The value adding role of green logistics in transport companies

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Abstract

The requirement to decrease the impact of business logistics activities on the environment is constantly increasing. A number of workshops organised by the University of Hull involving academics and practitioners in supply chain management to examine the challenges of the next generation supply chains, showed that environmental issues along with cost effectiveness is always the major and most imminent concern identified. Green logistics refers to “attempts to measure and minimise the ecological impact of logistics activities” (Reverse Logistics Executive Council, 2010). These activities include green purchasing, green material management and manufacturing, green distribution, warehousing and marketing, as well as reverse logistics (Hervani, Helms & Sarkis, 2005). The overall objective of green logistics is to reduce impact on the environment, lower production cost, and improve product value. Green logistics can also lead to decrease the inventory level, reduce logistics cost, increase revenue and profit, improve service, enrich information for reverse logistics, and enhance company image (Murphy, Poist & Braunschweig, 1995).

The purpose of this dissertation is to investigate and analyse how and if companies can add value to their firm by implementing “green logistics” to their transportation activities, thus achieving a competitive advantage. The research samples are small trucking firms located in South Sweden, and were chosen in order to understand the value of green logistics for small trucking firms.

The method used to achieve the objective of this dissertation is an inductive research approach. The empirical data was collected through a semi-structured interview guide, where four companies within in the transport industry were interviewed. The collected data was then compared with the theoretical review and analysed.

Findings

Among the findings of this thesis, the following can be mentioned:

- the main way in which transport companies can add value through green logistics is by focusing on renewing their truck lot, other options are not very popular at the moment;
• transport companies currently struggle to compensate the high costs of green logistics and the benefits they gain are not significant;
• transport companies do not consider that green logistics can represent a marketing tool at the moment, because the concept is rather new and the awareness is still not high enough;
• more needs to be done in the domain of regulations so that companies will be encouraged to use green logistics;
• green logistics is still not developed enough and managers do not give it enough importance at the present time.
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1 Introduction

The first chapter of this dissertation includes the background, the problem, the research question and the research purpose. In the end of the chapter the limitations and an outline of the dissertation are presented.

1.1 Background

Environmental issues of business activities have become an important matter in recent years for several reasons. Growing public knowledge of environmental conservation, increasing need for sustainable development, and introduction of environmental rules and regulations in developed countries are some reasons that force companies to consider environmental issues in their active agenda (Lau, 2011). Companies nowadays are redesigning and redeveloping their logistics practices to make the activities more energy efficient and environmentally friendly. Green supply chain initiatives in different logistical activities such as procurement, manufacturing, distribution, and recycling are rapidly emerging as major trends (Mason, 2002). Consequently, green logistics have become an important consideration and a big challenge to supply chain management around the world (Murphy & Poist, 2000; Rao & Holt, 2005; Vachon & Klassen, 2006).

The requirement to decrease the impact of business logistics activities on the environment is constantly increasing. A number of workshops organised by the University of Hull involving academics and practitioners in supply chain management to examine the challenges of the next generation supply chains, showed that environmental issues along with cost effectiveness is always the major and most imminent concern identified (EPSRC, 2010). Green logistics refers to “attempts to measure and minimise the ecological impact of logistics activities” (Reverse Logistics Executive Council, 2010). These activities include green purchasing, green material management and manufacturing, green distribution, warehousing and marketing, as well as reverse logistics (Hervani, Helms & Sarkis, 2005). The overall objective of green logistics is to reduce impact on the environment, lower production cost, and improve product value. Green logistics can also lead to decrease the inventory level, reduce logistics cost, increase revenue and profit, improve service, enrich information for reverse logistics, and enhance company image (Murphy, Poist & Braunschweig, 1995). Effective management of green logistics activities not only affects an organization’s operational and economic performance (Alvarez, Jimenez, & Lorente, 2001) but also increases its competitiveness in the long run (Rao, 2004).

From a wider perspective, green logistics can be considered as part of green supply chain management (GSCM) that aims at integrating environmental thinking into closed-loop supply chain management (Lau, 2011). The activities include product design, material sourcing, inbound transportation, manufacturing processes, waste reduction, product packaging, distribution and delivery to customers, and end-of-life product returns for recycling and reuse (Beamen, 1999; Srivastara, 2007). With the growing concern of the public about the environment, GSCM has moved to the top of the research agenda (Lau, 2011).

In spite of the widespread attention of green initiatives, the terminology “green” is loosely defined or not defined at all (Kim & Min, 2011). Though “green” may generally refer to
“eco friendliness” or “sustainability”, its focus has been predominantly reactive compliance with environmental regulations or public demand. Reflecting this shortfall in the real world, in most supply chain literature, the green concept was rarely incorporated into the supply chain performance measures and thus was not considered as a value-adding or a competitive activity (Kim & Min, 2011).

1.2 Problem

Logistics is the expression now generally used to describe the transportation, handling and storage of products during the movement from raw material source, through the production processes to the final point of sale or consumption. Even though logistics activities have been fundamental to the development of economies and societies for many centuries, it is only during the past 50 years that logistics has been regarded as a key determinant of business performance, profession and an important field of academic study. During these years of being regarded as an important subject, most of the research has been focusing on organizing logistics in a way to increase and maximise profitability (McKinnon, 2010). McKinnon further states that, the environmental and social costs have traditionally been excluded from the balance sheets over the years, until recently. With the increasing public and government concern for the environment, companies are now forced to put pressure on their logistics departments to reduce the environmental impact of their logistics activities (McKinnon, 2010).

The distribution of goods harms the local air quality, causes accidents, generates noise and vibration and has made a significant contribution to global warming. The impact that logistics have on the climate change has gained increasing attention in recent years, mostly because tightening of control on pollution and road safety improvement have improved the other environmental problems, but also because more and new scientific research has revealed that the problem with global warming presents a much more serious and immediate threat than previously thought of. It is estimated that cargo transport accounts for approximately eight per cent of the energy related CO$_2$ release worldwide (Ribeiro & Kobayashi, 2007). With also taking warehousing and goods handling under consideration, around two-thirds per cent more is added to this total. According to the European Commission (2003), in the road transport sector the amount of energy consumed to transport goods is increasing at a faster rate than the energy used by cars and buses, and may surpass it by the early 2020s.

If the CO$_2$ released from shipping continues to grow at the forecasted rate while governments cut the CO$_2$ release from their national economies by an average of 50 per cent to around 2050, shipping alone still would account for around 15-30 per cent of the total CO$_2$ release, even if allowing for a 33-50 per cent improvement in its energy efficiency until then (Committee on Climate Change, 2008). Having this in mind it is not surprising that the government and inter-governmental organizations are developing policies to lower the carbon for the transport industry. Making logistics more sustainable in the longer run will involve more than just cutting the amount of carbon release. In spite of the recent improvements, the potential for cutting other environmental costs of logistics still exist. Many of the actions that reduce the environmental impact that logistics has, the so called “green gold" actions, also saves money, and firms are in a better position to avoid the trade off between environmental benefits and economic costs (McKinnon, 2010). The question therefore is how can logistics firms add value by adopting green thinking into their transportation activities?
1.3 Research purpose

The purpose of this dissertation is to investigate and analyse how and if companies can add value to their firm by implementing “green logistics” to their transportations activities, thus achieving a competitive advantage. The research samples are all small trucking firms located in the south of Sweden, and were chosen in order to understand the value of green logistics for small trucking firms.

The companies that fit the description of small trucking firms are companies that do not have a very high impact on the market, their financial power is not very high, having no more than 30 employees and 50 trucks in their lot. Therefore, the present research focused on an in depth study regarding such companies and their use of green logistics operations.

1.4 Research question

The main research question and purpose of the study is:

“If and how can green logistics activities, with special focus on transport activities, create value for transport organizations?”

Apart from this main question, there are also two other questions on the topic of green logistics, their role being of providing the help to find out whether companies can add value by implementing green logistics:

1. “As far as companies are concerned, are the benefits brought by green logistics good enough in order to compensate for the costs of introducing green logistics policies? (in other words, are green logistics profitable?)”

2. “Do transport companies consider that green logistics can represent a marketing tool?”

1.5 Delimitation

The research in this study is limited to investigate how green logistics can add value for organizations. The focus will be on green logistics as a value adding method for logistics firms, particularly with regard to implementing green logistics in organizations transportation activities, but also looking at the wider picture of green supply chain and the value adding role of green logistics. Previous research will be gathered and used to give a deeper understanding of environmental impacts of logistics, green logistics, value adding activities and green logistics as value adding. Substantial literature can be found regarding Green Supply Chain Management, however the literature regarding green logistics as value adding is limited. According to McKinnon (2010), “In their review of 10 logistics, supply management and transport journals over the period 1995–2004, Aronsson and Brodin (2006) found that only 45 papers out of 2,026 (2.2 per cent) addressed environmental issues.”

1.6 Outline

The structure of this dissertation is subdivided into six chapters. The first chapter presents background information, problem, research purpose and introduces the research question of this dissertation. In chapter two the theoretical framework of this dissertation is pre-
presented including reviews of the theoretical literature regarding green logistics. The third chapter presents the methods used to conduct the research, such as the research approach and choice of philosophy, theory and methodology. In the fourth chapter the results are presented. The companies that participated in this study are introduced and the material from the interviews is summarized. In chapter five, the analysis of the empirical findings is presented. Lastly, chapter seven presents the conclusions of this dissertation and suggestions for future research.
2 Literature review

In this chapter the theoretical review for this thesis is presented. An ample literature review on the topic of green logistics is examined; subjects related to the awareness towards green logistics, the problems that green logistics encounters and the potential ways through which companies can add value with the use of them are discussed.

2.1 Environmental impact of logistics

Like any other activities nowadays, the activities involved in supply chain management have an impact on the environment. As the popularity of logistics operations grew in the last couple of years so did the impact that these operations had on the environment. For various reasons, company executives realized that they needed to take certain measures in order for their companies to have a more environmental approach (Goldsby & Stank, 2000).

2.1.1 Awareness of environmental impact

It is fair to say that supply chain management has evolved quite a bit from its early days in the 1980s to the complex technology driven processes that are present today. Along with the development of supply chain management grew the desire for the logistics companies to provide their clients with higher quality products and services in order to achieve an advantage among the competitors (Goldsby & Stank, 2000).

A lot of businesses took a more environmental approach in recent years and this was also the case with supply chain management (Beamon, 1999). Company executives considered that by employing environmental management practices, they would also be able to bring higher quality to their products and services (Srivastava, 2007).

According to Beamon (1999), what led to the awareness of the negative impact of the industry on the environment were aspects such as the pollution of water and air, the disposal of waste which got out of control or the alarmingly high speed with our natural resources are being consumed.

As Goldsby and Stank state (2000), it was in the 1990s when the support for environmental responsibility really took off. It is worth mentioning that this support was not only represented by government regulations, but also by the general public who realized the importance of protection of the environment. According to the article “Green logistics: Comparative views of environmental progressiveness, moderates, and conservatives” it seems that environmentalism can be characterized as one of the most significant forces that shaped the economy, as well as being one of the most important issues that business faced during the 1990s (Murphy, Poist & Braunschweig, 1996).

Soon companies took notice of these regulations and some of them actually considered that in some cases heightening the standards that were imposed by the authorities would probably help them gain an advantage over other firms competing in this domain. Furthermore, there was another reason why supply chain management in companies would be tempted to adopt these measures, and this reason was whether they were socially responsible enough in the eye of the public (Goldsby & Stank, 2000).
The customer awareness regarding environmental policies experienced a steady growth during the last couple of years and the firms involved in the logistics industry wanted to take that to their own advantage. It is therefore plausible to affirm that these decisions regarding the environmental protection were also probably taken because the logistics companies in this case realised that they would be able to benefit from them in the eye of the public – a public that started to request a lesser impact to the environment by the companies – and that would also serve their own interests (Goldsby & Stank, 2000).

2.1.2 Environmentally responsible logistics

Companies that implement environmentally responsible logistics believe that this strategy will also enable them to reach higher logistics performances comparative to other firms in their domain. However, from a belief to a certainty there is still a long way to go and numerous research studies have been conducted during the last couple of years in order to reach a conclusion regarding the plausibility of such a statement (Goldsby & Stank, 2000).

The studies that have been conducted in this area show that there definitely is a connection between environmentally responsible logistics and overall performance of the logistics operations. If a company desires to implement environmentally responsible logistics, they will gain an advantage from it when it comes to aspects such as the satisfaction of its customers or the implementation of new government regulations and policies. However, it has been observed that in the case of activities such as production, distribution, planning, purchasing or sales no significant influence has been detected regarding the implementation of environmentally responsible logistics (Goldsby & Stank, 2000).

Looking deeper into this issue, it is rather easy to see why these two aspects are so well connected. The companies that managed to develop a good assessment model and metrics also communicated well with their clients and were aware of their needs. Therefore, they also got the right signal from their clients when it came to product and service development. It can be concluded that environmental responsibility was more present in big companies than in small ones (Murphy et al., 1996).

When it comes to environmentally responsible logistics, it was discovered that the competence of a company’s management is also very relevant for the end result. For instance, companies that demonstrated a good problem assessment and performance measurement in comparison to other firms also had managers with better qualifications compared to the managers from the competing companies. These managers were usually employed by big companies, companies that were able to afford paying their salaries (Goldsby & Stank, 2000).

2.1.3 Logistics companies and environmental issues

Looking at companies by the way they support environmental responsibility, different authors identified several types of companies based on their relationship with the environment. Authors Goldsby and Stank (2000) identified three main categories: companies that are very little responsible, responsible companies and companies that base their strategy around protecting the environment.

The first category comprises those companies that do not consider that it is worth the effort to adopt environmental policies and engage in environmental activities. Such compa-
nies only tend to react to environmental regulations to a minimal point and their overall objective regarding environmentally responsible logistics is to keep their costs as low as possible. Therefore, they do not seek to improve their value adding services with the use of environmentally responsible logistics. Companies that extend their environmental strategies and decisions beyond those that are imposed by regulations and react proactively when it comes to value-added services creates the second category. Even though such companies embrace the protection of the environment and struggle to lessen the negative impact of the industry, there are companies that do even more when it comes to the usage of recycling activities and green logistics. The third category comprises those companies whose main strategy revolves around environmental issues and value-added services by using environmental policies. By using such strategies they seek to gain an advantage over other companies that do not embrace them. Their main concern is to protect the environment and minimize the negative impact of their activities. It is therefore easy to understand why such companies mainly have operations that consist of disassembly, reuse or recycling (Goldsby & Stank, 2000).

There have also been other attempts to classify logistics firms from an environmental point of view. For instance, Murphy et al. (1996) separated companies into three categories: progressive, moderate and conservative. It has been discovered that the companies that made good use of environmentally responsible logistics and developed their strategy around environmental issues were in most of the cases larger than the firms that used environmentally responsible logistics to a lesser extent.

This discovery can be explained by the fact that smaller firms did not have the necessary financial means required in order to develop a system capable of supporting an environmentally progressive strategy. Large companies on the other hand were able to employ the best specialists in the domain and come up with a system competitive enough to incorporate such a strategy (Murphy et al., 1996).

2.2 Green logistics

The reason why green logistics is such an important subject, and its impact in the supply chain grew in recent years, is because it promises to reduce the impact to the environment that the industrial activities have. Green supply chain management is able to reduce this environmental impact without having to sacrifice aspects such as quality, energy utilisation efficiency, performance or reliability (Srivastava, 2007).

2.2.1 Defining green logistics

Before analyzing green logistics, the factors that influence the adoption of green logistics and the problems that it might come up against, it is probably important to understand what green logistics represent and analyse a few definitions of this concept. Looking at the literature regarding green logistics, Srivastava (2007) states that green supply chain management (GSCM) represents the integration of environmental thinking into supply chain management, which includes elements such as material sourcing and selection, delivery of the final product, product design or manufacturing processes.

By analyzing this definition the following conclusion can be reached: once a company employs an environmental approach for its business, then it definitely influences the strategy of the firm and changes need to be made in all the departments. All these changes come at
a price though, because the company will have to make bigger investments and allocate more funds to certain sectors in order to reach its green logistics goals. In fact there are companies that oppose such an approach especially because of the additional costs that it implies (Srivastava, 2007).

Authors Hazen, Cegielski and Hanna (2011) identify GSCM with environmental sustainability practices in the supply chain. However, the authors add that the concept of GSCM is not always very well understood and the literature on this topic is not that well developed either.

“Environmental quality” is described by the Council on Environmental Quality and compared to healthy ecosystems, toxic free communities or safe food (Beamon, 1999). Even though green logistics managed to attract a wide interest from the 1970s, other topics such as the highly important reverse logistics did not gain attention until the 1990s (Goldsby and Stank, 2000).

2.2.2 Factors influencing the adoption of green logistics

Examining the literature regarding green logistics and looking for the elements that might influence its adoption, several examples might come to hand such as: environmental regulation, stakeholder pressure, human resources, managers’ characteristics or company size (Lin & Ho, 2010). It seems that when it comes to studies regarding several environmental issues, in most of the cases the main focus was on products rather than services. Therefore, being part of this sector, green logistics have been somehow neglected by these analyses (Lin & Ho, 2010).

In order to investigate the efficiency of green logistics, it is necessary to take a closer look and see what the elements that influence green logistics are. Drivers such as green design, green sourcing, reverse logistics, green packaging, green innovation or customer awareness have been identified by researches (Routroy, 2009).

Looking at an analysis that was conducted on the Chinese market for example, it can be said that several elements that can influence the adoption of green logistics can be perceived differently by supply chain management companies (Lin & Ho, 2010). The factors that have positive influences were governmental support, quality of human resources, regulatory pressure, organisational support, relative advantage and compatibility of green practices, while the complexity of green practices and environmental activities brought negative reactions from the companies. In the case of customer pressure, there was neither a negative reaction nor a positive one (Lin & Ho, 2010).

In contrast to other such studies, this study came to the conclusion that when it comes to the influence generated by customer pressure, the differences are not very significant. In this case, looking at the previous literature, it can be stated that at the moment there is not enough data in order to reach a conclusion regarding the potential influence that the pressure from the customers might have on the decisions a company makes (Lin & Ho, 2010).

2.2.3 Problems for green logistics

Even though the governments are trying to make supply chain management companies adopt new policies regarding green logistics, it seems that there are also some aspects that
are not working properly at the moment. For instance, it has been discovered that when it comes to public opinion, people consider that the overall quality of the products manufactured through green logistics based processes is inferior to those products that are manufactured through traditional methods. On top of that, there is also the matter of cost because green products tend to be much more expensive than normal ones, so this is another problem that might drive customers away from green products (Hazen et al., 2011).

This should not come as a surprise though given the fact that some of the processes that green logistics imply are “recycling, remanufacturing or reuse” (Hazen et al., 2011). It is therefore easy to understand why the consumers might be let down by these products. Because those products are not brand-new, a consumer might have second thoughts when it comes to purchasing them. However, Hazen et al. (2011) suggest that not all green logistics activities are perceived as equal by the general public. If we are to make a comparison between the perceived quality of new goods and recycled goods, it seems that the consumers did not consider that there was any significant difference in the quality of the products, so there are different results for different green logistics activities.

There are also other problems regarding green logistics (Srivastava, 2007). As Hazen et al. (2011) observed, there are problems when it comes to understanding the concept of green supply chain management, mainly when it comes to the diffusion and adoption of different practices related to green supply chain management.

It has been discovered that the general public is not able to comprehend entirely what activities like recycling, reuse or remanufacturing represent. Green logistics is a relatively new concept and it takes time in order for the consumers to get familiarised with it; this represents a problem for green logistics development (Hazen et al., 2011).

### 2.3 Green transport

Even though logistics operations have expanded significantly over the years, very little importance is still given to transportation when it comes to literature research. In spite of the fact that governments introduced several policies in order to decrease the impact of the pollution generated by transportation, there are several authors who question the efficiency of these measures, considering that their only contribution is to lead to the development of inefficient markets and increase the costs of companies (Bayliss, 1998).

#### 2.3.1 The reduction of greenhouse emissions – the main focus of green transportation

The biggest problem that green transport tries to solve when it comes to the negative impact on the environment is the problem regarding the emissions of CO$_2$, which represents the source of greenhouse emissions. Another problem that transportation is facing is its dependence on fossil fuels and its inability at the moment to shift efficiently to a different type of fuel. These fossil fuels are responsible for greenhouse emissions, so there is a direct connection between these two elements. In a study that was conducted in Australia, authors Tiwari, Cervero and Schipper (2011) identified that 88% of the CO$_2$ emissions are to be attributed to road transportation, while transport represents the third largest source of greenhouse emissions.
2.3.2 The regulation of transport

As technology progressed and worldwide transportation evolved, the amount of pollution generated to the environment by the means of transport increased dramatically. Therefore, most of the governments decided that certain policies needed to be deployed in the area of transportation regarding the reduction of these emissions. Because policies at international level were not being adopted fast enough, they decided to implement their own policies at local level in order to decrease the negative impact that transportation has on the environment. These measures targeted the pollution in the cities and they are called green urban transport policies (Carvalho, Mingardo & Van Haaren, 2012).

In order to decrease the negative impact that transportation has on the environment, governments introduce new regulations in order to reduce the level of CO₂ and greenhouse emissions. According to some authors, these measures come in contradiction to the other measures that have been taken over the years regarding transportation, measures which were mostly about the liberalisation and deregulation of transport, as opposed to regulation (Bayliss, 1998).

The observation is that in all the other sectors of transportation, with the exception of green transport where new rules are forcing contractors to reduce the impact on the environment, deregulation policies were adopted during the years and the results were more than satisfactory for the companies involved. In this case it is easy to understand why the general fear of these authors is that these new regulations will not lead to overall progress and why they question the logic behind it (Bayliss, 1998).

Another problem that the regulation of transport is facing is the fact that applying all the new rules in the policies in the targeted countries is not very easy at all. Until a new regulation passes, it faces problems of a different nature such as competitive, political, social, economical and geographical problems. All these parameters need to be met in order for a new policy in the area of green transportation to be adopted, leading to increased costs, while its efficiency is questionable according to some authors (Bayliss, 1998).

2.4 Value adding

Before investigating and analysing the way that green logistics manage to add value to logistics firms, it is important to understand how companies with activities in supply chain management add value to their products and services in the first place. Along with the increase in importance of logistics over the years, it has started to be labelled as a value adding process for firms, yet it is unclear how to define “value adding” or how to precisely measure it (Rutner, Langley & John, 2000).

2.4.1 The problem with defining value adding

According to Rutner et al. (2000), the way that logistics manage to add value can be traced to its definitions. For instance, when looking at one of its definitions, the “Seven R’s of logistics” evidence of value adding in logistics can be found: by offering the right product at the right place and at the right time, value is added to the customer.

Regarding the definitions that can be attributed to value and value adding, most authors realised that it is rather difficult to come up with a precise definition because value is per-
ceived very different from one person to another, or from one company to another. Nevertheless, value can be described as being the “quality of a thing according to which it is thought of as being more or less desirable, useful, estimable, important, etc.” (Rutner et al., 2000).

According to Berglund et al. (1999), the method through which a logistics firm is supposed to add value is by achieving operational efficiency at a better level than other companies would be able to and therefore provide their customers with a better performance/cost ratio. The authors also remarked the fact that logistics companies that are 3PL providers add value to customers in a different way than those companies that are 4PL providers.

A research that has been conducted on the topic of value and value adding also showed the lack of a clear or precise definition of these concepts at company level. In fact, there were numerous firms that did not even have a definition for value and value adding to begin with. Therefore, one of the conclusions that can be reached in this case is that it would be helpful for the companies in supply chain management to gain access to an industry-based set of definitions, regarding value and value adding (Rutner et al., 2000).

The problem with defining value adding led a lot of companies to not pursue the incorporation of logistics value into their strategies, but this lack of interest might also have something to do with the fact that many managers did not consider that adding value has a good potential in the first place. The fact that these managers did not see the potential behind adding value can be attributed to the fact that they considered that it is not profitable to invest and innovate in logistics value (Rutner et al., 2000).

2.4.2 How logistics firms add value

As it was established before, the concept of adding value can be very different from one party to another, but in the end companies do manage to add value if they follow a good strategy. The main problem for a company when it comes to adding value is to be ahead of its main competitors in providing its clients with superior products and services (Berglund, van Laarhoven, Sharman & Wandel, 1999).

In supply chain management, companies such as third party logistics providers can add value to their clients due to the nature of their services. In such cases, the customers realise that the third party logistics provider is able to accomplish certain operations with more efficiency than they would be able to and in such a case both parties would benefit from this (Power, Sharafali & Bhakoo, 2007).

In fact, clients consider that when it comes to added value, third party logistics providers not only contribute to lowering the overall costs, but they also increase flexibility. Customers hold in high regard the technologies used by third party logistics companies, as well as their objectives and services, which help them add value (Power et al., 2007).

2.5 The value adding role of green transportation

Transportation plays a key role in the supply chain, because without the efficient movement of finished goods and raw materials the entire system would not be able to work at its full potential (Randall, Defee & Brady, 2010).
2.5.1 Identifying the elements that add value to green transportation

There are problems however when it comes to implementing green transportation strategies in the case of some companies because the managers of these companies do not fully understand what are the measures that need to be taken so that their firm will be more effective in using green policies. The managers have problems in identifying the right drivers and barriers that they need to take into consideration in order to make their companies perform better from a green perspective. These problems seem to occur because there is apparently not enough knowledge in the domain of green transport among managers in order for them to be able to take the right decisions for their companies (Berns, Townend, Khayat, Balagopal, Reeves, Hopkins & Kruschwitz, 2009).

As technology progressed and governments and companies became more aware of the importance of protecting the environment, there have been new approaches towards value adding in green transportation. For quite some time, transport companies have identified the core values as being time and place utility, but there are authors who suggest that there are also other elements that need to be taken into account regarding the potential value that can be added to transportation in addition to time and place utility (Randall et al., 2010).

It seems that along with the development of modern transportation, companies in this domain have identified new elements that have the potential of bringing value to their business. Because the importance of green logistics started to grow in the last couple of years, it is fair to say that this did not remain unnoticed by the transportation companies and they became aware of the fact that areas of green logistics such as green transportation could represent the future (Randall et al., 2010).

As technology and infrastructure change, the focus of green transportation should also include the changes that take place when it comes to traffic capacity and volume or the condition of the pavement. Transport companies can add value through green logistics policies by coming up with solutions for modern day problems related to transport. As the awareness towards the use of these policies grew over the years, transport companies tried to add value by improving their services in different areas in order to minimise negative effects such as air pollution, congestion or greenhouse emissions (Donaghy & Schintler, 1998).

According to Randall et al. (2010), in the case of motor carrier transportation the concept of value is being developed around four themes: place, value-add, value management and time. The authors also managed to find other elements that might have the potential of serving as value-adders such as reliability, technology or type equipment. In the case of transportation it is very important for a company that has activities in this domain to have capabilities such as these in order to differentiate itself from other companies because in the case of the motor carrier industry price is not considered to be a distinguishing factor (Randall et al., 2010).

2.5.2 Modern solutions for transport companies

Transport companies realised that they can use technology in order to add value through their green logistics policies. In the past three decades quite a lot of progress has been achieved in the area of ozone pollution, but it seems that at ground level there is still a lot left to be done regarding ozone concentrations. Local authorities can help transport com-
panies in this area by informing them about the change of the levels of these emissions during the day (Gao & Niemeier, 2008).

Another area where transport companies can add value through green logistics is represented by the use of bio-fuels. This type of fuel presents several advantages and is less harmful to the environment compared to regular fuels. Bio-fuels enable land carriers to lower their emissions of pollutant gases that result in raised greenhouse levels and acid rain, and thus limiting the negative impact on the environment. Companies that use bio-fuels have the advantage of offering superior services to their customers and they also respect government regulations. Furthermore, bio-fuel is harvested from farms and forests and then is transported in order to be processed and this automatically implies that the most suitable means of transporting it would be by road carrier (Allen, Browne, Hunter, Boyd & Palmer, 1998).

The activities of producing bio-fuel are interconnected and it is better for transport companies to take part in all these operations, instead of only incorporating a few into its strategy, because this way they will be able to limit their costs. This represents another reason for transport companies to consider exploiting the advantages brought by this fuel. However, the use of these bio-fuels has the disadvantage of the costs that it brings to the company, because all the operations involved in order to harvest and produce these bio-fuels involves a great financial investment from the companies that are willing to use them (Allen et al., 1998).

Transportation companies use several methods of analysing their activities, one of these being represented by benchmarking. One of the uses of benchmarking is also to identify the areas where a company can use green transport policies in order to add value. Authors Menacho and Wassenberg (2000) conducted a research in order to find out more about the activities that companies benchmark, what type of benchmark they are using and what are the areas where using benchmarking proved to be successful. When it comes to benchmarking, they identified that the greatest barrier is represented by time, and not employee commitment, while the second greatest barrier is represented by organizational complexity.

Even though a lot of progress has been made in establishing the methods of adding value in the case of transport companies, there is still a long way to go until the concept is fully understood by everyone. Several authors discovered that when it comes to value adding, there are a lot of companies that do not know exactly what value adding really represents, let alone what value adding from green logistics is or the advantages that different types of green logistics such as green transportation can bring to their companies (Rutner et al., 2000).

At the present time, the topic of green logistics is still underused and under-researched. However, it seems that the awareness of the importance of using green strategies in transportation companies is growing and there is a future for green transportation (Randall et al., 2010).
In this chapter the methodology is presented and discussed, as well as further aspects regarding the research that will take place and the data collection.

3.1 Research philosophy

When trying to achieve the objectives of a dissertation a well defined research philosophy is required. Authors Saunders, Lewis and Thornhill (2009) state that the four research philosophies that are most commonly used are positivism, interpretivism, realism and pragmatism. These theories are different from one another and represent theories regarding the way that researchers look at the world, their role being in providing help in choosing the methods and the research strategy that are part of the overall strategy. According to Saunders et al. (2009), it is very important in the case of researchers to have a good reflection regarding their choices and be able to defend them in the face of other potential alternatives (Saunders et al., 2009).

Positivists think that facts are more important than impressions. If there is a theory on a subject, then this theory can be used to bring up hypotheses that can be confirmed and tested, leading thus to further developing the theory that is used. Positivists use quantifiable observations for a good analysis of the data. According to interpretivism, it is highly important to understand what the differences between people and the role that they have in society are. An empathetic stance is required in the case of conducting a research that uses an interpretivist philosophy. In this case, the researcher will see the existing problems through the point of view of the subject. A scientific approach is used by realists when they develop knowledge, therefore meaning that the data they collect and subsequently research will be correctly understood. According to realism, what our senses show us represents the truth and therefore there are two recognized types of realism: critical realism and direct realism. Critical realism states that our senses can be sometimes deceiving and what we actually see represents sensations. On the other hand, direct realism has the argument that what you actually is what you actually end up with. On the other hand, according to pragmatists, the most important aspect that needs to be taken into consideration when designing a method is the research question itself. Philosophies that are different from one another might have a different impact on the way they answer questions and this is the reason why pragmatists consider that researchers should use the philosophies considered to be most suitable for every situation in order to reach their objective (Saunders et al., 2009).

This dissertation will use an interpretivist research philosophy because the research that will be conducted is going to be on the topic of how green logistics can add value to companies. Such a research philosophy will enable us to understand the problems regarding green logistics from the respondents view point, therefore enabling us to get a better understanding of the problem.

3.2 Research approach

Authors Saunders et al. (2009) state that when it comes to research approaches, there are two types that can be found: the deductive approach and the inductive approach. The de-
ductive approach uses a strategy that is based on theories that already exist in order to have a starting point. Later on, such theories will be used in order to help with the development of hypotheses and other new theories. After the creation of a hypothesis, a thorough analysis takes place making use of the data that so far had been collected. In the end, this can lead to an update of the original theory if the hypothesis is confirmed.

When researchers use a deductive approach, they usually collect quantitative data so that the results that are obtained can be generalised.

A simplified explanation of a deductive research process:

<table>
<thead>
<tr>
<th>Theory</th>
<th>Hypotheses</th>
<th>Data collection</th>
<th>Analysed</th>
<th>Confirm or reject</th>
</tr>
</thead>
</table>

An inductive approach represents quite the opposite of a deductive approach, its main focus being on creating new theories. In the beginning, data will be collected regarding a problem, and after that is done the data will be developed into results that are used to come up with a new theory. It can be observed than an inductive approach is best used when there are either very few or no theories regarding a subject (Saunders et al., 2009).

A simplified explanation of an inductive research process:

<table>
<thead>
<tr>
<th>Data collection</th>
<th>Analysed</th>
<th>Formulation of theory</th>
</tr>
</thead>
</table>

A further approach is mentioned by Kovács & Spens (2005), that being the abductive approach. In the beginning of an abductive approach, empirical or real-life observations are made and when these observations do no match with the research that has been previously done, then the abductive process itself starts, thus leading to the development of new hypotheses.

A simplified explanation of an abductive research process:

<table>
<thead>
<tr>
<th>Research process</th>
<th>Data collection</th>
<th>Find deviations</th>
<th>Development of new theories</th>
</tr>
</thead>
</table>

The aim of this study is to follow an inductive approach because there are few existing theories about the way that value is added through green logistics. The research began with the data collection, followed by the analysis of this data in the upcoming chapters.

### 3.3 Choice of methodology

Gathering data that is relevant from different sources represent one of the most important parts in a research process. There is also information that is provided by data that is collected by other sources such as governmental statistics or similar researches. Author Halvorsen (1992) states that two research methods exist: the qualitative and the quantitative method. In the case of qualitative data, this is used when the respondent is required to state his opinion regarding a topic (Ghauri & Cateora, 2010).

The objective of this research is to reach a conclusion regarding how companies can add value by using green logistics in their transport activities. A qualitative research is used for the gathering of the empirical data. The first part of the operation was represented by the
collection of data from previous studies related to this topic, followed by the structuring of an interview guide. By using a qualitative approach, the observation and understanding of various aspects of the companies that are interviewed will be easier and will have more depth. It should be added that in the case of a quantitative approach, a lot of important information might not be obtained which the reason why a qualitative approach is used. The companies chosen for this research are small trucking firms.

3.4 Research design and strategy

Saunders et al. (2009) state that in studies, three ways of describing research design exist: exploratory, descriptive and explanatory designs. The first is used when a problem needs clarification in order for it to be understood, giving the possibility of further exploration in that domain. “An exploratory study is a valuable means of finding out ‘what is happening; to seek new insights; to ask questions and to assess phenomena in a new light” (Saunders et al., 2009, p.139).

Therefore, there are two advantages that an exploratory design brings: flexibility and adaptability. In the case of a descriptive design, this is characterised through the identification and description of events or situations. This means that this design is related to the explanatory research design as well as with the exploratory research design. In the case of explanatory designs, this is used for investigating problems with the aim of explaining the relationships that are between variables (Saunders et al., 2009). This research is has an exploratory nature because its purpose is to study how green logistics can add value for companies with the aim of getting a better understanding regarding a field that is rather un-researched.

Authors Saunders et al. (2009) also note that it is highly important to have the right strategy. Choosing a strategy can be influenced by aspects such as questions or research objectives, or the amount of time that is allocated as well as the literature that exists in the topic. According to the same authors, seven research strategies exist and any of these can be used for the research design previously mentioned. The strategies are the following: case study, experiment, grounded theory, archival, experiment, ethnography and action research. A case study strategy will be used for this research. This type of strategy enables researchers to get a better understanding of the processes that are performed as well as the context of the study. The case study strategy also offers the opportunity to find answers for a greater number of questions that come up during the research. According to Saunders et al. (2009), this strategy is useful in the case of analysing theories that already exist. In this case, given the purpose of this dissertation, it is highly appropriate to use this type of strategy.

3.5 Time horizon

According to Saunders et al. (2009), during a research time has two different dimensions: longitudinal and cross-sectional. The first one is used when studying a problem for an extended amount of time. Author Sekaran (2000) states that the longitudinal dimension represents the collection of information about a problem at two or more moments in time. This allows the for the updating and evaluating of the study during the time that the research takes place (Kumar, 1999).

The cross-sectional time horizon can be used when a problem is studied at a precise moment in time. Such a dimension is preferred when time represents a limitation (Saunders et
al., 2009). Given the fact that the purpose of this study is to analyse research objects at a precise moment in time, a cross-sectional horizon will be used in this dissertation.

### 3.6 Data selection

Authors Saunders et al. (2009) state that there are five different ways through which research data can be gathered: questionnaires, observation, interviews, sampling and secondary data. There are also three different types of interviews: in-depth, group or semi-structured interviews. Because the subject of this thesis is complex, empirical data will be collected by using semi-structured interviews. The reason behind this decision is that in this way more detailed answers will be extracted. Furthermore, this approach leads to a better understanding regarding the opinion that companies have on green logistics and if they think it is worth investing in. Therefore, the role of the interviews is to gain information about the way logistics companies are able to add value to their firm by implementing green logistics. Further on in the thesis, an analysis of the data will be made, leading to a conclusion regarding the applicability of the theories from the literature review. The empirical data is collected through face-to-face semi-structured interviews with persons representing the middle and top management of the interviewed companies. In addition to the existing interviews, follow-up question will be used where required. The interviews are conducted in Swedish and recorded with the help of a voice recorder.

### 3.7 Sample selection

A research that is conducted on a smaller amount of population is obviously easier than a study that focuses on selecting data from very numerous groups. The population thus represents an entire set of cases that can provide a sample, the meaning being that any person or company that is a part of the population is of relevance for the study (Saunders et al., 2009). In the case of this research, the full population is represented by all the companies that carry out land transportation. The sample is represented by four companies in the south of Sweden. The reason why these companies are from the south of Sweden is that this region is of very high importance for transportation, it ties Scandinavia with the rest of Europe and it is also the place where many companies have their main warehouses.

Saunders et al. (2009) also mention two very different sampling techniques: non-probability (judgmental) and probability (representative). The first type of technique offers more alternative techniques that help in the selection of examples such as: purposive, snowball, probability, convenience, quota and self selection (Saunders et al., 2009). The second technique however needs to be conducted on the entire population with the respondents being chosen at random in many cases. This study uses a purposive sampling approach because this enables the selection of companies that fit the research goal best. The four chosen samples have all successfully established themselves in the transportation business and they are all attempting to create value for their companies, giving the opportunity of a research regarding how green logistics can add value for transportation companies. The companies were contacted by phone, enabling the explanation of the purpose and goals of the research and also ask for interviews.
3.8 The credibility of research findings

There is a point during a research when researchers cannot be sure that what they found is 100% credible. In this case, the probability of obtaining wrong answers can be reduced with the use of a proper research design. Authors Saunders et al. (2009) state that in order to be less prone to obtaining irrelevant answers, the researcher needs to take two factors into consideration: validity and reliability.

3.8.1 Validity

According to Saunders et al. (2009), in order to keep a research valid, it is preferable to highlight that what has been found is what it appears to be. Validity “refers to the extent to which the researcher gain access to their participants’ knowledge and experience, and is able to infer a meaning that the participant intended from the language that was used by this person” (Saunders et al., 2009, p. 327). In the case of a qualitative research, validity does not represent a very big problem, but it is important to conduct interviews focusing on presenting clear questions and examining the answers and signification of the topic from different perspectives. Propositions are tested against the data that has been collected in order to check the existence of another explanation with the hope of getting to a proper conclusion (Saunders et al., 2009). In this case, responders are considered as a valid source of information, therefore there is no need to raise questions regarding the validity.

3.8.2 Reliability

When collecting data, the techniques that are used need to have consistency for them to be deemed as reliable. Three factors need to be taken into consideration when conducting a proper research:

- Similar observations should be found by other observers
- There needs to be clarity regarding the way that the collected data was translated into the script
- A research that is conducted at a different time should bring up similar results

Authors Saunders et al. (2009) also state the existence of four threats regarding the reliability of the research:

- Subject of participant error
- Subject or participant bias
- Observer error
- Observer bias

Subject of participant error happens when the interviewee provides different answers at different times. For instance, if a person is interviewed in the first day of the week can lead to them having a negative view regarding their organisation, while conducting the same interview later in the week can lead to a totally different attitude.

Subject or participant bias occurs when the interviewees state what they think that their managers would want them to state. In this case, the respondent needs to know the existence of this problem, the best way of doing that is by allowing the respondent to be anonymous.
The observer error can happen when more than one person conducts the interview. Results can be difficult to compare and analysed because of the multiple ways that the questions are asked. In this case a solution would be represented by a good interview guide or a schedule. On the other hand, observer bias occurs when different people conduct these interviews and the answers can be interpreted in many ways (Saunders et al., 2009).

In the case of a qualitative research, there is a problem regarding reliability from the point of view of whether similar results were found by other researches. Another problem is represented by the absence of a standard format in the case of semi-structured interviews. Other such problems that need to be mentioned are interviewer bias and response bias. In the case of response bias, this can be the result of the perception of the respondent regarding the interviewer. This can also happen when there is a reluctance from the interviewee to discuss regarding a certain subject due to the nature of the information that might be divulged. In this case, the researchers will only receive a part of the real picture showcasing only the positive aspects of the organisation. Interviewer bias happens when the interviewer tries to impose his own beliefs regarding the topic, which can influence the way that the respondent answers the questions. Interviewer bias also refers to the moments when the answers are interpreted by the interviewer. If the interviewer was not considered trustworthy by the interviewee, then the data collected data can be limited and affect the validity and reliability of the research (Saunders et al., 2009).

To avoid potential problems, in the case of this study, all the interviews are performed by one person. This person then starts to interpret the answers and puts down his reflections. The conducted interviews are all tape recorded so that another person can listen to the interviews and ensure that the findings are correct. In order to make sure that an observer error does not take place, the respondents have the possibility to discuss freely on the subject due to the openness of the semi-structured questions. There is also the case of anonymity, which is guaranteed both for the respondent and company. In this case, there is a greater possibility of avoiding participant or subject bias and obtaining open answers. The interviews are carried out at the workplaces of the respondents. The reason for doing this is to ensure the respondents that they have enough time to take part in the interview and also in order to make them more comfortable. According to Saunders et al. (2009), findings that come from a non-standardised research “reflect reality at the time they were collected, in a situation which may be subject to change” (pp. 327-328), which means that these findings cannot necessarily be repeated or are really intended.

3.8.3 Generalisability

Results of the research are deemed as generalisable if its findings can be applied to other environments, like other organisations. If there are too many or too few organisations in the research or if these organisations are too diverse, there is the possibility that the study cannot be generalisable. Authors Saunders et al. (2009) affirm that it is not the aim of the research to come up with a theory generalisable for all organisations. In the case of qualitative research, generalisability can however be increased in some ways. Relating the project to the existing theory would represent such a way. This way, it will show that what was found during the interviews can be more significant from a theoretical perspective than specific cases. This study is based on a qualitative approach, using semi-structured interviews. According to Saunders et al. (2009), generalisations regarding the whole population cannot be made through the use of semi-structured interviews, due to the fact that they ap-
ply to unrepresentative cases. This means that the results that are presented in this study cannot be generalised, but they can offer indications regarding green logistics.
4 Empirical data

This chapter starts with a brief presentation of the companies that participated in this research, followed by the presentation of the empirical data. Lastly, a short summary of the empirical material will be presented.

4.1 Company presentation

In this subchapter a brief presentation of the four companies that participated in this research will be presented. All the companies have established them self in the transportation industry and are located in the south of Sweden. The respondents are because of their experience and positions within respective company, considered to be a valid source regarding knowledge regarding the value adding role that green logistics can have in a company. All the companies and respondents are kept anonymous on the respondents’ requests and to increase the possibility to gain honest answers.

4.1.1 Company A

Company A was founded in 1965 and have their main headquarters located in Helsingborg, Sweden. The company mostly carries out its transportation activities in Western Europe for its main customers such as DHL, DSV and Schenker. The company has expanded during the last decade but since the recent recession, the company had to sell a part of its fleet and also to close down the representative office they had in Germany. At the time of the interview they had 45 trucks and an estimated turnover of around 90 million SEK.

The interview was carried out on the 27th of April at 14.00 with the Logistics manager (Interviewee A). The interview lasted for around 30 minutes and was carried out in the Logistics managers’ office in the headquarters located in Helsingborg.

4.1.2 Company B

Company B was established in 1954 and they also have their main headquarters located in Helsingborg, Sweden. The company is highly specialized in a wide range of products, from sensitive space instruments to thoroughbred horses for the Swedish national team. Company B have representative offices in three other locations in Sweden as well as one in Denmark, two in Germany and one in Italy. They offer in addition to transportation, limited storage capacity in Sweden as well as forwarding activities. The turnover of the company was in 2010 almost 300 million SEK.

The interview was carried out with the marketing manager (Interviewee B) on the 29th of April at 10.00 in a conference room in the head office in Helsingborg. The interview lasted for 30 minutes.

4.1.3 Company C

Company C became an independent company in 1991 and before that it was a part of another organisation. They have their head office in the village of Hasslarp located 15-20 km north of Helsingborg and they are specialised in car transport and have presently twelve
car carriers that transport cars all around Europe, including Turkey. The carriers are both
can open and covered to offer special protection when required by the customers. In 2011 they
had a turnover of around 7 million SEK.

The interview was conducted with the Logistics manager (Interviewee C) on the 29th of
April at 13.00 in the dining room in the headquarters located in Hasslarp. The interview
lasted for around 45 minutes.

4.1.4 Company D

Company D is private owned and was founded in 1991 by a couple in the city of Falken-
berg but moved its headquarters to Helsingborg in 2006. Today they have around 25 em-
ployees and over 20 trucks and delivery cars. The customers are DHL alongside with other
smaller clients, and the main areas of operations are in Skåne and Denmark. In 2011, the
compny had a turnover of around 19 million SEK. The company motto is “on the right
place, with the right merchanises, at the right time”.

The interview was conducted with the owner and CEO (Interviewee D) of the company on
the 30th of May over dinner in a restaurant in Helsingborg. The reason why the interview
was conducted in a restaurant was because the respondent did not have any other possibili-
ty to take part in the research. The interview lasted for 30 minutes.

4.2 Empirical data presentation

In this subchapter the collected data from the interviews will be presented. The empirical
data will be presented in the form of a free flowing text with quotations from the respond-
dents.

4.2.1 Value adding role of green logistics in Company A

The respondent in Company A explains that the main purpose of green logistics in the
transportation industry is to lower the consumption of diesel and this has been their main
focus in the area of green logistics. Company A has put a lot of effort into lowering the fuel
consumption and has put extra focus on minimising the amount of time spent by the
trucks on idle. Interviewee A explains:

Idling is a major cost bearer, in some cases we have had trucks that have
consumed 100 litres of diesel during a month, just because of idling. In those
cases it has been significantly cheaper to buy two new batteries so that the
heaters and so on work without having to consume diesel. We started these
kind of actions around 10- 15 years ago and already then discussions were
held on how to solve these kind of problems, but if I am going to be honest,
the environment was not the priority, lowering the cost of operations was the
biggest concern, the environmental benefits were just a big plus.

Educating the drivers in eco-driving has been done since the mid-nineties, there is a huge
difference if the drivers fully press on the gas paddle or having it three cm higher up, the
truck would still drive at the same speed, however, the amount of fuel consumed would
vary significantly. By lowering the maximum speed from 90 km/h to 85 km/h, the trucks
that Company A uses reach their optimal fuel consumption, and the drivers are monitored
and checked so they do not exceed the speed limit. Just by these few actions a lot of money and environment is saved. Interviewee A also mentions a product called add blue. Add blue is a liquid product that has an own tank, the reason they use this is because it acts like an energy boost and at the same time it lowers the diesel consumption.

Interviewee A continues on discussing that he believes that green logistics and green solutions in the transport industry is both necessary and profitable, however he mentions that he himself thinks that company 1 is bad at this. Interviewee A states:

There is a lot to work on when it comes to green logistics and green solutions, to give you an example, before the road taxation you had in Germany the roads that we used were so costly that you had to drive different ways to reach Holland and Belgium, but since the new trucks we bought have a lower road tax because they are more environmentally friendly, we can now drive straight to our destinations. This has increased our efficiency, saved us money and has given us shorter driving distance. So being green brings economic profit as well as saving the environment, but keep in mind the margins is still very low.

By having new and modern trucks, Company A adds value to the organization, but only to the assets. However, interviewee A mentions that:

Except the assets, there is not so much more that you can do to add value in the company when it comes to green logistics. I do not believe that green logistics gives us an edge over our competitors. What the customers are looking for when they hire you is that you are able to deliver on time, that you do not complicate things and that you do your work effectively and independently. The environmental questions are my own issues to handle and our customers do not put so much emphasis on that when hiring our services. The environmental issue goes hand in hand with the fuel consumption, so it is basically in my interest to be green since it saves me money, so in that way we are environmentally oriented. We try to keep it green in order to save money basically.

The only action taken towards a greener operation by Company A is that they use new trucks, which keep the fuel consumption down. Some time ago they tried to lower costs even more by acquiring trucks with smaller engines; however, this showed to be a mistake since the trucks with the smaller engines actually consumes more than one with a bigger engine. Interviewee A explained that they bought the Scania 400 which consumes 3, 2 litre diesel/10 km, while a Scania v8 500 which is equipped with a larger engine consumes 2, 7-2, 8 litre diesel/10km. Interviewee A further states that, having the right fleet of trucks is the most important action we can take towards green logistics, since it lowers our fuel consumption, road taxation and repair costs.

Interviewee A is optimistic about green logistics but feels that the subject is not that developed yet, and a lot more can be done in this area. The company has been reactive to the market trends and the green actions taken so far have made a significant impact.
4.2.2 Value adding role of green logistics in Company B

The respondent at Company B explains that they have acquired environmental certification many years ago, and the incitements for green logistics and solutions increase automatically with the rise of the fuel prices. This has been the main priority when it comes to green logistics for Company B. Interviewee B continues to explain:

Green logistics is of course a necessity because we have to take responsibility towards the environment. We get questions from our customers if we have environmental certifications, and we reply to them that we have, but it is up to the customers and how they value the environment and in the end it is the price that is the main determinant. But I have to say, and I do so happily, that the environment has gotten a higher place in the agenda. Some clients demand that you have a certificate, but in the end factors such as price, delivery times and so on, push down the environmental factor on the list of criteria. It all depends on the way the customer perceives the various trade-offs, and mostly the price factor wins.

According to interviewee B everything is in relation to the cost, and it is all about how much the company is willing to pay for the investments and the profit gained. In today's business environmental competition is harsh and a wrong investment could be disastrous.

Interviewee B continues to discuss the situation in Sweden and mentions that in Sweden there are environmental zones that the government has created. This means that trucks cannot drive in certain places unless they are environmentally classified. But these rules only apply to Swedish trucks, German trucks are allowed to drive into these environmental zones. The Swedish government does not have the same standards for Swedish and foreign trucks and interviewee B feels that this creates an unhealthy competition, but also states that, for his company this is not a problem since their fleet of trucks are all environmentally classified.

Interviewee B clarifies that Company B's approach towards adding value by green logistics is to buy the new trucks with the latest technology available. Interviewee B explains:

There is a lot of money involved, it does not matter so much in Sweden but in the continent the difference is remarkable due to the fact that what you pay on road tax depends on what euro class the truck is, that means that euro class five and euro class six are the cheapest to drive. If you use euro class two or euro class three trucks, the cost will increase dramatically. Especially the Germans and the Swiss are putting emphasis on this, but it is a way for them to get rid of the older trucks, which I believe is completely right. This gives us more incitement to have new fresh trucks.

Company B has been involved in a project with both Volvo and Scania in testing their new trucks, the trucks are used and later they are sent back to the manufactures where the data can be collected and analysed. There is a trade off between being “clean” and the fuel consumption, because some actions that minimise the pollution released actually consume fuel, but other actions such as installing wind deflectors have been successfully done.
Interviewee B mentions that they have clear goals that they renew once a year, mostly because they are environmentally certificated and have reviews and check-ups carried out by an independent consulting firm. During the annual renewal of the environmental goals they discuss what they should decrease and what they should increase, for example, increase the amount of class six trucks and sell the older. Interviewee B explains:

The drivers are important in order to decrease the amount of fuel consumed. We talk to our drivers and tell them that, everybody driving in Sweden with the heavy 60 ton trucks should not drive faster than 80km/h, to the drivers in Europe we tell them to hold 85km/h. All these trucks have a limit of maximum 89km/h, but this small reduction of four to ten km/h in speed makes a lot of difference in fuel consumption. So this is a part of our strategy to work closely with the drivers and monitor and control so that we can reach optimal fuel consumption, but of course the type and weight of cargo also affects consumption.

Company B has been looking into using intermodal systems in Europe, but after calculating and analysing all the trade-offs, the decision was not to use it since the Just In Time (JIT) approach the company has adopted would be jeopardized. Company B has its own workshops to keep the maintenance cost down and they have their own washer for the trucks equipped with a special water recycle plant. The company has a proactive approach towards green logistics and the CEO is highly engaged in trying to implement the Swedish size standard on the trucks and trailers (25x25) instead of the 17x19 that is used in Europe. By implementing this, two trucks would move as much cargo as three regular ones, allowing more space on the roads and lesser environmental impact. But a major trade-off according to interviewee B is the loss of jobs.

Company B has been working with truck manufacturers in order to develop more sustainable trucks, since the diesel price is as high as 15 SEK/ litre there is strong incitement to lower the fuel consumption, but as Interviewee B states;

Unfortunately the motivation of being green is not the environment, but to save money, this is how it is in business, I mean I do not think most of the people in this industry would care about green logistics if the diesel prices was a lot cheaper.

Interviewee B has an optimistic view towards green logistics, and together with Company B’s CEO is trying to minimise the environmental impact that their operations have. However, the motivation to lower the impact on the environment is not the environment itself, even if they both think that the environment is important, the biggest motivation is to simply save money.

4.2.3 Value adding role of green logistics in Company C

The respondent in Company C explains that green logistics has been a subject of discussion for around ten years in the company, but that they do not have any special green logistics strategies. Interviewee C explains that they adopt themselves to the customers’ requirements and that the environmental actions are taken depending on if the customers are willing pay for it.
Interviewee C continues to explain that there are much more serious problems in the world that need to be addressed, and believes that too much focus is put on small problems, when it comes to green logistics and the environmental concern there is a serious double standard, interviewee C explains:

The strange thing with green logistics is that, in Sweden at least 30 per cent of all the transports are empty, I mean, if I drive from the south of Sweden to the north and then drive back down south empty, because my competitor is cheaper from north to south for some strange reason, while I am cheapest from south to north. Where is the environmental thinking in that? There is no environmental thinking in that, because the only real factor that comes in to play is the price. The coordination needs to get improved and then everybody would win from it, both man and nature.

Interviewee C continues on explaining that:

We have the matters of the length on the on the trailers, the longer the trailer the more we can load on it, in Europe today we have a limit of 18 meters, and in Sweden we have a maximum length of 25 meters. Volvo together with a Swedish based trucking company is now testing a trailer that is 32 meters long that goes between Göteborg and Skåne during the night. The funny thing is that 40 years ago when my father owned this company, they used 34 and 36 meter long trailers, I mean that was 40 years ago so one can ask where is the environmental thinking in that? The fact is that laws and regulations and green logistics do not go well together, on the contrary we are going backwards, we were between 32-36 meters back in 1970 and today we are testing 32 meter trailers, don’t you find that funny? Regarding the trailers that go internationally which are 18 meters, they can carry three cars less than the 25 meter trailers used here in Sweden, this means that 30 per cent less cargo can be carried by the 18 meter trailers. Can you now understand the illogical thinking of the policy makers?

Interviewee C believes that laws and regulations which limit the length of the trailers were made in order to protect the railroad, but interviewee C also states that even though the railroad here in Sweden is clean and nice it cannot replace the trucks. One of the most important factors is the harsh winter in Sweden, which makes railroad not the best option for transportation.

Interviewee C further explains:

If we were allowed to use 30-40 meter trailers here in Sweden outside the cities and when they reach the city limits, they get shortened and transported into the city, this would I believe end the railroad transportation completely. The solutions are there but no one wants to look at them, because ask yourself, who owns the railroad here in Sweden? Why do you think that they do not want the longer trailers? Because they make money from the transportation of cargo on the railroad.

Interviewee C also mentions that they do not have a special approach towards green logistics, because they do not believe in it at the moment. Interviewee C explains that at the
moment the only action towards green logistics that Company C can take is having new trucks with the best engines, and that they are limited with this as well, because the customers are not willing to pay for this.

Longer lead times and coordination is also of high importance, interviewee C explains:

If the skipper could manage to negotiate with the customer for longer lead times this would be the best thing for everybody. Then we would be able with good coordination to have full truck loads to only one destination, instead of driving to many destinations, unloading small amounts of goods. This would be the best for all, the environment, the shipper, the customer and of course us. One can sit and talk about green environment and how important it is, but what is even more important is the work environment. When we always have to hurry up and stress as we do, there is nobody who feels good with this, either man or the environment. I mean why does everything have to be so tightly scheduled? We need to calm down and that I believe is the big thing.

Interviewee C does not feel like the few green logistics actions they have taken has given then any notably benefits. Interviewee C further explains:

As mentioned before, the only actions we take towards green logistics is that we buy new trucks with better engines, and of course we save some money on lowering our fuel consumption but at the same time we are spending a lot of money to acquire these new trucks. But the funny thing is that when I sell my older trucks to some competitors, they will use these cars and be able to take a lower price. Environmental class on the trucks does not matter here in Sweden and we pay the same amount of tax, regardless if we use a newer or an older truck. But on the other hand in Germany there is a huge difference, but here in Sweden you do not get any benefits by being green.

Interviewee C is not optimistic about green logistics and feels that the only benefit you can get from it is lowering your fuel consumption. The government does not give incitement to be green like in Germany. He ends the interview by saying this:

Laws and logistics does not match, money and the environment does not match.

4.2.4 Value adding role of green logistics in Company D

The respondent is Company D states that they have been discussing green logistics as a way to lower the fuel consumption since the year 2000. Since the diesel prices have been steadily rising in the last decade, an increased interest for green logistics with a main focus on lowering the fuel consumption has been developed. Interviewee D explains:

In today’s hard business climate where competition is very though, we need to identify all the places where we can save money. Lowering the fuel consumption is the most important step we have taken towards green logistics. By having newer and cleaner trucks we have been able to lower the fuel con-
sumption and by this way we have saved money. But the main problem with this is that the customers do not care about the environment as much as one likes to think. For them, the price is of the biggest concern, followed by delivery time and the ease of doing business with us. The environment is not of a great concern for them and naturally we need to take this under consideration, I mean we cannot be greener then the customers are willing to pay. It does not work like that in this business.

Interviewee D continues discussing that Company D mostly drives in the south of Sweden and Denmark, and since there is no tax reduction in having green trucks here in Sweden they do not have the incitement for green logistics, more than that it lowers their fuel consumption. Interviewee D explains that:

> It would be good if the government introduced a system like in Germany so that we could benefit more from being green. The government and the people that are so concerned about the environment must understand that we need to make money, and it is not like the customers are willing to pay us more just because we are green. The environmental issues come in the bottom ranking of criteria when the customers select you. I do not understand the government, the issues regarding the environment have been known for many years now, but still no real actions have been taken by the government’s side to improve the transportation industry. A really easy example is if the government could allow longer trailers, at least for the longer domestic routes outside the cities, a lot of energy could be saved.

Interviewee D explains that in Company D, they educate all the drivers in eco driving in order to try to minimise the fuel consumption. Extra batteries have been installed in order to minimise the time spent on idle. Interviewee continues explaining:

> Educating our drivers in eco driving has saved us a considerable amount of money, there is a huge difference in driving 90km/h or 85km/h. For the longer routes we have put a limit on 85 km/h, but with the smaller delivery trucks which we use in the city we cannot do so much about. We try to keep the entire fleet nice and clean and wash the trucks on a regular basis. This has shown some small difference in the amount of fuel consumed, a dirty truck consumes more than a clean one; we have also installed wind deflectors, but all these actions are employed in our larger trucks that drive longer routes and it is here where we see a difference. For the smaller delivery trucks that run in the cities, there is unfortunately not so much that we can do.

Interviewee D states that the government needs to change policies and regulations so that the trucking industry can gain more from being green. At the moment, the only benefits gained from thinking green and adopting green thinking is, according to interviewee D, lower fuel consumption. It is this that is the main motivation for trucking firms to adopt green thinking into their operations.
Table 1 – Short result summary

<table>
<thead>
<tr>
<th></th>
<th>Main Goal With Green Logistics</th>
<th>Action towards Green Logistic</th>
<th>Approach towards green logistics</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Company A</strong></td>
<td>Lower fuel consumption</td>
<td>Having new and updated trucks, installed extra battery to minimize time spent on idle</td>
<td>Reactive, follow the market trends</td>
<td>Optimistic view on Green Logistics, but feel that more development is needed</td>
</tr>
<tr>
<td><strong>Company B</strong></td>
<td>Lower fuel consumption</td>
<td>Having the newest trucks, own cleaning facility, testing sustainable trucks for Volvo</td>
<td>Reactive, engaged with Volvo and Scania in their truck development</td>
<td>Optimistic view on Green Logistics, helping the truck manufactures develop Greener trucks</td>
</tr>
<tr>
<td><strong>Company C</strong></td>
<td>Lower fuel consumption</td>
<td>No special action taken except using newer trucks</td>
<td>Reactive</td>
<td>Pessimistic view on Green Logistics, feels like Green Logistics and the environment is not of the highest importance</td>
</tr>
<tr>
<td><strong>Company D</strong></td>
<td>Lower fuel consumption</td>
<td>No special action taken except using newer trucks</td>
<td>Reactive</td>
<td>Optimistic view of Green Logistics, but more development is needed.</td>
</tr>
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5 Data analysis

This chapter will focus on analysing the empirical data provided by the companies that were interviewed and comparing it with the statements made by the authors in the literature review. This analysis will be useful for understanding the role that green logistics has today for transport companies and reach a conclusion regarding its value adding role.

5.1 Analysis of empirical data

The study on the value adding role of green logistics was based on in depth study of four trucking companies. The role of the questions in the interviews was to provide enough accurate information in this field of research so that a proper conclusion could be reached regarding this topic. At the end of the analysis of the collected empirical data there will be enough information in order to have a proper answer for the main research question:

- If and how can green logistics activities, with special focus on transport activities, create value for transport organizations?

Furthermore, there will also be a focus on the other two questions:

1. “As far as companies are concerned, are the benefits brought by green logistics good enough in order to compensate for the costs of introducing green logistics policies? (in other words, are green logistics profitable?)”

2. “Do transport companies consider that green logistics can represent a marketing tool?”

5.1.1 Analysis of empirical data from Company A

Murphy et al. (1996) state that environmentalism has had a great impact on shaping the economy, therefore it can be assumed that companies would be eager to adopt green measures in order to be competitive. In the case of company A, they were reactive to the market trends rather than being proactive, although they managed to introduce green logistics in their company around 10-15 years ago.

Looking at a classification made by Goldsby and Stank (2000), company A would be classified in their first category when it comes to the relationship with the environment, meaning that they present little interest in protecting the environment through their actions. The conclusion that can be drawn from here is that prior to introducing green policies, Company A knew little about green logistics and the introduction of such policies came as a result of regulations rather than free will. This should not come as a surprise though because given the fact that little is still known about the efficiency of green logistics it is easy to see why a lot of companies are reluctant to trust green policies.

According to Goldsby and Stank (2000), companies that implement green logistics policies into their strategies do this in order to be more competitive in their field of work. By adopting environmentally responsible logistics, these companies believe that they will gain an advantage in front of their competitors. Even though the interviewee from Company A
stated that they do not believe that this is true, the company did register an increase in their efficiency of transport after they implemented green measures. Therefore, by analysing this result it can be said that Company A can decide on future green policies based on the possible advantages that it brings.

Furthermore, according to their representative, they really believe that there is a future for green logistics even though they acknowledge the fact that they have not done very much in incorporating green policies into their strategy. The reason why they consider that green logistics operations have a future is the fact that the impact it has had on their company so far has been positive and provided them with an advantage over their competitors who have not done the same thing.

Yet despite all these gains, Company A had a reactive approach towards the market trends and incorporated only a few green measures. This can be explained by the fact that the company did not have the financial power to afford taking such a risk, a thing that is common for small and mid-sized companies. Another explanation is the fact that the company had to suffer a downsizing which translates in a safer approach in choosing its future strategies.

Regarding the various laws and regulations that are introduced for transport companies in order to protect the environment, author Bayliss (1998) states that despite all these policies, their efficiency is questionable and they rather lead to inefficient markets and lead to an increase in the costs of companies. Other authors such as Tiwari et al. (2011) consider that the main purpose of these regulations is to protect the environment and lead to the reduction of greenhouse emissions and road transport is to blame for most of these emissions. Company A reacted to these regulations, its main focus being on renewing its truck lot and having trucks that have fewer emissions. It is easy to understand why Company A adopted for this strategy only after the new regulations came out because investments in new trucks involve a great deal of money and their finances could have been otherwise affected.

It can be said that, as in the case of Company A, some companies would rather wait until they are forced to make changes than make investments without being sure of the outcome. In spite of the fact that Company A registered benefits from the green policies such as less fuel consumption or paying a lower road tax in Germany, they were not very sure of the efficiency of the new measures. Despite the positive result, it seems that the differences are not that big at the moments and it can be understood why Company A was not very enthusiastic regarding green logistics.

By analysing the empirical data, it seems that there was a great deal of uncertainty regarding the value adding role of green logistics in the case of Company A which explains its reactive approach towards green logistics. This came more as a necessity rather than a desire to protect the environment and as in the case of other companies, it is profit that drives the implementation of these new regulations rather than protecting the environment.

Rutner et al. (2000) state that many companies have problems in defining what adding value represents and given the fact that green logistics is a relatively new concept, it is easy to understand why companies struggle to identify the potential benefits that it can bring. Such is the case of Company A, where there have been problems in adapting to the new regulations and taking gains from their potential. In this case, this has probably happened
because green logistics are still new to most of the companies and they lack the required experience in order to be efficient.

Among the problems that Company A had with the new green measures was to teach its drivers how to drive more economically and they also stated that they have problems in being efficient in the incorporation of green solutions. This probably has to do with the fact that some members of the staff do not have the necessary experience required and they need proper training in order to be more effective. In this case, perhaps more time is needed in order for these green logistics measures to be better used by companies.

When it comes to adding value, some authors such as Berglund et al. (1999) considered that companies will be able to add value through green logistics by offering customers superior products and services. According to the interviewee from Company A, this is of little importance to its clients, their main concern being getting the goods on time. Furthermore, Company A does not consider that green logistics is capable of providing an advantage over its competitors. In their case value was added mainly through the decrease in fuel consumption and the fewer environmental taxes that had to be paid, other benefits not being recorded.

Several authors identify different solutions that add value to transport. Allen et al. (1998) identified bio-fuel as a solution while Menachof and Wassenberg (2000) propose a modern benchmarking as a possible approach. In the case of Company A, little of these modern solutions were used for the purpose of adding value. It was the case of a product called “add blue” that contributed to lowering the fuel consumption at times. Otherwise it can be said that the company did not use any other solutions because they were considered to be too expensive in comparison to the benefits that would have been gained or they simply lacked the knowledge required to use such solutions efficiently.

5.1.2 Analysis of empirical data from Company B

As in the case of Company A, this company has also introduced green logistics into their operations for several years. Therefore, their accreditation took place in the 90’s a period which was described by Murphy et al. (1996) as being the moment when environmentalism was at the peak of its importance and its awareness was growing. Company B looks at green logistics as a necessity because they consider that the environment must be protected and we are responsible for the harm that is done. Even so, they state that the main reason why they use green logistics is the benefits brought by the lower costs that it brings along and even though they consider that protecting the environment is highly important the main driver in their case is still financial.

In this case, according to the classification made by Goldsby and Stank (2000), Company B would still be classified in their first category as it was the case with Company A, because they only react to regulations to a minimal point and their overall objective is to keep their costs as low as possible. The reason for this lack of interest of expanding the use of green logistics can be explained through the high cost of new green solutions and the uncertainty that these solutions would be able to add value for the company. For such a company, the price of failure could be very big and it is easy to understand why they are not willing to take such a high risk.
However, in the case of Company B more emphasis is put on green logistics and there are annual meetings regarding the use in the future of green solutions. The company leaders really think that there is a future for green logistics, but not from the perspective of decreasing the impact on the environment. It can be assumed then that as long as there are enough financial gains for companies from green logistics, the environment and the clients will also have to benefit from that.

In the case of Company B, the clients are environmentally aware and they raise questions regarding the possible green operations that the company undertakes. The company also observed that as the years passed more clients would enquire about the existence of various environmental certificates.

This was not the case for the first company, and this positive feedback from the clients can mean that green logistics are starting to make an impact. However, it seems that in the end, in spite of the fact that the clients are more interested in being environmentally friendly, it all comes down to the price that they have to pay.

Therefore, the statement made by Berglund et al. (1999) regarding the fact that value can be added by offering clients superior services and products can be applied for Company B, but not in the case of green logistics. In this case, the value added from green logistics is put in second place by the clients, who rate value for money higher. It seems that clients react the same way as companies when it comes to the added value of green logistics, they are aware that it can bring benefits, but in the end the financial gains are considered to be more important in the detriment of the environment.

Authors Carvalho et al. (2012) state that along with the evolution of worldwide transportation and the subsequent increase of air pollution, more and more governments have come with policies in order to decrease the emissions that come from automobiles. Bayliss (1998) observed that with the exception of green transport, all the other sectors of transport have registered decreases in the number of regulations, whereas in the case of green transport the number of these regulations has grown over the years.

Company B has to deal with regulations such as these because in Sweden there are regions that cannot be accessed by trucks due to regulations, unless these trucks are environmentally classified. Therefore, it can be said that Company B invests in green logistics because it is forced by the measures that are taken by the government rather than because they have a proactive approach towards green logistics or their objective is protecting the environment.

As in the case of Company A, the main value adding role for green logistics is through the use of new, modern trucks that help with the fuel consumption as well as with the different regulations that certain states have. Berns et al. (2009) state that the managers of transport companies lack the required knowledge in the domain of green transport in order to take the right decisions and thus identifying the ways in which value can be added through green logistics. This statement can be applied in the case of Company B, where it seems that in spite of the fact that progress has been made with the use of green solutions, there still is a long way to go until these solutions are used efficiently.

It seems that the use of modern solutions such as the bio-fuels that are described by authors Menachof and Wassenberg (2000) is absent for Company B as well. However, the company does have its own solutions when it comes to traffic capacity and volume, a way
of adding value that has been described by authors Donaghy and Schintler (1998). Therefore, the company manages to add value with the use of Swedish sized standard trucks instead of the European sized ones, translating in the use of only two trucks instead of three.

Company B also has its own workshop along with its own developed special water recycle plant. In this way, the company manages to add value through green logistics. However, it can be said that the company reached these solutions not by trying to be environmentally friendly, but by trying to be economically efficient which nevertheless translated into having more space on roads and less environmental impact. It is also important to note the fact the company took these measures by its own will without being pressured by regulations which can lead to the conclusion that with time companies could take a more proactive approach towards the use of green logistics.

5.1.3 Analysis of empirical data from Company C

The attitude that Company C has towards green logistics is different from the first two companies present in the study. In spite of the fact that the company is independent from 1991 and therefore witnessing the ever growing importance of environmentalism in the decade as stated by Murphy et al. (1996), the company is yet to incorporate any certain green logistics strategies.

Company C states in the case of the use of green logistics it all comes down to the clients' requests and whether they are willing to pay the extra price for being environmental. It seems that for this company, protecting the environment is not among their main objectives and at least for the moment they do not consider that there are too many benefits to be gained from this. By analysing this, it can be stated that because Company C lacks an approach towards green logistics, it also lacks the required knowledge in the domain and therefore the information about the potential benefits that green logistics has.

Looking at the classification made by Goldsby and Stank (2000), Company C fits perfectly into the first category, the category characterized by companies that only react towards green logistics when they are forced to do so by the existing governmental regulations. However, in the case of Company C as opposed to the first two companies from the study, it can be argued that this lack of approach towards green logistics is not only because of the unwillingness of taking the risk of adopting such measures, but also because of the lack of trust in the efficiency of green logistics. Analysing this even further, it can be stated that this difference in opinions among companies regarding the use of green logistics in their strategies is not something new and as the years passed the new government measures and regulations did not manage to convince the companies that are against green logistics that it is worth to invest in these new solutions.

Author Routroy (2009) identified numerous elements that influence the adoption of green logistics such as green design, green sourcing, reverse logistics, green packaging, green innovation or customer awareness, but in the case of Company C it seems that only the latter element is of any significance in the adoption of green logistics. Given the company's attitude towards green logistics it can be assumed that they are satisfied to only react to this problem and incorporate green solutions only when really required. The reason for this attitude can be that their desire is to minimise their cost and avoid investing in a solution that they consider to be unprofitable.
Bayliss (1998) stated that the new regulations that have been introduced throughout the years in green transport brought more barriers for companies and there is a good reason why they question the logic behind them and do not consider that they can lead to overall improvement. This happens to be the exact case with Company C, whose attitude towards these new standards and regulations reflects the concerns presented by Bayliss.

For instance, Company C considers that the regulations that were present in the past allowed companies to be more economically efficient than the one that are present today. Furthermore, they consider that because these new regulations do not allow companies to be efficient, they also have an impact on the environment and they are by no means helping with its protection. A case can be made regarding the length of the trailers that are used today, considerably shorter than the ones in the past, thus not allowing an efficient transportation of the goods and materials from one point to another.

By comparing this result with the empirical data provided by Company B, where the same issue was discussed, one can argue that some of the regulations issued by the governments are definitely questionable and contribute to the lack of trust that companies have in these regulations. Regarding the inefficiency of these governmental measures, Company C goes even further stating that in the case of Sweden if longer trailers were to be allowed, then it would considerably help trucking companies to increase their efficiency of transportation, but that would mean that the railroad would become redundant, and according to Company C there is no state interest to make the railroad redundant.

It is obvious that Company C has a case here and there are times when the state makes decisions that do not benefit private companies, but this is nevertheless only one of the negative aspects of regulations and companies in this case should try to focus on extracting what is good from the policies.

In the case of Company C, modern solutions for adding value through green logistics such as those proposed by Randall et al. (2007) could not be identified. Even though authors such as Power et al. (2007) consider that adopting such measures can help a company by increasing its flexibility and decreasing its overall costs, Company C seems to not be convinced by these statements. This can be explained because of the company's unwillingness to adopt green logistics solutions in the first place.

The only value adding measure that was taken by company is represented by the acquisition of new and modern trucks that help them pay less taxes from regulations and reduce their fuel consumption. Even so, Company C does not consider that the few benefits registered through the use of green logistics operations were significant and they do not consider they are worth the effort.

Furthermore, they state that in the case of Sweden, which represents their main area of operations, it does not matter whether the trucks are new or old, because the tax is the same. In such a case, in the absence of a clear attitude of governments towards regulations and their economic impact on companies, it is easy to see why some companies are reluctant towards green logistics and do not have a very good opinion about it.
5.1.4 Analysis of empirical data from Company D

According to Goldsby and Stank (2000), it was in the 90’s when the general public realized the importance of protecting the environment. In the case of Company D, the awareness towards green logistics was manifested around the year 2000 which places it a little later than the other companies that were interviewed. This also means that at the time they acknowledged the existence of green logistics other companies were ahead with their research regarding this topic and the potential benefits that it might bring. Maybe this can explain the fact that Company D does not think very highly of green logistics and only adopts green solutions when it has to.

As in the case of all the other companies from the study, Company D also fits into the first category regarding the relationship with the environment (Goldsby & Stank, 2000). Company D fits perfectly the description of a company in this category, because its main attitude towards environmentally friendly measures is only reactive, trying to minimise its costs as much as possible and respect the government policies in the same time.

It seems that a trend is definitely emerging among companies regarding their attitude towards the environment and financial stability represents a priority in the detriment of the environment. This can be explained by the fact that after all the main purpose of a company is to be profitable, so in the case in which adopting environmentally friendly policies can lead to a company to recording losses, it is understandable why they react in this manner in order to protect themselves and be economically efficient.

In the case of Company D, the only driver of green logistics is represented by the interest manifested by the clients. Even in this case, the company states that the interest shown from customers in the attempt of protecting the environment is not as high as authors like Goldsby and Stank (2000) would state. Company D argues that they cannot afford to offer their clients products or services obtained through green logistics that they will not be able to buy, even if they were willing to do this. Furthermore, it seems that in the case of this company, their clients rank the protection of the environment last in their list of priorities. In the end, it all comes down to money and its importance is greater than the environment.

The main problem encountered by Company D was regarding the government regulations, which once again confirms Bayliss' (1998) affirmation that some of these measures are highly questionable and do not lead to the greater good of companies. In the case of Company D it is probably the lack of measures taken by the Swedish government corroborated with the measures taken at international level that leads to the company’s inability to be efficient in its transport operations.

Because Company D does most of its business in Sweden and Denmark, countries that do not have different taxes for different generations of trucks like is the case of Germany, there is no real reason for this company to invest in newer and more expensive trucks other than a reduction in fuel consumption. This was also the case with Company C, which encountered the same problems caused by governmental regulations and it seems that such problems will continue to exist for these companies unless a global measure is taken in order to standardize the road transport.

Another problem that Company D faces is regarding the training of its employees. Their truck drivers need to know how to drive their vehicles as efficient as possible and this takes
time and money and represents thus a drawback when it comes to the adoption of green logistics policies. By analysing this, it can be affirmed that green measures are still too new for some of the workers and they are still not fully prepared to cope with the new challenges that green logistics brings along.

As in the case of the other companies that represented the object of the study, the main adding value role of green logistics in Company D is through the acquisition of new trucks and the reduction in fuel consumption that it brings along. From the empirical data collected from the companies, it can be stated that the vast majority of transport companies nowadays have identified the usage of new trucks and the benefits brought by less fuel consumption as the main value adding property of green logistics, but the reason why they did that is most probably because they were forced to adopt these solutions due to the existing regulations and not because they valued the protection of the environment too highly.

5.2 Overall analysis and findings

Looking at the results from chapter 4 and the analysis made so far the assumption that small and mid-sized companies are less prone to incorporate green logistics and have less desire to be proactive towards green solutions can be confirmed. Goldsby and Stank (2000) stated that it is mostly the big companies that are able to incorporate efficiently environmentally responsible logistics, while the smaller ones have difficulties in achieving this. The companies that represented the subject of our research are either small or mid-sized, meaning that it is harder for them to come up with the financial resources required to be efficient with green logistics.

This also means that they cannot afford to pay for the most experienced management capable of taking the important decisions. From this point of view, the findings of the study are well correlated with the affirmation made by Berns et al. (2009) regarding the abilities of managers of understanding how to add value through green logistics. The authors say that one of the main reasons why it is difficult for companies to add value is that their managers are not able to identify correctly the right drivers and barriers. By confronting the empirical data with the literature review it can be confirmed that managers in transport companies still have a long way to go until they fully understand the concept of green logistics.

Authors Goldsby and Stank (2000) identified three categories of companies based on their relationship with the environment: companies that are very little responsible, responsible companies and companies that base their strategy around protecting the. All the four companies that were interviewed fall into the first company and fit the description made by the authors. However, given the fact that all the four companies that represented the subject of our study show little responsibility towards the environment, it can be assumed that most companies nowadays are still reactive towards green logistics and they also lack the required knowledge about the subject, while very few companies fall in the other two categories.

Hazen et al. (2011) identified the main problems of green logistics as being the attitude of the customers towards the quality of the products and services obtained through green logistics, considering that they are inferior to normal ones, but the results that were obtained seem to show that things are a little different. The main attitude that the clients of these transport companies had was that they were more interested in receiving their goods on time rather than caring about the processing, be it green or normal. Furthermore, even
when they showed interest for green logistics, the inflated price was a determining factor for them that meant they would reconsider their attitude.

Another problem for the interviewed companies was the training of their staff in driving their trucks. The new measures that had to be taken through green transportation meant that the companies also had to support an additional cost with instructing their people. This can be translated to the fact that this represents an extra reason for a small or mid-sized company to avoid using green logistics unless forced because the financial resources involved are too great for their capabilities.

The relationship between the companies and the decisions made by governments in adopting new policies and regulations was always a difficult subject, but it seems that there really are important differences of opinions among the two parties. According to Bayliss (1998), governments are unpopular because their decisions regarding policies and regulations do not always benefit companies and some question the logic behind them and the findings of this study can only come to confirm that.

One of the biggest problems that were identified by the interviewed companies was the fact that they have to respect some international regulations that force them to make investments whereas the internal regulations do not help them benefit from these regulations. However, in the case of countries that have a clear regulation, such as Germany, the interviewed companies agreed that it is worth investing in new trucks in order to gain the potential benefits. In the case of policies a solution would be represented by the introduction of some standardized regulations for road transport which would lead to lower costs for companies and would represent a driver for green logistics.

As opposed to the literature on the topic such as Allen et al. (1998) who identify new modern solutions such as bio-fuels for green transport, in reality, very few of these solutions were incorporated by the companies that represented the object of our research. In fact, with the exception of Company B, which used larger trailers that enabled to optimize its transport and also developed a special water recycle plant, all the other companies were complacent in their actions and only invested in new and better trucks that lead to a smaller fuel consumption. However, they did agree that this green solution brought its benefits, but they also stated that the investments are high and the results are not spectacular.

Rutner et al. (2000) stated that when it comes to adding value, one of the biggest problems is that managers do not see the benefits as being very big and they consider that it is not worth the investment after all. This proved to be very true because the general attitude towards the potential of added value through green logistics was negative, two managers stating that it is still a long way to go before the efficiency is increased in order to increase profitability, while the other two were sceptic that green logistics can really add value.

As stated by Bayliss (1998), still very little importance is given to literature research in the domain of transportation. The fact that not enough authors have devoted their time to this topic can slow down the process of adopting green logistics, but from the findings of this research it can be stated that company managers know even less about green logistics and seem to be disinterested regarding the subject, which represents an even greater problem for the future of green logistics. Nevertheless, green logistics is still a new concept and it might need time in order for companies to grow accustomed to it.
6 Conclusions and future implications

This last chapter focuses on the conclusions following the research that was undergone as well as making a few statements regarding the future implications of green logistics.

6.1 Methodological implications

It can be concluded from the findings of the research that the main way in which transport companies can add value through green logistics is by focusing on renewing their truck lot, thus leading to a better fuel consumption and saving money on different taxes. Other assumptions regarding ways of adding value such as recycling, bio-fuels or advanced analyses such as benchmarking have not been confirmed. This has happened because such practices require a great deal of investment, with no guarantee that the outcome will be positive, meaning that very few companies are willing to take such a risk in order to incorporate green logistics into their strategy.

The other two research questions that represented the object of this study proved to be very useful in understanding the attitude that companies nowadays have towards green logistics. The feedback from the companies regarding the benefits of green logistics has been mostly negative and it seems that the benefits do not manage to compensate on the high investments. For the moment, the benefits brought by green logistics seem to not be enough in order to compensate on the high investments. This probably has something to do with the fact that a lot still needs to be done regarding policies and regulations at an international level. Once improvement is done in this area, then perhaps companies will find green logistics to be more attractive.

When it comes to the policies that transport companies found to be useful one could mention the different standards used for taxing different generations of trucks. In this case, the money saved from road taxes showed that an investment in new trucks can be absorbed because of policies and it also proved that green logistics can add value, but the margins are still very small to be deemed to be worth the effort.

In the case of the last research question, it can be said that there is enough data in order to affirm that for the time being, transport companies do not consider that green logistics can represent a marketing tool. The cost that green logistics involves is too high and there is also not enough knowledge at a managerial level for such a strategy to work. It seems that this has also something to do with the public awareness regarding the subject as well as the general responsibility towards the environment. When these areas will show signs of improvement then there is a clear possibility that managers will incorporate green logistics in their marketing strategy.

6.2 Future implications

As things look right now there is still a long way to go for green logistics in order to be viewed as being profitable for the majority of transport companies. However, the conclusion that green logistics do not help to add value to companies cannot be drawn. The rea-
son is that green logistics is still too young and underdeveloped and it is still not given enough importance by both managers and customers.

The main problem that stands in the way of the efficiency of green logistics is that both managers and workers are still unaccustomed to this concept and know very little about it. Their training requires a degree of investment that most companies are not willing to make and this represents a drawback for green logistics, slowing down the process of its incorporation in companies and making it unpopular with managers. However, there is a very good indication that things will change for the good because as slow as things are developing right now, they are still developing and in the near future there is a distinct possibility that green logistics can register a major growth throughout companies.

However, things are changing for the good of green logistics and there are a lot of future developments that can help benefit green logistics. For instance, international transport regulations can lead to more companies being encouraged to incorporate green logistics operations in their strategies. Managers will also probably view green logistics differently in the near future and the growing competition in the domain will also lead to a higher usage of green operations.

In spite of the fact that the findings of this study showed that there is still a long way to go for green logistics in order to be deemed as profitable for most companies, these findings also showed that green logistics operations are being used by companies. Perhaps it is this attitude that managers have towards green logistics that represents the major factor that needs to be revised. Time will tell if green logistics will be able to represent a major way of adding value for transport companies, but they certainly represent the future and surely their impact will be greater in the coming years.
References


Appendix – Interview questions

1. For how long have you been using green logistics strategies in your operations?
2. Do you consider green logistics a necessary evil or are they not evil at all?
3. What is your approach towards adding value through green logistics in transport?
4. Do you have a clear strategy of adding value through green logistics in your company?
5. What are the green logistics elements that you used the most and found most useful?
6. What are the green logistics elements that you used the least and found least useful?
7. Were you ever forced by the governmental decisions to adopt certain policies?
8. Are there any policies that you adopted at your own will? (if there are any, name them)
9. Do you have a proactive approach towards green logistics or is it only reactive?
10. Did the new changes bring substantial benefits to the company?
11. Did you happen to notice negative effects brought by green logistics elements in your companies?
12. What were the biggest problems that you came across when introducing green logistics policies?
13. When incorporating green logistics in your strategies do you follow the trend in the market or do you try to come up with your own solutions?
14. Have organisations that promote green transport influenced your way of doing business and adoption of policies? (if so, in what way? did it help?)
15. What green logistics elements are you planning to introduce in the near future?