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**Sustainable Logistics in Germany's SMEs**

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## Thesis abstract

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The term "sustainability" is not new. A report by the "Club of Rome" on the topic of the limits of growth was released forty years ago. Sustainability corresponds well with the current spirit of the time.

Only the urgency of prompt action seems not to have transpired into all states, governments, business leaders and consumers. Knowledge for multiple solutions for sustainable problems is already available. The global, practical and consistent implementation, however, is still relatively underdeveloped.

The transport and logistics industry cannot escape their responsibility for climate protection and social commitment. In the near future sustainability aspects significantly influence the competitiveness of logistics enterprises, as customers are increasingly demanding transparency and disclosure

The aim of this paper was to research the current situation of sustainable development in Logistics in SMEs in Germany and possible deficits which should be worked on and overcome to ensure sustainable implementations in Germanys companies.

Keywords: Sustainability and Logistics

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## Abbreviations

<b>BDI</b>	Bundesverband der Deutschen Industrie e.V.
<b>CC</b>	Corporate Citizenship
<b>CG</b>	Corporate Governance
<b>CSR</b>	Corporate Social Responsibility
<b>DSL</b>	"Deutscher Spediteur- und Logistikverband" in english: German freight forwarders and logistics association
<b>EU</b>	European Union
<b>e.V.</b>	"eingetragene Vereinigung" in english: registered association
<b>G8</b>	The Group of 8. A forum of the governments of eight of the world's largest national economies
<b>IfM</b>	"Institut für Mittelstandsforschung" in english: Institut for Small and Medium sized Business Research
<b>mt</b>	metric ton
<b>R&amp;D</b>	Research and Development
<b>SBA</b>	Small Business Act
<b>SME</b>	Small and Medium sized Enterprises

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# 1 INTRODUCTION

Although sustainability is not a new issue, it has gained in importance and public interest over the last decades.

This chapter will give an introduction to the issue of sustainability as well as the motivation behind the choice of this particular topic.

## 1.1 Research Purpose

There is mounting concern over the recent rise in man-made emissions which are changing the earth's climate. Logistics are at the heat of modern transport systems. It implies a degree of organization and control over freight movements that only modern technology could have brought into being. It has become one of the most important developments in the transportation industry and yet it is more than ever facing the task of developing appropriate strategies to ensure the measurability of resource efficiency and to demonstrate improvements in the effectiveness and efficiency of sustainability. These requirements can be summarized under the term sustainable logistics.

The overall purpose of this study is to examine the effect of sustainable logistics in a company. A closer look will be taken at strategies for sustainability, as well as a study of possible challenges sustainability faces in a company that hinder its implementation. We are also going to put emphasize on triggers that make companies change their logistics to be more sustainable in the future.

In the beginning of this thesis is a brief introduction to the sustainability theme, and theoretical foundation. Further on the thesis contains the detailed description of the study. Due to the small number of cases in the survey, no detailed statistical



analyses are possible, but there are trends seen how sustainability can be integrated into the business operations and it is pointed out.

## **1.2 Motivation**

The international debates about climate change and exhaustion of natural resources raise the environmental awareness of customers and demand for sustainable products and services. They are an essential impulse that environmental protection in businesses has stepped over the threshold of being a theoretical problem and become an economic challenge and opportunity. Since then, environmental-friendliness has become a significant management task in numerous companies worldwide. Small and medium sized enterprises (SMEs) are now facing the challenge of designing a more sustainable logistic division in their company, seeing that this department is in large responsible for the currently emitted environmental pollution.

The ongoing debate about climate change arouses in many customers the interest to seize the opportunity to influence. A large number of consumers in Germany are convinced that their consumer behavior has a major impact on environmental protection. Customers pay attention to the implementation of environmental standards, investors and media companies increasingly review their strategies based on climate and environmental change. Issues such as sustainability in the business environment become more and more the center interest. (Barr, Gilg & Shaw 2011, 712-720)

This paper focuses on the importance of sustainable logistics and the implementation of sustainable strategies in SMEs. Small businesses have great power and advantages over larger companies. Some are able to build a business on the platform of sustainability while others are more flexible to making the necessary changes.

### **1.3 Research Methods**

The methodology of this research is based on both qualitative and quantitative analysis. The quantitative research is by definition exploratory and in this thesis used to develop an initial understanding of the issue. In the following it will go deeper into the issue of interests and explore nuances related to the problem at hand.

The quantitative research is conclusive in its purpose as it tries to quantify the problem and understand how prevalent it is by looking for projectable results. The quantitative aspect of this thesis is based on the survey conducted.

## **2 SUSTAINABILITY AND LOGISTICS**

This chapter will give a brief description of all necessary theory related to the topic of sustainability in SMEs with a closer look at the logistics division in a company. While there are numerous theories targeting the improvement of business conduct, the theories mentioned in this chapter are chosen because they have a relevance to the questionnaire.

### **2.1 Sustainability**

Despite it being current and much debated subject, sustainability is not in principle an entirely new concept. Due to the manifold definitions, the German Freight Forwarders and Logistics Association (DSLV) had a study commissioned which investigates the question how logistics companies would define sustainability. As a result most companies came to the conclusion that "Green Logistics" includes measures to optimize utilization, bundling and route optimization to reduce traffic and transport emissions. (Lohre, Bernecker & Gotthardt 2011, 18)

This is the most opaque definition, being primarily aimed at the function of the carrier concentration, which is chiefly economically motivated. At the same time however, economic benefits arise from the environmental actions, which lead to a harmony between economic and environmental objectives. However, this "lean is green" understanding of the term for a "green logistics" may not be enough. Ecological efforts which go beyond that definition play an important role for many companies. (Ehrhart 2010, 56)

But still it is to be noted that the central purpose of business logistics companies is not in the environment, so that given a conflict of objectives between environmen-

tal and economic measures occurs, the latter will always take precedence. For the same reason green measures are already pursued for economic reasons. In this sense, Green logistics is here to be understood as a sustained and systematic process of collecting and reducing consumption of resources and emissions resulting from transport and logistics processes within and between companies. (Wittenbrink 2011, 149)

It is important to notice this difference between *sustainable logistics* and *green logistics*, another term frequently used in this context.

### 2.1.1 The Three Pillars of Sustainability

The concept is based on a conceptual understanding of ways to address economic, environmental and social problems whose mutual interaction is essential for sustainable approaches. From this idea arose the "Three Pillar Model". (Hansmann 2006, 167)

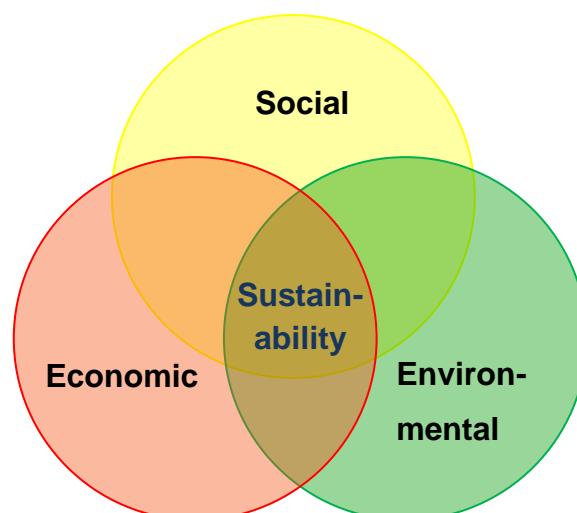


FIGURE 1. The Three Dimensions of Sustainability.

This model is a commonly used approach for the illustration of *sustainability*. The difference between "Green Logistics" and "Sustainable Logistics" lies in the fact that apart from the economic and the ecological, the social dimension is taken into account.

### **Economic Sustainability.**

The economic sustainability refers to the ability to remain competitive, ensuring the long-term survival of the company. Important goals can be the optimization of business processes, securing of know-how, assets and capital preservation for future generations and a balancing of individual and community interests. (Waniczek & Werderits 2006, 65)

### **Ecological Sustainability.**

The ecological dimension is of an added value. This contrasts with the ecological determinant, which is considered as eco-efficiency or "environmental damage". (Schaltegger & Dyllick 2002, 33) It can be interpreted as the "relationship between an economic and physical (environmental) size." (Schaltegger, Herzig, Kleiber, Klinke & Müller 2002, S.15)

The focus of the environmental pillar is the protection of the natural basis of life. This is achieved especially through the careful usage of natural resources. Applying this to the transport sector means in particular a cautious usage of the oil resources and a reduction of emissions and other external effects. (Schaltegger, Herzig, Kleiber, Klinke & Müller 2002, S.16-17)

## **Social Sustainability.**

Although the social dimension gets more and more attention in recent years, it is not yet as defined as the other two dimensions are. Social sciences defines social overhead capital as the existing social networks and values which further trust and cooperation in a society. Those qualities are essential for the cohesion of this society. The bigger the conflicts and tensions in the population are, the bigger is the impact on a nation's economy and economic development. (Hauff 2011, 19)

The social dimension of the 3-pillar model has several characteristics. First is the social integration of a social group or company. Next is the horizontal connection companies have with their stakeholders. Another characteristic is the relationship of the government with the citizen and the quality of governmental institutions. (Koplin 2006, 22; Hauff 2011, 19)

### **2.1.2 The Relationship Between the Three Dimensions**

A mere definition of the three terms does not give any information about their relationship to each other. In the relationship between ecological and economic capital it comes down to the purpose of successful economic activity within the limits of ecological systems. The target is to achieve a long-term balance for example by setting the assimilation limits of climate-damaging emissions.

In recent discussions, however, the role of the social capital gains attention in the area of conservation, accumulation and productivity for other types of capital, such as physical capital, natural capital and human capital. This can be illustrated by an example: clean air and clean water improve the human health and thus the productivity and human capital. But quality education also improves the society and boosts the availability of human capital.

That suggests that the synergies of two or more complementary types of capital, improve the quality of life. (Hauff 2011, 20)

## **2.2 What Will Force Us to Adapt**

### **2.2.1 Rising Energy Costs and Fuel Prices**

"In 2010, OECD countries accounted for 57 percent of the world's total demand for transportation fuels." (Conti 2013, 143) Airplanes, ships and trucks are depending on oil and will not soon get away from it. The rail traffic is so far the only one which is mostly powered by the electric grid and thus depending on various energy carriers, among others, renewable energy. But as 95% of all industrially manufactured products depend on oil, the logistics sector will compete with other sectors for the increasing scarcity of oil supply. (Bretzke & Barkawi 2012, 61)

The growth rate and thus the increasing demand for oil of "emerging market" like China and India, adds to the shortage of oil. Also, the increasing world population (estimates range from 9.1 to 11.7 billion people by 2050) will lead to an increasing demand for fossil fuels. Since 1980 the global demand for energy increases approximately in proportion to the growth of the population, which would mean that with a world population of 9 billion people in 2050 the energy required then would increase by almost 50% without changing the per capita requirement. (Quaschnig 2008, 92)

### **2.2.2 The Impact of Nature on the Economy**

Natural disasters as for example Fukushima in 2011 and the deep water horizon oil spill in 2010 show how tightly linked economy and environment are. Shortly after the catastrophe of Japan the prognoses proclaimed a major impact on the economy. Within days many companies closed their branches in that area and stock prices were in a full on free fall. Experts called this a case of "panic selling", and a number of them predicted that the world's economy would not be battered in the process. (Reuters 2011)

By now we know of the negative effects this catastrophe had on the market condition. Although this natural disaster was not caused by men, numerous others are the result of mankind meddling with nature. Hurricanes, floods and heat waves lead to loss of agriculture and forestry and have a major negative impact on the economy every year. (Podbregar, Schwanke & Frater 2009, 77)

### **2.2.3 Increasing transport infrastructure shortages**

The second factor "scarce transport infrastructure" has only indirect connections to issues of environmental protection. It is about cover nature with concrete to construct more roads, but especially the impact of increased emissions in traffic jams. Not only do they have an environmental aspect, but an economic one as well, because there are high losses in productivity and process uncertainties. Transports will become more expensive and slower, but also less dependable, which will in turn increase the costs again. A growing infrastructure means that it will be that much more difficult to adhere to the strict reduction of emissions. (Bretzke & Barkawi 2012, 67)

### **2.2.4 Growing Public Pressure**

Given the already proclaimed voluntary commitment of nations to rigorous goals of cutting emissions (Kyoto Protocol, the G8 summit in L'Aquila, EU decisions and directives) there can't be any doubt that politics will massively influence economic processes in the future. (Bretzke & Barkawi 2012, 77)

"Corporate responsibility" (CR) describes the responsibility of companies for the environment and stakeholders. According to the definition of the EU, CR is the "the responsibility of enterprises for their impacts on society and outlines what an enterprise should do to meet that responsibility" (European Commission 2011)



The state has very different fields of action and measures: from rigid prohibitions and commandments of pollutants quotas to price incentive systems, from subsidizing renewable energies to internalize external costs of transport through tolls or emission. Politicians are driven by voters whose awareness is growing as well as their knowledge. (Sinn 2008, 107)

### **2.3 SMEs**

"Micro, small and medium-sized enterprises (SMEs) are the engine of the European economy. They are an essential source of jobs, create entrepreneurial spirit and innovation in the EU and are thus crucial for fostering competitiveness and employment." (Verheugen 2006, 3)

In Europe SMEs accounted for 99.8 per cent of non-financial enterprises in 2012, which equates to 20.7 million businesses and provided 67.4 per cent of jobs in the non-financial business economy. (Wymenga, Spanikova, Barker, Konings & Canton 2012, 9)

But since we are going to focus on the SMEs in Germany, we are going to apply the German definition of SMEs instead of the European one, which uses smaller numbers. According to the definition of the (Institut für Mittelstandsforschung Bonn) IfM, small companies have up to 9 employees and an annual turnover of less than 1 million Euros. Middle sized companies have between 9 and 499 employees and an annual turnover of less than 50 million Euros.

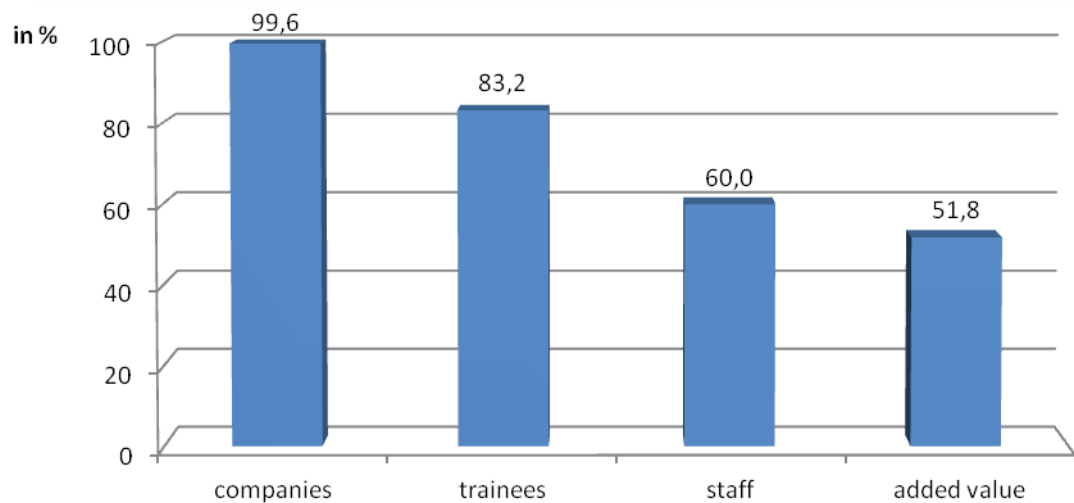


FIGURE 2. Success Factors of SMEs in Germany. (BMWi, 3-4)

These findings couldn't be more true for the SMEs in Germany, where more than 99% of all German firms are SMEs, contribution with 52% to the total economic output. (BMWi, 3)

SMEs continue to be a major provider of jobs and trainee positions subject to social insurance contribution. In 2010 about 11.8 million worked for medium sized companies with 10 to 499 employees. In small-sized businesses with less than 10 employees about 3.6 million were employed. Thus the German SMEs provided 60 per cent of the employees in 2010. (BMWi, 3)

Medium-sized companies have specific characteristics, which distinguish them from large companies. For many SMEs, but especially family businesses, short-term profit or relocations play a minor part as opposed to large corporation. This is due to the sense of community the company has to the region and employees.

Aside from the employment effects of small- and medium-sized companies, there are a number of their economically relevant factors to the middle class which must be mentioned in this context. They contribute to gross value added, investments, tax revenues and the innovation of SMEs. The result justifies the large economic importance of the middle class in Germany. (Hauff 2011, 8)

## **2.4 Logistics**

### **2.4.1 Concept and Definition of Logistics**

The concept of logistics originated in the military sector. As early as the 19th century people used the term to describe the design of the infrastructure regarding replenishment, troop and supply- movement. The modern logistics concept which has established itself since the mid 80's can be described by a variety of definitions, but they all contain the same elements. (Logistics World) These include the logistic processes, objects and systems. Logistical processes include all transport and storage processes, and the associated handling. Logistical objects are material goods, in particular products and materials from industrial plants, people and information. Logistical systems are used to carry out processes. These systems are to be understood as networks consisting of hubs, such as various storage locations and spokes, such as the transport routes. (Arnold, Isermann, Kuhn, Furmans & Tempelmeier 2008, 3-4)

Although there is not standard definition of the term logistics, the following definition however holds all the elemental parts described above "Logistics is defined as the process of planning, implementing and controlling the efficient and cost-effective flow and storage of raw materials, goods, equipment and personnel from the point of origin until the completion of an activity, in accordance with end-user's requirements." (Procurement Practitioner Handbook)

The main purpose of logistics operations is to overcome any kind of gap between customers and suppliers (Waters 2003), which is essential in order to achieve customer satisfaction. Bowersox (1992) summarized this in his "Seven Rs", "the right material, in the right quantity, at the right time, from the right source, with the right quality, at the right price".

### **2.4.2 Importance of Logistics**

"Logistics has always been a central and essential feature of all economic activity. There are few aspects of human activity that do not ultimately depend on the flow of goods from point of origin to point of consumption." (Shapiro & Heskett 1985)

But not only is logistics an essential part of every trade, it is also expensive. Unfortunately normal accounting conventions don't separate logistics costs from other expenses and thus it is not possible to tell how expensive logistics truly is. (Waters)

Although the costs vary from industry to industry, logistics has a definitive impact on the financial performance of a company. The Institute of Supply Chain Management estimates that every 1% saved in materials delivery cost gives the same benefit as a 5% increase in sales. (Institute for Supply Chain Management)

Financial performance is largely what managers are judged by, which is why they try to focus on reducing costs. But logistics many more measures of performance besides the financial performance and customer satisfaction. It virtually has an impact on every aspect of a business. (Waters)

According to Novich (1990, 48-53), "poor logistics are the cause of roughly 50% of all customer complaints." This in translation means that a well-organized and structured supply chain can give a company a significant competitive advantage.

### **2.4.3 Changing Significance of Logistics**

The development of logistics, as described by numerous authors (Baumgarten & Walter 2000; Straube 2004) can be summarized as an overcoming of rationalization-bottlenecks, and thus the constant expansion of the scope of responsibilities of logistics within the corporate functions and processes. (Arnold, Isermann, Kuhn, Furmans & Tempelmeier 2008, 1052)

Under the influence of increasing global competition and the development of information and communication technologies, logistics as a management discipline experienced a steady increase in importance both in practical- as well as in scientific terms. This is made evident by the expansion of the scope of responsibilities over the past decades. (Klaas 2002, 1; Göpfert 2009, 40)

Logistics is becoming the decisive competitive factor (Göpfert 2009, 40) and its scope and quality are increasing necessary and effectual conditions for the satisfaction of customer needs (Straube 2004, 31). The holistic focus of logistics for value creation and customer-related processes emphasizes its importance as a strategic management tool. (Straube 2004, 2)

Also sales and employment figures reflect the importance of logistics. The more than 2.85 million people directly employed in logistics and an annual turnover of around 225 billion Euros in 2012 make this industry extremely valuable both as a labor market and for the economy in Germany. (Pieringer 2013)

## 2.5 The Green Paradoxos of Logistics in Transport Systems

### 2.5.1 Costs

One purpose of logistics is to reduce costs, especially those arising from transportations. The benefits of logistics are realized, but the environment is the one paying the price and bearing the burden. (Rodrigue, Slack & Comtois 2001, 3)

Basically external effects are uncompensated repercussions on noninvolved parties. The negative external effects create a difference between profits of the company and profits of society. An example for this would be the noise protection. The people living in the area of an airport are affected by the noise, but not the whole population. But if this noise leads to a law which bans flights at night, it might create bottle necks and an increased amount of exhaust emissions, which then affects all citizens alike. Those flights at night have costs that are not part of the regular price which leads to a higher demand of this service and to increase the earnings those services are conducted with second rate technologies. (Bretzke & Barkawi 2006, 35)

To compensate for the external effects and to motivate polluters to reduce their exhaust of environmental damaging emissions, those effects are internalized. The compensations responsible parties have to pay entice them to reduce their exhaust emissions. Internalizing the costs leads to higher prices the consumers have to pay so that the services are less in demand and the amount of needed fossil fuels will decrease. Another added effect is that internalization will further the development of new technologies. (Bretzke & Barkawi 37)

Since the introduction of the hub-and-spoke structure 20 years ago it has reduced costs and improved the efficiency of air, rail and maritime freight through the consolidation of freight and passenger hubs. But despite the cost savings, its modes and terminals are less sustainable and environmentally friendly, because the number of terminals is limited which causes more noise, air pollution and traffic

congestion in those areas. In addition, the logistical buildings according to this system require an enormous amount of land. (Rodrigue, Slack & Comtois 2000, 3-4)

### **2.5.2 Time and Speed**

Time is one of the essential parts in logistics. An increase in efficiency is easily achieved by reducing time of flows which in turn will increase the speed of distribution systems. (Rodrigue, Slack & Comtois 2001, 5)

Because logistics offers mostly door-to-door services combined with just-in-time strategies, it creates a vicious cycle. On the upside the physical distribution gets more and more efficient, but on the downside it means that production, distribution and procurement are less and less constrained by distance, as becomes evident in increased truck traffic and freight volumes. (Cooper, Black & Peters 1998; Mc Kinnon 1998)

### **2.5.3 Reliability and Warehousing**

Providing the service at the right time and with undamaged goods is a core component of successful logistics services. In order to achieve this, the most reliable transportation modes are utilized, which aren't necessarily the most environmentally friendly. (Rodrigue, Slack & Comtois 2001, 5)

Another important factor in logistics services is warehousing. Especially when it comes to globalization, logistics is of foremost importance, because nowadays stockpiling is not necessary anymore as most inventories are delivered on time and thus are being transferred to the road. (Rodrigue, Slack & Comtois 2001, 6)

## **2.6 Different Approches of Sustainable Development**

### **2.6.1 Corporate Social Responcibility (CSR)**

With Corporate Social Responsibility (CSR) companies are expanding their responsibilities by adding ecological and social aspects to the operational ones. CSR ensures a fair allocation and use of economic, natural and social resources, both in the present and for future generations.

Responsible and sustainable companies face the following tasks:

- to get involved with the short- and long-term interests of the company
- treat employees responsibly
- preserve and create new jobs
- take environmental concerns and consumer demands into account
- get involved with the social environment and take on social responsibility
- take stakeholder concerns into account (Hauff 2011, 23)

"By definition, stakeholders are the individuals or groups which have an interest in the organization and are affected by its actions. Stakeholders are customers, employees, and suppliers, the board of directors, owners, shareholders, government agencies, unions, political groups, the media, and others." (The Saylor Foundation 2013, 1) In the following figure, the number and diversity of stakeholders of companies is shown. It is a complex network, which places increasing demands on SMEs.



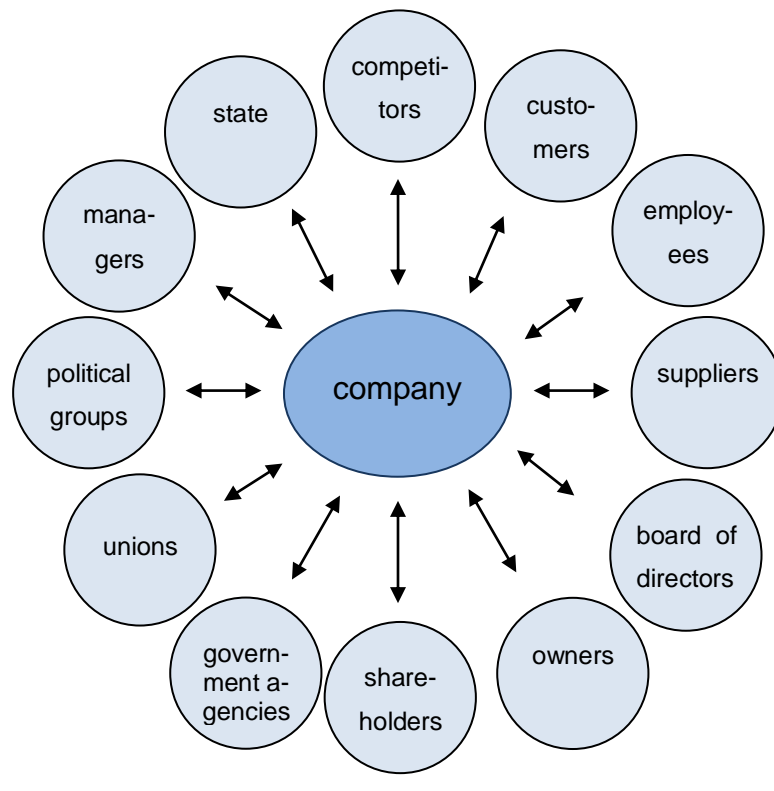


FIGURE 3. Stakeholders

The active implementation of CSR is a win for the economic, environmental and social performance of a company. Leading companies have long recognized the benefits of CSR. But they frequently lack a concept, especially for measuring and continuous development. This is especially true for small businesses. (Hauff 2011, 24)

### 2.6.2 Corporate Citizenship (CC)

The Corporate Citizenship is about the mutual benefit of all partners involved, thereby making social innovations possible.

Companies assume an additional social responsibility in the local communities that goes beyond their actual business. Corporate Citizenship includes donations and

sponsorship (Corporate Giving), the establishment of non-profit corporate foundations (Corporate Foundations) and a commitment to social causes, including the employees (Corporate Volunteering).

Critics, however say that this merely constitutes a diversion, which is supposed to distract from the companies poor image.

Small businesses can derive a number of benefits from its social commitment. The use of the employees of the company in corporate citizenship projects can contribute to the improvement of communication and team skills, goal orientation, self-activity and creativity and social- and leadership skills. At the same time it may lead to an increase in employee satisfaction and thus a higher identification with the company. This often leads to an increase in labor productivity and a reduction in employee fluctuation. (Hauff 2011, 24-26)

### **2.6.3 Corporate Governance (CG)**

According to a definition "Corporate Governance is concerned with ways of bringing the interests and objectives of investors and managers into line and ensuring that firms are run for the benefit of investors."

Corporate Governance is another concept that is related to sustainable management of SMEs. It is generally understood as a concept which focuses on the relationship of business to its equity holders. Thus, Corporate Governance is mainly concerned with issues of managing and monitoring of primarily incorporated companies. (Hauff 2011, 26-27) The concept is supposed to increase the transparency of corporate activity for shareholders. The shareholders, not the stakeholders are the pivotal point in this concept. (Habisch, Neureiter, Schmidpeter 2207, 76)

#### 2.6.4 Sustainability Indicators for Small and Medium Businesses

Sustainable indicators make the specification and operationalization for sustainable development possible. The indicators, however, have to be distinguished between large and medium-sized enterprises. While indicators for large companies go beyond the operational boundaries, indicators for SMEs relate more to internal issues.

In contrast to the indicators for large companies, the 4070 Directive "Sustainable management in small and medium-sized enterprises", developed by the Association of German Engineers, is more narrowly defined. The indicators are appropriated to the three dimensions of sustainability. The ecological and economic dimensions are operationalized by commonly well-known indicators. In contrast, the social dimension refers only to the employees and trainees of a company. However, it would be in accordance with the concept of Corporate Social Responsibility and Corporate Citizenship, if the external area of SMEs would be taken into account as well, especially since they have great potential in this field and are already actively involved in their social environment. (Hauff 2011, 27-28)

Table 1. Sustainability Indicators (Hauff 2011, 27-28)

<b>Ecological dimension</b>	<b>Economic dimension</b>	<b>Social dimension</b>
Raw material charge	Company earnings	Number of employees
Energy consumption	Equity ratio	Number of trainees
Water consumption	Rate of return on equity	Health rate
Sewage quantity	Rate of return on borrowed capital	Accident rate
Emissions in the air	Return on Investment	Fluctuation rate
Emission in the sewage	Net value-added	

## **2.7 Strategies**

### **2.7.1 Conceptual Strategies**

#### **Sourcing Strategies.**

No company is capable of producing a product solely by themselves. Each company to some extent at least relies on sourced parts, which creates high carbon emissions throughout the product lifecycle. Rising crude oil prices however may cause a shift in the sourcing strategies. (Berg et al 2010, 82-83)

A possible countermeasure is the local procurement, which considerably shortens the transport routes compared to global sourcing (Müller-Steinfahrt 2010, 19)

"Sourcing regionally not only has an economic impact, but an environmental one too. Bringing goods that are available from the other side of the world, even if economically feasible, exerts a high environmental price." (Berg et al 2010, 83)

Regional procurement of material must not automatically be environmentally friendly. It always comes down to the company size. For SMEs, for example that would mean to lower transport volumes significantly lower, use smaller transports, but have these more frequently. Larger companies can afford to own trucks, and thus they can have fewer transports with higher volumes at lower CO<sub>2</sub> emissions (FML 2009, 38) or even share warehouses with other companies to lower emissions. (Baumgartner, Biedermann & Ebner 2007, 225)

## 2.7.2 Manufacturing Strategies

### Forward Stocking.

In large due to the internet, consumers now are able to make better informed decisions when it comes to their purchases. In order to meet these increasing demands, companies have to manufacture, transport and stock several varieties of the same product, which increases costs for the company because they have to have the product available if they don't want dissatisfied customer. Forward stocking produces customized products at a mass production level, which saves effort and reduces stock. (Berg et al 2010, 83)

### Packaging Design.

In distribution most packaging is required by regulations and thus gives not much room for sustainable changes. In the manufacturing, however, potential savings are possible by eliminating unnecessary packaging or exchange is with lightweighting one. (Berg et al 2010, 83)

As part of the production logistics, transportation costs can be minimized by avoiding long transfer of work pieces between the individual work stations. (Schulte 2009, 345-346)

In the area of logistics properties the following field can be listed as examples for sustainable logistics: (Müller-Steinfahrt 2010, 19)

- Conversion from normal to energy-saving lamps
- Alternative heating concepts
- High-quality insulation of facades and roofs
- Intelligent lightning circuit
- Automatic shutdown or reduction of lightning

### 2.7.3 Distribution Strategies

#### Network Designs.

Most distribution networks are designed to only take time and money aspects into consideration, but it is economically sound to add the aspect of carbon emissions while still have low cost and high speed.

"From a sustainability point of view, the design of a network faces two contradicting objectives: on the one hand, to have the lowest inventory and warehousing CO<sub>2</sub> emissions, while on the other hand, achieving the lowest transportation CO<sub>2</sub> emission." (McKinnon, 2010)

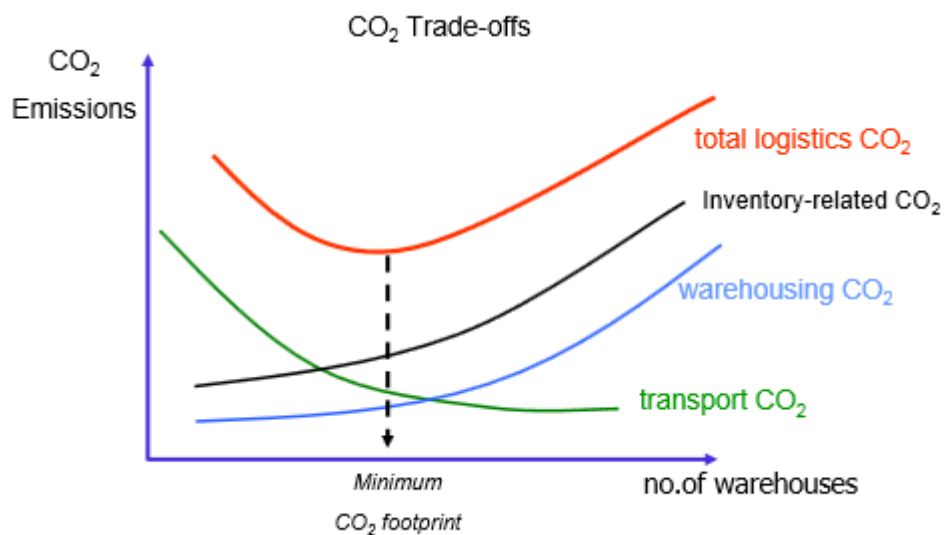


FIGURE 3. CO<sub>2</sub> Trade-Offs (McKinnon, 2010)

By creating warehouses for multiple users, sustainability of networks can be improved considerably, because transports and warehouse costs can be minimized. In addition it is possible to benefit from better performance and shorter response time.

**Modal Mix Strategy.**

Since the degree of environmental pollution differs with each mode of transport, companies should consider carefully which alternative they choose and use telematics systems which indicate when a change in means of transportation would be advisable. (FML 2009, 45, 50)

**Route Management.**

"The vast majority of overland transport is currently done by road. Routing and scheduling all these vehicles is a highly complex process. Optimization of transportation routes not only leads to significant cost savings, but also protects the environment." (Berg 2010, 91)

Using telematics systems (Telematics is a combination of telecommunications and computer science, (FML 2009, 53) helps to determine the best routes and to avoid traffic jams. (FML 2009, 45, 53)

In the USA for example are fewer and fewer traffic lights for right-turns, which is why engineers at UPS map out every route with right-turn directions for the drivers only, to avoid dwell-time at traffic lights. (Shontell 2011)

**Capacity Management.**

A current challenge is the optimal utilization of assets. There are some ways to improve the transport efficiency and prevent empty runs. The transport volume will improve the transport efficiency and prevents empty drives. Empty journeys are not only economically wasteful, but also carry an environmental cost. This means that out of the 1,620 mt of truck emissions in Europe, 405 mt are in vain (World Economic Forum, 2009)

Planning of integrated inventory and transportation is one way to utilize transport vehicles more efficiently. It is also possible to use electronically aided dispatch and vehicle management for optimized use of storage space and to adapted packaging containers, which are best for the storage space (Baumgartner 2007, 225, 259; FML 2009, 45)

Another factor to consider in the initial purchase of utility vehicles are trucks with a lightweight design, with low-emission drive assemblies (tires), aerodynamic shape, start-stop techniques and recovery of braking energy. (Bretzke & Barkawi 2010, 70) "EuroCombi's" are another possibility. These are trucks of extra length, larger capacity and a gross vehicle weight of 60 tonnes. In the best case, it is feasible to cut emissions by 20 percent, fuel consumption by 15 percent, transport costs by 25 percent and an increase in capacity of 50 percent. (Bretzke & Barkawi 2010, 74)

A petroleum- and emission-free transport for example by using battery-powered vehicles would be desirable. So far however, only small deliveries and the rail freight can be covered by the electric grid. Another problem with batteries is that there are no long-term tests with battery-powered trucks yet (Bretzke & Barkawi 2010, 70)

In addition an efficient driving of the trucks is of great importance. Driver training can teach truckers to adjust their driving habits and other efficiency improvements, such as the optimum tire pressure.



### 3 RESEARCH ENVIRONMENT

"SMEs and entrepreneurs play a significant role in all economies and are the key generators of employment and income, and drivers of innovation and growth" (OECD 2009, 5).

#### 3.1 SME Definitions

In the European Union were 6,051,566 Small and Medium sized Enterprises in 2009. By 2010, this number had grown to 6,222,356 and their annual turnover mounted up to € 8,870,866.2 Mio. That is at least the numbers according to the European definition of a SME. (Eurostat)

The first common definition of SMEs in Europe was compiled in 1996. It was based on a broad application throughout the European Union. In 2003 the European Commission adopted a new recommendation to take into account the economic developments since 1996. According to this definition the SMEs are divided into 3 groups depending on their number of employees, annual turnover or annual balance sheet total. (Europäische Gemeinschaft, 6)

Table 2. European Definition of SMEs

<b>Company category</b>	<b>Number of employees</b>	<b>Annual turnover</b>	<b>Annual balance sheet total</b>
<b>Medium companies</b>	< 250	≤ 50 m EUR	≤ 43 m EUR
<b>Small companies</b>	< 50	≤ 10 m EUR	≤ 10 m EUR
<b>Micro companies</b>	<10	≤ 2 m EUR	≤ 2 m EUR

The second definition is from the IfM Bonn and is in place since 2002. According to this definition, companies with up to 9 employees and less than 1 million Euro annual turnover are small companies. Companies with up to 499 employees and an annual turnover of up to 50 million Euro are categorized as medium sized businesses. (IfM, KMU-Definition)

Table 3. IfM Definition of SMEs (IfM, KMU-Definition)

<b>Company category</b>	<b>Number of employees</b>	<b>And</b>	<b>Annual turnover</b>
<b>Small companies</b>	< 9		< 1 Million Euro
<b>Medium companies</b>	9 - 499		1 - 50 million Euro
<b>(SME) total</b>	< 500		< 50 Millionen

### 3.2 Why the European Definition is Relevant

The European definition has the advantage of classifying companies in all of Europe and thus making a direct comparison possible. In Germany however, the definition of the IfM is more often applied because German SMEs are called "Mittelstand" and differ from other European SMEs. Thus the IfM definition is tailored to suit the needs of the German Mittelstand, which can't be described by quantitative aspects only. (IfM, KMU-Definition)

The SME sector in Germany are often times owner-managed family business, whose main objective in management is to hand over a well-positioned company to the next generation. Therefore long-term strategies determine the course of action in SMEs in Germany. The middle class and its family owned businesses are characterized by robust economic activity, sustainability and social responsibility. (IfM, KMU-Definition; BDI 2012, 1)

In particular, highly innovative and fast-growing companies are often not recognized by the European definition due to the quantitative criteria. (BDI)

It is essential to maintain and promote the strengths of the Mittelstand. In order for that to take place, they need a positive environment of political frameworks which have to be adjusted continually to changing markets and technologies.

### **3.3 The SME Sector in Germany**

As mentioned before, the SMEs provide 60 percent of jobs in Germany. Besides the employment effects of SMEs, there are a number of other economically relevant factors to the middle class listed. Mention may be made of the contribution to gross value added, investment medium-sized enterprises. Hence the large macro-economic importance of the middle class in Germany, which is especially emphasized by the policy repeatedly, is justified. (Hauff 2011, 34)

And while the importance of a strong industry for growth, innovation, investment and employment has been recognized, it is further of significance, not to poison those breeding grounds with laws which will stifle the competitive capabilities (for example compulsory CSR requirements). In addition a smooth financing is crucial to ensure the continued upsurge of the SMEs competitiveness and innovative ability.

There is hardly any other Member State of the EU to rival Germany SMEs in terms of generated turnover and employer. Only those who are highly innovative and internationally competitive can survive in the globalized markets in the long run, which is why they invest in research and development. According to the 'Stiftverband der deutschen Wissenschaft e.V.' German SMEs invested an estimated 5.5 billion Euros in R&D in 2012. Between 2005 and 2010 German SMEs have increased their R&D expenditures by 35 percent, despite the financial and

economic crisis. Thus expenditures on R&D in SMEs grew even stronger than in large companies. (BMW, 5)

As a first conclusion it can be stated that SMEs have structural proximity to sustainability. An integral reason for this is that especially in family and owner-run companies long-term value and job retention are a crucial part of how business is conducted. Sustainability in business can be understood as a company policy that brings together business success with the requirements of the environment and the relationship of a company to its employees and the social environment to a long-term equilibrium.

In 2009 and 2010, approximately 3.25 million jobs were lost in the SME sector due to the global economic crisis. The promising development of small and medium-sized enterprises has come to a standstill with the beginning of the crisis in 2008.

The production in the SMEs has fallen an estimated 5.5 percent in 2009. From 2002 to 2008, the SMEs in the EU have proven themselves to be a job generator, creating 9.4 million new jobs. On average, the number of jobs increased in SMEs in this period by 1.9 percent annually. In large companies, there was only 0.8 percent annually.

The European Commission is pushing for the implementation of the "Small Business Act" to address the crisis. The SBA is Europe's flagship initiative in the SME policy. Among other things it is supposed to facilitate the access to finance for SMEs and reduce the bureaucracy. (EurActiv.de)

European governments have taken many measures to help small businesses. These include tax credits for investment in research, corporate sponsors (so-called "business angels"), the development of innovation centers and plans to link SMEs with universities and large industry.

The SMEs are faced with major challenges: Even before the crisis limited the lack of access to venture capital in innovation performance. It is also very expensive for

them to defend their intellectual property and difficult to get to money from the EU research budget. (EurActiv.de)

## 4 SURVEY TO THE SUSTAINABILITY IN LOGISTICS IN GERMANY'S SMES

The survey was conducted in early October using a structured questionnaire, which contained only a few open questions. About 65 German companies were contacted and encouraged via e-mail to participate in this empirical study in this thesis. Due to the low return number of only 17, no conclusions or trends can be drawn from this survey, which would be representative of the area. However, the survey has brought some results and interesting findings which reveal basic tendencies.

In the following subsections these findings are represented in written, tabular and graphical form. The associated questionnaire can be found in the appendix.

### 4.1 Number of Employees

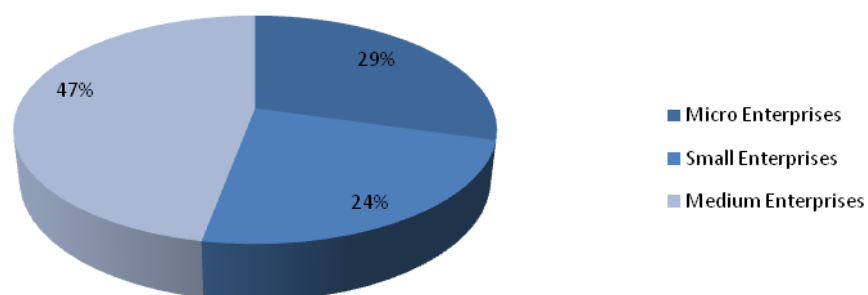


FIGURE 4. Distribution of Respondents by Number of Employees

In the survey, a mixture of both definitions of SMEs is applied. This survey was sent to enterprises with up to 499 employees, which were subdivided in mic1ro,

small and medium sized enterprises. Originally this was intended to serve to identify whether there is a different commitment in sustainability between micro, small and medium sized enterprises. Of the 17 companies surveyed are five among the micro, four among the small and 8 of the medium sized businesses.

## 4.2 Sustainability in the Enterprises

In the past sustainability was largely translated with CO2 reduction, today it looks different. When asked what issues will be important or very important for the maintenance of competitiveness in the future, 81 percent of the respondents mention the security of corporate data and the prevention of threats posed by global networks and social media. Thus a subject is at the top, which is relevant for sustainable management, but is more located in the area of compliance. Number two and three are climate protection (76 percent) and employee concerns, such as models for flexible working hours (70 percent). Two of these three issues (multiple answers were possible) cannot be assigned to the dimension of ecology.

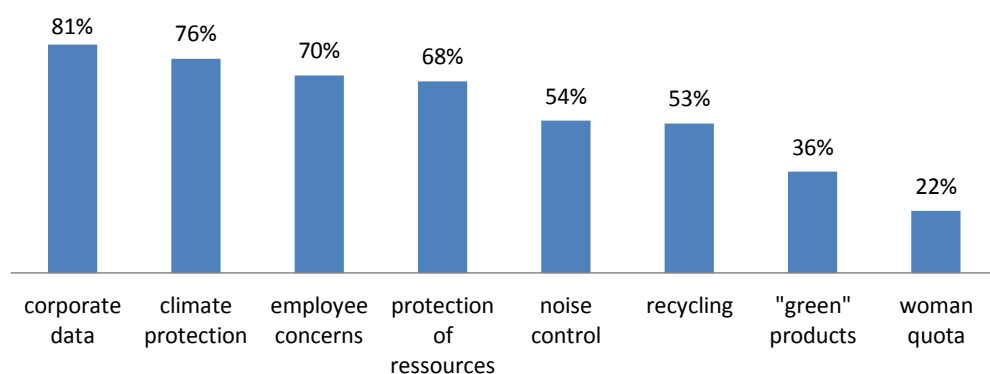


FIGURE 5. Issues That Will Gain in Importance

In the midfield companies ranked the issues of noise control (54 percent) and recycling (53 percent). The issue of diversity by a woman quota for management positions is only considered relevant by 33 percent of the companies surveyed.

### Sustainability Promoting Factors.

The survey gave a number of factors that potentially induce companies to act more sustainable.

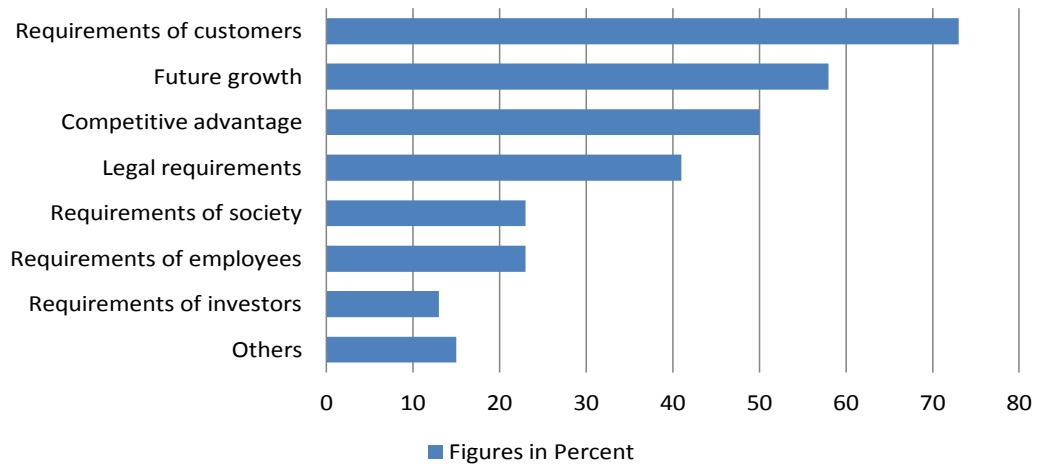


FIGURE 6. Factors That Induce Sustainable Developments

Customer requirements are the most important booster for sustainability measures. The opportunity to enter new markets and to ensure future growth through sustainability along with legal requirements were other important factors for companies to deal with the issue of sustainability.

Moreover, but of less significance, companies named cost reduction, competitiveness and their own convictions. Rising energy and fuel costs and pollution-related taxation also play a role in the motivation to act more sustainable.

However less than a quarter of companies (23 percent) feel that their employees are creating pressure to become more sustainable. Against the backdrop of the impending shortage of skilled labor it is feasible to assume that this aspect will



play a more significant role in the future as credible sustainability activities can make the company more attractive to young professionals. Currently, however, companies consider this factor negligible compared to others.

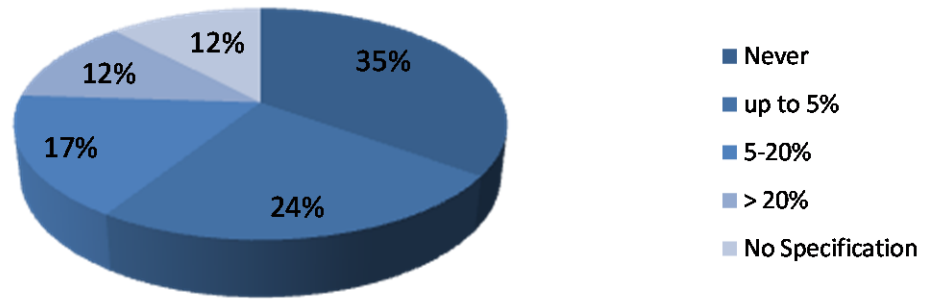


FIGURE 7. Frequency of Customer Demands for Sustainable Aspects

The majority of the companies surveyed (53 percent) has had - to varying degrees - experienced requests of customers for sustainability in the company.

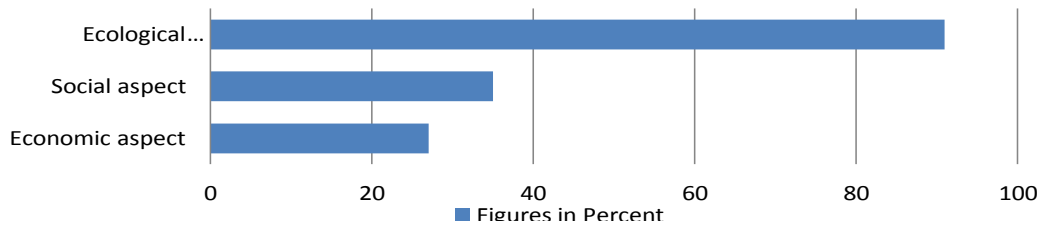


FIGURE 8. Aspect Most Often Targeted in Customer Inquiries

Almost every company confirmed that the customer demands related to aspects of environmental aspects. A third of the companies said they received requests for the dealings with its employees. This number will likely swell in the future because working conditions are perceived by the public eye quickly and can harm the company economically.

### 4.3 Commitment of Enterprises to the Implementation of Sustainability Measures

80 percent of the companies surveyed indicated to get involved with sustainability beyond the requirements given by law and legislation. How this commitment manifests itself and which motives are boosting this development is illuminated in the following tables and diagrams.

#### Measures Taken Concerning Employees.

In the area of employees this survey shows a positive result. The majority of respondents recognize its employees as a valuable asset and take measures to form lasting ties with them and thus have implemented several measures in the area of human resources already.

The surveyed companies answers in a given, expandable list of activities show that they already offer or plan to implement in the near future. The training of apprentices is one of six choices, and almost all respondents have realized that in their enterprises. As for the other three companies, they answered that they are in

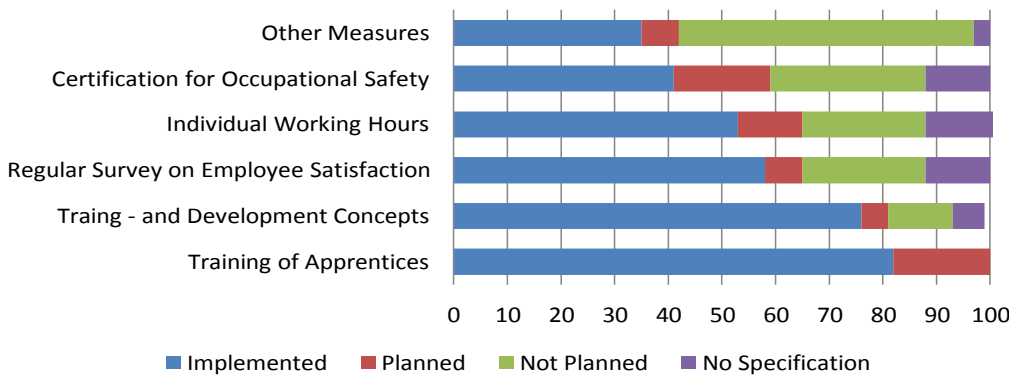


FIGURE 9. Status of the Measures for the Staff

the progress of implementing it. Other more commonly used concepts are training and development programs and individual working hours.

Few companies mentioned child care and the advancement of women in the option for other measures. This shows clearly that sustainability is no longer just an environmental issue. And in addition sustainable actions for employees are a competitive advantage.

**Measures Taken Concerning the Society.**

The most popular action where society is concerned is the donation of money. 13 of the 17 surveyed companies are already involved in this regard.

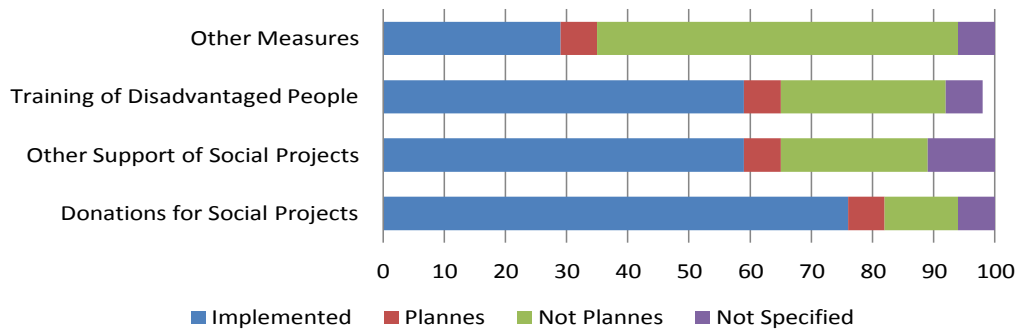


FIGURE 10. Status of the Measures for Society

A slightly smaller share of companies - but with 59 percent still the majority - support social projects in another form than with money and the training of disadvantaged people. Like before only few companies plan on implementing further support measures.

The following additional activities were given in the questionnaire by the surveyed companies for other measures.

- Training more apprentices than have to for their own requirement
- Sponsorship of sport- or cultural events
- Promoting environmental projects
- Employment of long-time unemployed

Thus it can be said that the respondents are active in many different ways or plan their involvement. Again this result points out that sustainability is not merely an environmental issue any longer.

#### 4.4 Efforts to Support Sustainability

16 companies indicated that they consider managers to be the boosters of sustainable efforts in the company. Generally it can be said that there are more internal (managing directors, department managers, employees, owners) reasons to further sustainable development than external (suppliers, customers and government) ones.

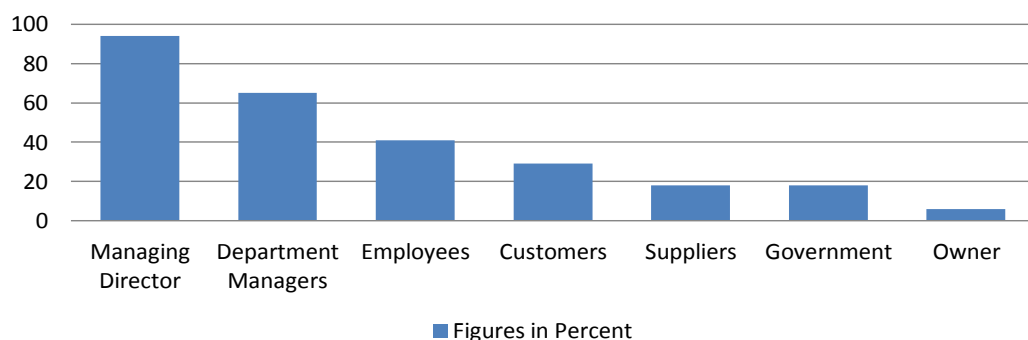


FIGURE 11. Promoters of Sustainability Efforts

### Definition of a Sustainability Strategy.

This survey so far has clearly shown that sustainability is more than just the aspect of environmental protection. For the maintenance of competitiveness of the enterprises all three dimensions of sustainability are considered relevant and are therefore covered by measures. An unmistakable strategy along with measurable objectives would be of great service not to lose sight of the essentials. It can also lead to a more efficient and targeted use of resources.

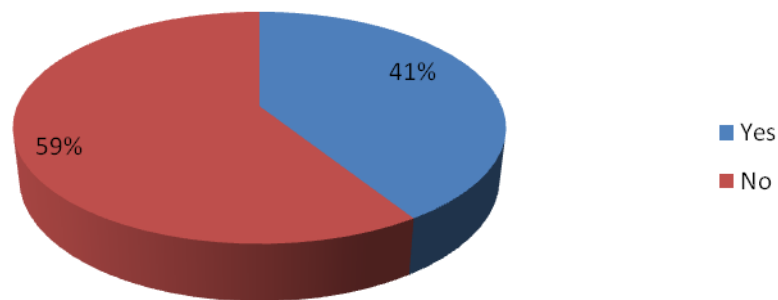


FIGURE 12. Definition of a Sustainability Strategy within the Company

Of the respondent companies only 42 percent have a sustainability strategy defined. However, the majority of 59 percent has no definition in place. Given the fact that 16 of 17 companies said that sustainability is part of management and therefore is a strategic issue, this is a surprisingly high number.

#### 4.5 Commitment in the Corporate Divisions

In order to identify the areas in which divisions of the company the respondents are engaging in sustainable developments, the next question "Commitment in the divisions of the company" was asked in the survey.

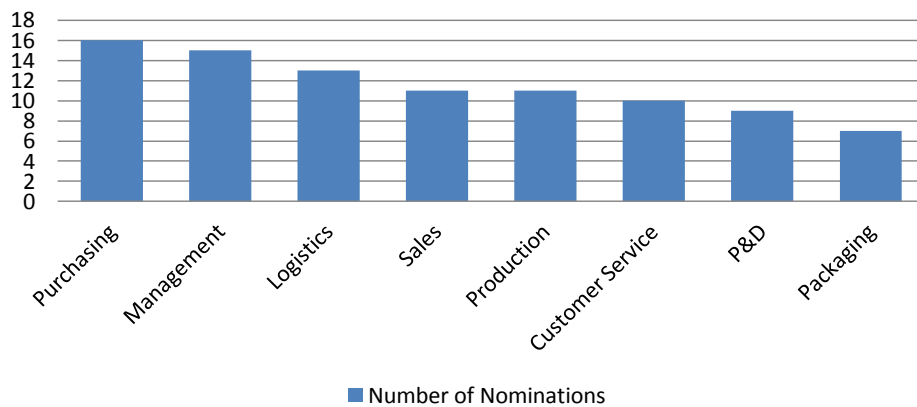


FIGURE 13. Commitment in the Individual Corporate Divisions

In most areas the number of companies committed to sustainability aspects outweighs the number of companies which aren't. With two exceptions that is, "research and development" and "packaging". The number of companies actively pursuing sustainable activities in logistics is high and illustrates the importance of this sector in the corporate environment.

The following statistic is aimed at the actual implementations of sustainable activity in the division of logistics. The table shows the answers of the surveyed companies.

### Procurement Process.

In the area of procurement, 13 of 16 respondents stated that they take sustainable aspects into account when they procure raw materials and supplies. Examples are regional procurement or choosing certified suppliers. Four companies use sustainability-based criteria in the selection of suppliers. Less common are special principles for sustainable development. Here only two of the respondents state to have plans for implementation in this field.

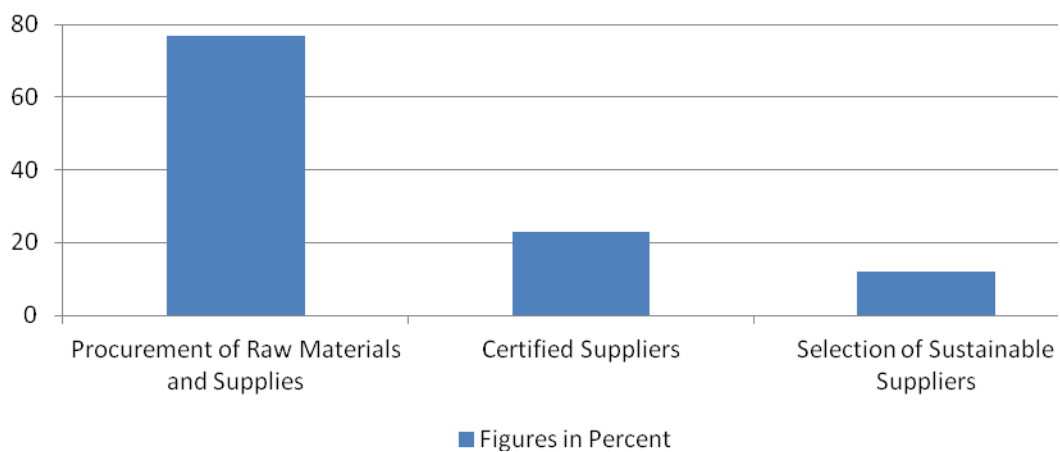


FIGURE 14. Measures Taken in Procurement

### Production Process.

Environmental criteria are at least partially included in the building design of 12 companies. The issues here are saving energy, disposal of abandoned waste and the consideration of short routes within the production area. Good working conditions in the production in terms of safety (accident prevention and health protection), ergonomics and work environment are met with almost all respondents. Safety aspects, however, enjoy a higher priority than ergonomic workstations or a more appealing work environment (break room).

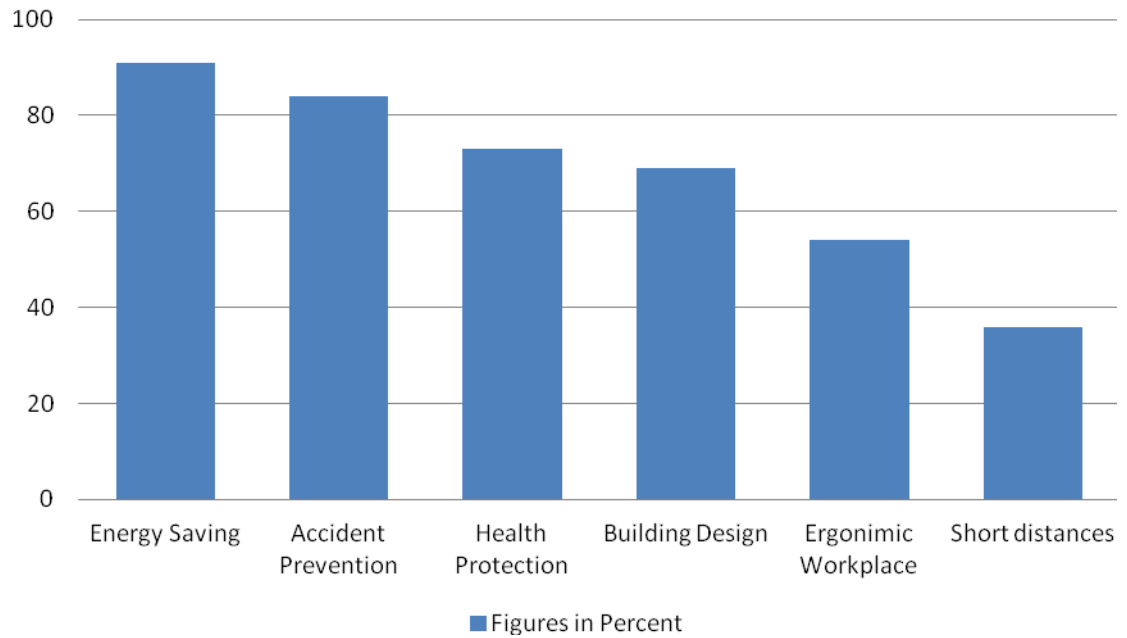


FIGURE 15. Measures Taken in Production

### **Distribution Process.**

A change in the distribution processes in order to adhere to environmental issues was realized or is being done by seven companies. On the question of considering ecological aspects in the choice of means of transport, in the selection of service providers, warehousing and packaging or in the make-up of the vehicle fleet, the majority of the respondents stated not to have any plans.

The training of drivers is seen as the biggest aspect to safe costs and is implemented in most companies surveyed.



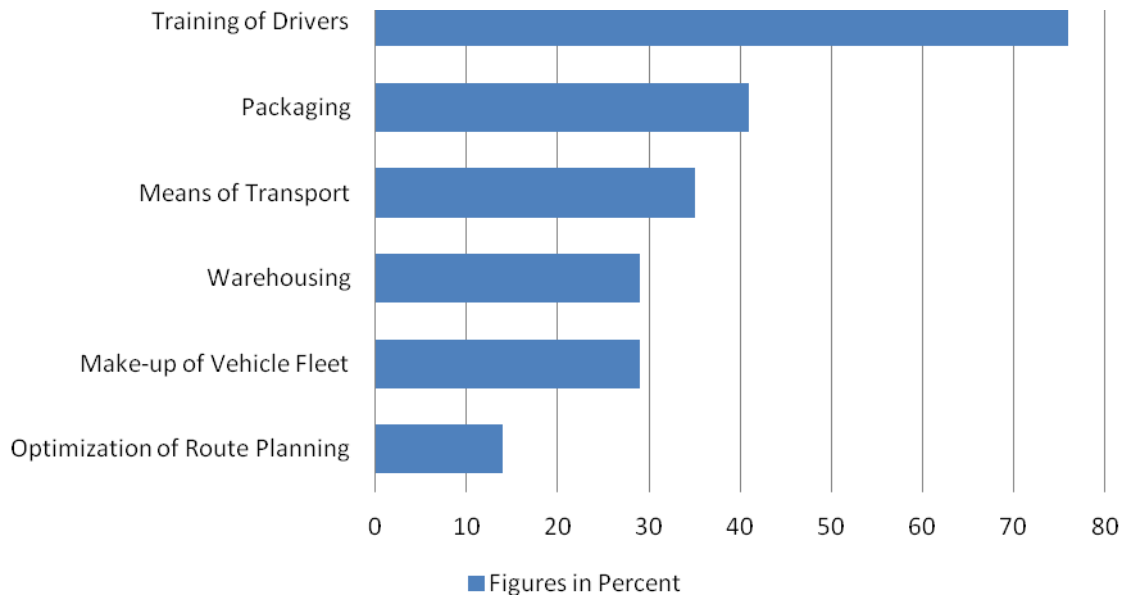


FIGURE 16. Measures Taken in the Distribution

#### 4.6 Measuring the Effectiveness of Sustainable Implementations

On the question whether companies measure the effectiveness of the implementations regularly using Key Performance Indicators or other indicators about every second company stated to do that. 29 percent of the businesses declared to carry out sporadic measurements.

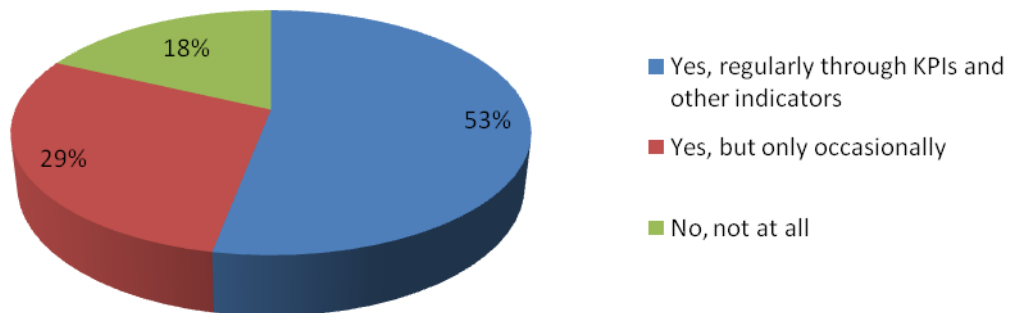


FIGURE 17. Control of Sustainable Efforts

Especially logisticians are often confronted with the question of whether their customers are willing to bear the extra cost of more sustainable products and services. For this reason efficiency is of particular importance. Clear goals, measuring and control of the successful implementation of the sustainability strategy can greatly increase the efficiency. Because who wants to invest measures which, although well-intended, are not very effective?

**4.7 Economic Aspects**

Aside from environmental and social sustainability, it is important for entrepreneurs that economic considerations are not left out of the equation.

**Impact on Cost and Sales.**

As the question about the "motives for sustainable developments" revealed, the majority of respondents emphasize the positive side effects of sustainable business.

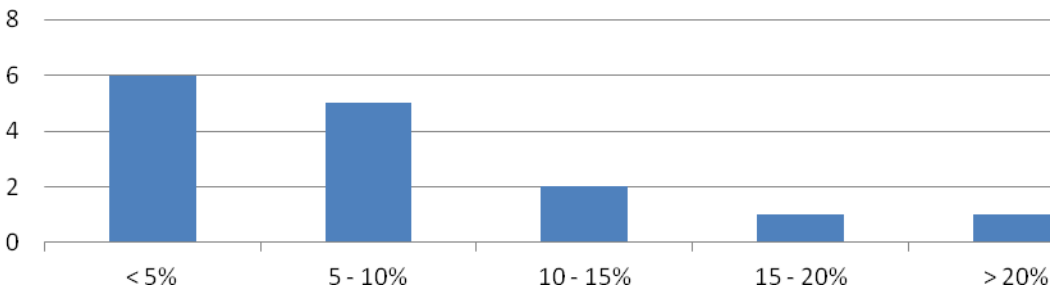


FIGURE 18. Cost Saving Through Sustainable Implementations

On the one hand it is important that the revenue does not decrease and the costs do not increase. Anything else would not be economical and lucrative for the en-

terprise. For this reason the questionnaire included a question about cost savings and revenue growth in the year past. As can be seen in the two statistics, sustainability can help at different levels to reduce costs and increase revenue.

It has to be noted that not all companies responded to this question and that in many cases it is difficult to discern where the cost reduction stemmed from because there are no separate records of the sustainable implementations.

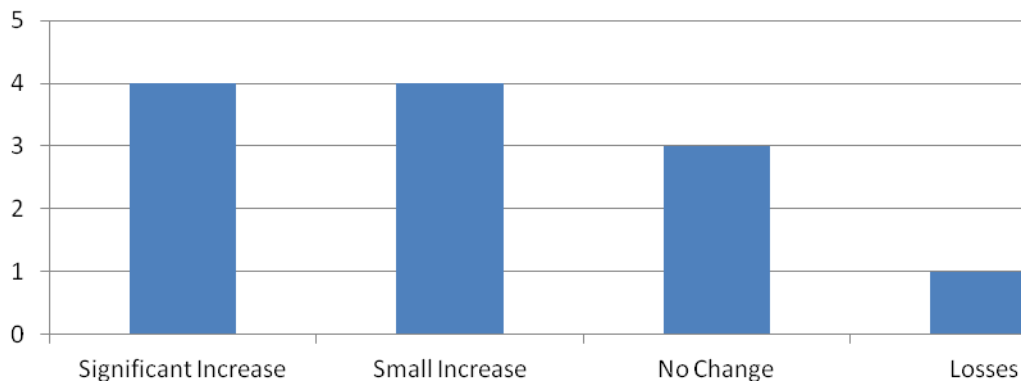


FIGURE 19. Sustainable Implementation's Effect on Sales

Although the majority of the estimates is only in the single digit percentage range (0 - 10 percent). However, one respondent indicated that sustainable activities seen over the last year were at the root of higher costs for the company. The majority is therefore of the opinion that a sustained and conscious economy certainly has a positive effect on the economic situation. Of 12 respondents, almost half sees a slight to significant increase in revenue. But again, one company stated that sustainable methods and products caused additional costs leading in a loss of revenue.

## Revenue.

Looking at the issue of sustainability from a theoretical point of view, as we did in the beginning of this report, it can be said that there appears to be no difficulties in the integration of economic, ecological and social aspects. In reality there are a number of different barriers and obstacles which hamper the motivation to act sustainable. In the survey, four possible inhibitory factors (finances, time, knowledge and technology) were given.

The lack of financial resources and a lack of time are the most frequent mentioned factors. Technology is number three and a lack of know-how on the subject was the least reason for not implementing sustainable measures in the company.

Four companies named other barriers which can be summarized as a short-term thinking and the absence of support of sustainability in the company.

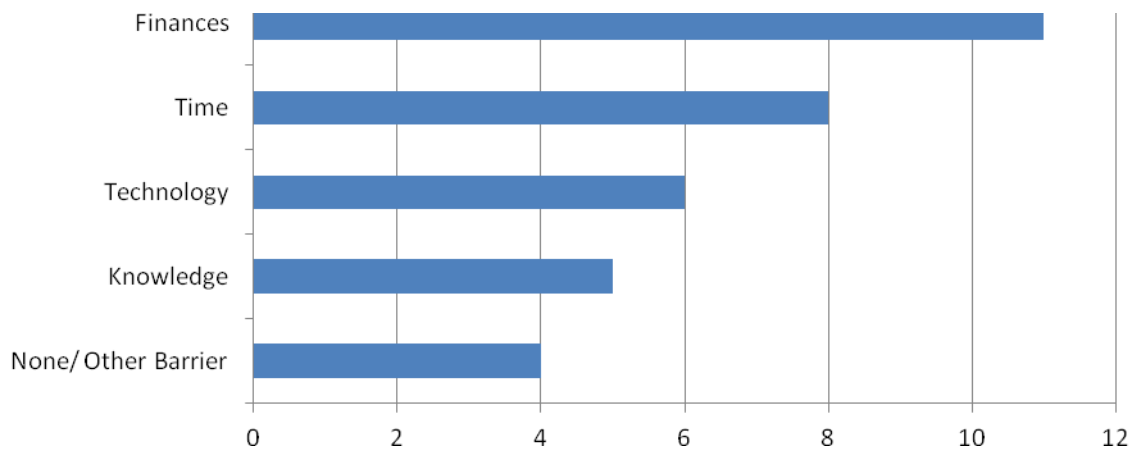


FIGURE 20. Barriers for Sustainable Development

#### 4.8 Risk or Chance

Finally it was asked whether the respondents see sustainability as an opportunity, which is important for the future in general or rather as a disturbance and upsetting factor or even as a risk.

88 percent stated that they perceive it more as a chance or even as a major opportunity for the future. One respondent sees only the cost factor rather than the opportunity behind it.

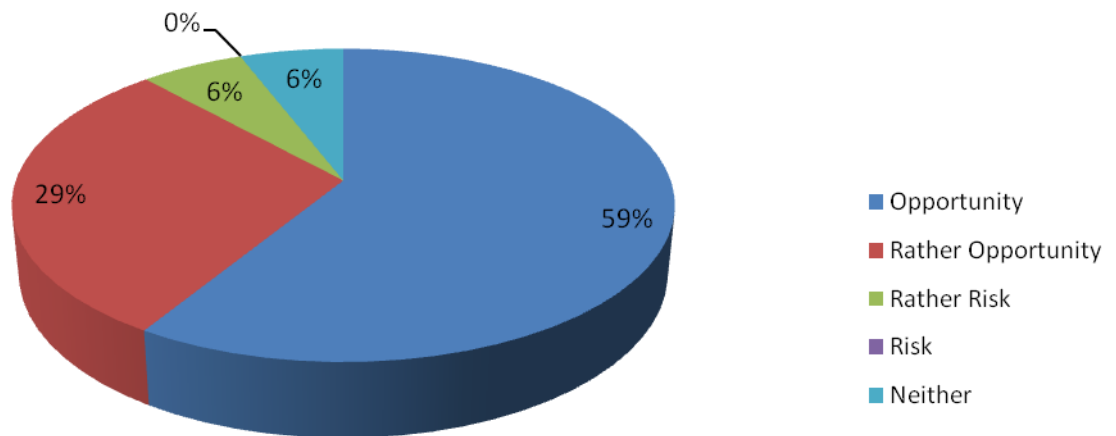


FIGURE 21. Sustainability as a Risk or Opportunity

This trend although only represented by a small number of companies, illustrates that many companies are open to sustainable behavior. The understanding that the opportunity to save the nature and its resources has to be sized already exists. The task now is not to leave it at that but to gradually set further measures into motion.

## **5 CONCLUSION**

This chapter contains a comparison between the theory of literature and other media and the study. It identifies where the SMEs surveyed are already active and where major gaps still exist. The recommendations evolve either from existing ideas and activities which several of the companies surveyed pursue or procedures that do not or rarely occur in practice, but in theory are considered very important.

### **5.1 Validity and Reliability**

Due to the small number of cases and the lack of random selection, this study does not claim to be representative. But this does not hinder the purpose of the study, to give a first impression of the importance of sustainability in SMEs and the specific implementations.

Some issues only allow for a limited interpretation, since it is to be assumed that the response has been influenced by social desirability. Another problem, especially for very small businesses, is the clear delineation between processes, which led to confusion and generic answers. The term "sustainable" is frequently interpreted as long-term or permanent, resulting in part in a limitation on the economic dimension. This makes it clear that the developed questionnaire can be optimized in some places to get clearer results.

The low willingness to participate suggests that the importance of the topic of sustainability fades in comparison to the general economic situation. Or it may be that the selected companies have a negative attitude towards this survey.

## 5.2 Usefulness of the Results

The assessment of the importance of the economic dimension was not asked at this point. In retrospect it would have been interesting to know whether the growing importance of ecology and social-economic aspects means a decline of economic aspects.

In the area of staff it would have been interesting to know if there are rules of conduct for sustainability in business, e.g. work instructions, and how the staff deals with these rules, and what is being done to comply with them.

When asked about barriers that make the introduction of sustainable methods difficult, most companies reported financial resources as the biggest reason. In retrospect, it would be good to know how the company preferably wanted to tackle this, e.g. through donations, investors or government subsidies. And especially if government subsidies can increase the commitment of a company to sustainability.

The survey results probably have a limited relevance for other countries within the EU at most, let alone for countries outside the zone. Due to the very specific definition of SMEs and the unique disposition of SMEs in Germany alone it would be difficult to draw conclusions from this study to other EU Member States.

While measures of the European Union find application throughout the European zone, there is a particularly close link to the topic of sustainability and environmental protection in Germany and especially in the SME sector. About 4 years ago during the economic crisis the German government made an effort to support the German automotive industry by offering bonuses to citizens who were willing to scrap their old cars in exchange for a new, more environmentally-friendly car. In Europe, the idea was still more rarely used.

It is also not possible to argue that countries of similar economic strength have an equal predisposition to sustainability as Germany and e.g. France strive for opposite things especially when it comes to alternative energy

### 5.3 Reflection

To address customer needs in order to satisfy sustainability issues is a good and understandable step. It remains questionable however, whether it is sufficient to respond to customer needs rather than to get proactive and start influencing the customer wishes to gain a competitive advantage.

Dealing with the consequences of demographic change in the future will be increasingly important and requires a closer examination of the topic. In order to prevent skill shortages the compatibility of family and career for example will prove a success factor for companies.

A large proportion of respondents classified sustainability as a strategic issue today. Nevertheless, a sustainability strategy with clear objectives is not widely spread in the companies yet. The development of the significance of the field of sustainability and the importance ascribed to the issue give rise to the assumption that a lot will change in the next few years.

Waste separation, cleaning and energy saving nowadays go without saying but by enforcing a code of conduct, employees will be sensitized and can transfer their habits from the enterprise to their private life as well.

Renewable energy is gaining ground and importance, as more and more companies are utilizing it, making information on various types of production and financing options ever more important. Information on current environmental regulations and the legislation, including funding opportunities are important for companies to make the right, informed investment decisions.

Extending the sustainable implementations from isolated well-intentioned measures to a systematic sustainability is a challenge for many companies. And the development and implementation of a coherent sustainability strategy is a process that takes a certain amount of time, because not only are they supposed to classify and evaluate climate challenge and skill shortages, but also help further the development of the company.



Sustainability measures are in many little companies controlled or used strategically. As a consequence, funds are often not optimally invested or good initiatives come to nothing. Businesses thus often times can't take full advantage of the great potential of sustainability issues.

#### **5.4 Green Logistics**

The issue of sustainability has arrived in logistics. This realization is one of the most important and gratifying results of this study. Has CO<sub>2</sub> reduction played a central role in the industry until now, there are also other environmental issues and social issues in the focus of interest today. This corresponds to the now well-established concept of sustainability, namely to bring economic, social and environmental objectives in line - and also connect them to business opportunities.

The logistics, especially transportation of goods, is one of the ecologically harmful corporate divisions. Due to the fact that freight transport produces high pollution and consumes finite resources, there are a number of theoretical ideas on how to improve sustainable organization.

The survey showed that a majority of enterprises use sustainability already and apply some of the ideas indicated in the literature. Many different specifications show that already a lot is being done here. But despite everything sustainability seems to be more of a positive side effect. The rather high costs of finite resources appear to be, among other factors, the reason that there is so much commitment in this division. It is important that companies consider cost-saving alternatives from the perspective of sustainability.

This would bring benefits for the environment and economic opportunities, such as the improvement of the corporate image, targeting a new field of customers who are environmentally aware, cost-reductions through less fuel consumption and fewer transports. "Green Logistics" gains in importance even with business customers who now select their suppliers more often based on ecological criteria, and it is only a matter of time until legal requirements will be imposed.

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## APPENDICES

### Appendix 1. Questionnaire about the Sustainability Development in SMEs in Germany

#### 1. Number of employees in your enterprise

- Up to 9
- From 9 to 249
- From 249 to 499
- More than 499

#### 2. Which of the sustainable issues will gain in importance in the future? *(multiple answers are possible)*

- Climate protection
- Employee concerns (flexible working hours- and remunerative model, ...)
- Green products
- Noise control
- Protection of resources
- Quota for women in management positions
- Security of corporate data
- Waste recovery, recycling

#### 3. What reasons cause you to deal with the issue of sustainability *(multiple answers are possible)*

- Approach for future growth
- Competitive advantages
- Corporate Culture
- Demands of society
- Employees
- Important for innovation

- Legal Requirements
- Profit increase
- Reduce risk
- Requests by investors
- Requirements of customers
- Other:

**4. Is your enterprise committed to sustainable measures beyond the law?**

- Yes
- No

**5. How often do inquiries made by customers include questions of sustainable aspects?**

- Never
- Up to 5%
- From 5 % to 20 %
- More than 20%
- Not specified

**6. Which aspect(s) do the inquiries made by customer's target? (*multiple answers are possible*)**

- Ecological aspects
- Economic aspects
- Social aspects



**7. Do you have or plan to implement the following measures concerning your employees?**

	implemented	planned	Not planned	Not specified
Certification of Occupational Safety	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Individual working hours	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Regular survey on employee satisfaction	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Training - and development concepts	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Training of apprentices	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Other measures:	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

**8. Do you have or plan to implement the following measures concerning the society and region you are located in?**

	implemented	planned	Not planned	Not specified
Donations for social projects	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Other support for social projects	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Training of disadvantaged people	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Other measure(s)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

**9. Who is promoting sustainability efforts in your company?** *(multiple answers are possible)*

- Customers
- Department Managers
- Employees
- External consultant
- Government
- Managing Director
- Owner
- Suppliers

**10. Do you have a sustainable strategy defined in your company?**

- Yes
- No

**11. If so, what is it?**

**12. Which of the following barriers prevent you to deal with sustainable development?** *(multiple answers are possible)*

- Finances
- Knowledge
- Technology
- Time
- None/ Other barriers

**13. How committed are your individual corporate division?**

Customer-service	Logistic	Management	R&D	Packaging	Production	Sales
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

**14. What specifically is done in procurement?** *(multiple answers are possible)*

- Certified suppliers
- Sourcing from the region
- Selecting suppliers by sustainable criteria
- Other:

**15. What specifically is done in production?** *(multiple answers are possible)*

- Considering sustainable aspects in the building design and renovation
- Energy saving
- Ergonomic Workplace
- Prevention of accidents
- Protection of health
- Short distances in the production
- Warehousing and packaging
- Other:

**16. What specifically is done in distribution?** *(multiple answers are possible)*

- Optimization of logistics facilities
- Optimization of route planning
- Shifting to other modes of transport
- Training of drivers to save fuel
- Other:

**17. Do you have specific goals defined in your enterprise? And if so, what are they?**

- Yes
- No

**18. Do you measure the effectiveness of sustainable implementations?**  
*(multiple answers are possible)*

- Yes, regularly by KPIs and other indicators
- Yes, but only occasionally
- No, not at all

**19. To what extent are the sustainable implementations helping in saving cost?**

- Less than 5 %
- Between 5 and 10 %
- Between 10 and 15 %
- Between 15 and 20 %
- More than 20 %

**20. Since the sustainable implementations, do you have experienced an increase in sales?**

- Significant increase
- Small increase
- No change
- Losses

**21. Do you consider sustainability to be an opportunity or risk for your company?**

- Opportunity
- Rather opportunity
- Rather risk
- Risk
- Neither