is very likely to have affected the sustainable performance of transport companies that play an important role in supply chains as they act as 'ties' between various players.

There are effective ways to raise the overall sustainable performance of transport companies. Executing planned route optimisation, bundling movements or investing in efficient warehouses are examples that would enable transport companies to improve their ecological and economic performance in the long run.

Of course, it is necessary for politics to provide a market framework that encourage transport companies to improve their environmental performance. Nevertheless, it is impossible to ignore the need to be competitive. By supporting companies with financial aid (e.g. through

tax abatement or subsidies) an improvement can be initiated. As small and middle-sized firms dominate the sector and act as a backbone of many national economies, they have to be supported in strengthening their sustainable performance in order to stay competitive in the long run. As a first step, it is the duty of superior associations like the economic chambers to raise attention and spread know-how. Smaller firms could profit from synergy effects by pooling of movements. Furthermore, the possibilities of successful examples of environmental measures have to be communicated.

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Tables

Development corporate environmental management	
Q1	How did environmental management historically develop in your company?
	Evaluation of various factors of influence
Q2	How does profitability affect environmental management decisions?
Q3	How do regulations affect environmental behaviour?
Q4	How do stakeholders (society, customers, partner companies, etc.) affect my environmental behaviour?
Illustration of specific environmental measures	
Q5	Which specific measures had a positive impact on the overall business performance? Please specify with “costs and benefits”.
Problems and outlook	
Q6	Did any problems arise during the implementation of EM measures?
Q7	Which specific measures would you predict to have the highest potential?

Table 1: Layout of interview protocol

Transport and logistics	Energy-efficient vehicles	<ul style="list-style-type: none"> • 3 “natural gas” vehicles • Higher investment costs are accepted • 1.1m t CO₂ reduction/year
	Green Product Rail	<ul style="list-style-type: none"> • Use 3,000 block rails • Reduction of CO₂ emissions by around 75%
	Calculating tool	<ul style="list-style-type: none"> • Free-of-charge online tool for calculating environ. balance of global supply chains across all modes of transport • Co-operation with renowned German research institutes
	Driving training	<ul style="list-style-type: none"> • Training of 20,000 drivers (incl. drivers from subcontractors) • Monitoring of effects through on-board units
Energy	Chopped goods combustion facility	<ul style="list-style-type: none"> • Opened 2010 in Vienna • Investment costs: €700,000 • Replaces the old oil-heating system • Saving of 187 tons of CO₂/year
	Gas heating system	<ul style="list-style-type: none"> • Replaced an oil heating system at one site • Saving of 38,000 litres of heating oil/year energy
	Molecular vaporiser	<ul style="list-style-type: none"> • Integrated into a gas heating system • Reduction of gas consumption by 7.83%/year (=25,100 KWh/year)
	On-site optimisation	<ul style="list-style-type: none"> • e.g. energy efficient lamps, motion sensors & timers, reduction of stand-by-time of electronic devices

Table 2: Environmental Measures of Company A

Emission reduction	Climate-neutral logistics hall	<ul style="list-style-type: none"> • Replacement of metal panels, usage of energy-friendly heating pumps & renewable electricity • Saving of 90 tons of CO₂/year
	Multi-modal transport	<ul style="list-style-type: none"> • Cooperation with other companies • Promotion of railroad transport • Saving of 9,000 tons of CO₂/year (= 15,000 truck movements or 1.1m. kilometres on the motorway & 400,000 litres of diesel fuel) • Customers use such projects as reputation
Transport and logistics	Transport Bundling	<ul style="list-style-type: none"> • Bundling transport movements with other countries • Optimisation of capacity utilisation • saving of 900 km road transport/year
	Routing software	<ul style="list-style-type: none"> • Optimisation of transport • Reduction of 410 tonnes CO₂/year
	Mobile Data Terminals	<ul style="list-style-type: none"> • Optimisation of order management • Saving of 15,000 paper-printed documents/day
	Driving training	<ul style="list-style-type: none"> • Optimisation of road behaviour
Energy	Wind power station	<ul style="list-style-type: none"> • Opened 2011 in Northern Germany • Investment costs: €15 Million • Underlines the goal of using exclusively green energy in the long run
	Photovoltaic system	<ul style="list-style-type: none"> • Investment costs: 4m . • Introduced at one German site • Energy savings of 134,000 KWh/year. • Plans to transfer to Austrian sites
Recycling	Waste reduction system	<ul style="list-style-type: none"> • Co-operation with external specialist • Reduction of waste by 24%

Table 3: Environmental Measures of Company B

Transport and logistics	Modernisation of vehicle fleet	<ul style="list-style-type: none"> • EURO class 5 • Implementation of synthetic brake pads for noise reduction (planned for 2012/2013)
	Shift from road to rail	<ul style="list-style-type: none"> • Planned investment volume: 400m Euros
	Driving training	<ul style="list-style-type: none"> • Optimisation of road behaviour
Energy	Hydropower of railway energy	<ul style="list-style-type: none"> • 83% of the total amount of energy consumption
	Stand-by time reduction	<ul style="list-style-type: none"> • At working stations • calculated saving of €50,000 – 100,000

Table 4: Environmental Measures of Company C

Emissions	Transport Carbon Calculator	<ul style="list-style-type: none"> • Calculator for customers' carbon footprint for whole Supply Chain • Standardised methodology
	Facility Carbon Calculator	<ul style="list-style-type: none"> • Tool to prioritise actions to reduce resource pollution • Implemented in over 400 sites • Reduction of energy and fuel consumption by 2.6% (40,316 kWh)/year • Reduction of water consumption by 12.3 Mio l/year • Reduction of waste production by 25.7% (56,841 t)/year • Reduction of CO₂ emissions by 2.8% (13,116 t)/year
Transport and logistics	Green Facility	<ul style="list-style-type: none"> • Pioneer project • Includes a photovoltaic array, central wood-burning heating system fed with wood chips, warm water generation by solar energy, innovative ventilation system instead of air conditioning, efficient illuminating system, rain water harvesting • Energy savings of over 1m kWh/year and CO₂ reduction of 1000 t/year
	Driving training	<ul style="list-style-type: none"> • Reduction of fuel consumption by 5,500 litre/year
	Shift from road to rail	<ul style="list-style-type: none"> • Savings of 11,000 tons of CO₂/year
Employee behaviour	On-site optimisation	<ul style="list-style-type: none"> • Motion activated lighting, stand-by time reduction, energy efficient bulbs • Employee environmental champion award

Table 5: Environmental Measures of Company D

Transport and logistics	Use of biofuel for vehicles	<ul style="list-style-type: none"> • 10% share of biofuel on total fuel consumptions • Investment volume: €267,000 (since 2009)
	Railway siding	<ul style="list-style-type: none"> • At all strategically important sites • Promotion of rail transport
	Driving training	<ul style="list-style-type: none"> • Optimisation of road behaviour • Saving of 475,000 l fuel/year • Saving of 1,250 t CO₂/year
Various environmentally friendly initiatives	On-site optimisation	<ul style="list-style-type: none"> • Motion sensors and timers • Water recycling

Table 6: Environmental Measures of Company E

Transport and logistics	Fuel efficiency training for employee	<ul style="list-style-type: none"> • Company cars and private cars • Reduction of CO₂ by 55.8 tonnes/year (- 23%) • Savings of 5,500 l fuel
	Shift from road to rail	<ul style="list-style-type: none"> • For one specific destination (Vienna – Rotterdam) • Avoidance of 7,500 t of CO₂ emissions (-70 %)
	Environmentally-friendly company cars	<ul style="list-style-type: none"> • Biogas vehicles and 1 electro car • Savings of 14.8 t of CO₂/year + NoX reduction • Development of a procurement guideline for environmentally friendly company cars
Energy	Free cooling	<ul style="list-style-type: none"> • Investment costs of €17,000 • Calculated amortisation time of 4 years • Savings of 38,000 kWh/year • Reduction of CO₂ emission of 8.5 t/year
	Swap of low temperature boiler with forced air burner for a natural gas calorific value boiler	<ul style="list-style-type: none"> • Investment costs of €15,000 • Calculated amortisation time of 10 years • Savings of 9 t of CO₂ emission/year
Employee behaviour	Controlled light regulation	<ul style="list-style-type: none"> • Reduction of CO₂ of 1.7 t/year (- 31.3%)

Table 7: Environmental Measures of Company F

	Key figures (worldwide)	Integration of sustainability/EM	Influencing Factors		
			Profitability	Regulations	Customers
A	<ul style="list-style-type: none"> Transport and logistics service provider (road, air, sea, specialized logistics solutions) Globally operating 90.000 employees Turnover 2010: 18.9 Mrd. Euro 	<ul style="list-style-type: none"> Board strongly supports sustainability Incorporated into CI Sustainability has been part of corporate culture since 1990s → pioneers of EM in transport & logistics sector 	<ul style="list-style-type: none"> Central decision criteria Long-term perspective Exceptions for cost intensive EM projects → regular amortisation time can be expanded 	<ul style="list-style-type: none"> Regarded as essential Basis for motivation and acceleration of innovative corporate measures 	<ul style="list-style-type: none"> Important influence Increasing environment related requests
B	<ul style="list-style-type: none"> Freight forwarding company specialised in road, rail, air, sea transport and logistics services (family owned) Globally operating 5,000 employees Turnover 2010: €1 bn 	<ul style="list-style-type: none"> Board has taken responsibility since 2003 Incorporated into CI since 2007 Sustainability as one “pillar” of the corporate culture 	<ul style="list-style-type: none"> Exclusive decision criteria EM projects must be expected to be profitable in the long run Exceptions for central EM projects that at least promise not to bring negative economic results 	<ul style="list-style-type: none"> Commonly accepted Regarded as essential for overall environ. protection in the sector Will be tightened 	<ul style="list-style-type: none"> Initiation of environmental protection Increases customer inquiry; however, no willingness for payment of additional value Strong stakeholder impact in general
C	<ul style="list-style-type: none"> Logistic service provider (formally state owned) Focus on Austria plus Central-and South-Eastern Europe 11,000 employees Turnover 2010: €2.2 bn 	<ul style="list-style-type: none"> Of minor concern due to difficult economic situation Listed in mission statement Ambitions towards sustainable employee behaviour 	<ul style="list-style-type: none"> Central decision criteria No exceptions for non-profitable projects 	<ul style="list-style-type: none"> Regarded as very important Suitable for improving the overall environmental situation 	<ul style="list-style-type: none"> In recent past, only little customer requests were monitored Increasing inquiries lately
D	<ul style="list-style-type: none"> Specialised in sea and air freight, trucking and warehousing, integrated logistics solutions (family owned) Globally operating 63,000 employees Turnover 2010: €16bn 	<ul style="list-style-type: none"> Board takes responsibility Partly integrated into mission statement since 2008 	<ul style="list-style-type: none"> Exclusively decisive decision criteria Positive reputation also a decisive factor 	<ul style="list-style-type: none"> Regarded as important Not hindering Suitable for improving the overall environmental situation in the transport 	<ul style="list-style-type: none"> Important Solutions/product offers are aligned with customer requests
E	<ul style="list-style-type: none"> Freight forward company (family-owned) Focus on Western Europe and CEE 500 employees Turnover 2010: €174bn 	<ul style="list-style-type: none"> Board is driving force Integrated into CI rather lately (first sustainability report in 2011) Ambitious sustainability strategy Holistic concept → Strong integration of employees 	<ul style="list-style-type: none"> A major role Long-term perspective Only profitable measures are implemented 	<ul style="list-style-type: none"> Regarded as a decisive and necessary factor 	<ul style="list-style-type: none"> Driving force Integration into the creation of innovative sustainable solution
F	<ul style="list-style-type: none"> Specialised in transportation and integrated logistics(family owned) Globally operating 2,300 employees Turnover 2010: €500m 	<ul style="list-style-type: none"> Board supports sustainability approaches Foundation of “Environmental association” in 2007, ISO 14001 certification in 2008/09 Listed in mission statement, integration of employees (first 	<ul style="list-style-type: none"> Central decision criteria No definition of specific environmental goals, however, environmental aspects are considered in every investment 	<ul style="list-style-type: none"> Regarded as important and essential for overall improvement of the transport and logistics sector 	<ul style="list-style-type: none"> Decisive role Customer service and customer compound are regarded as core processes Support of customers in individual emissions calculation

		sustainability report in 2010)			
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Table 8: Summary of cases