Reducing the Carbon Footprint
With focus on the outbound logistics

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The article is based on a study conducted at Sony Ericsson Mobile Communications in Lund, Sweden. The purpose of the thesis was to construct recommendations on possible means to reduce the carbon footprint within outbound logistics. In order to fulfil the purpose, an analysis of the external environment that influence, or will influence, their work within logistics was conducted. This analysis is presented in the article. The mapping of Sony Ericsson’s logistics activities that affect the emission levels together with the specific recommendations on how to reduce the carbon footprint are left out due to the belief that this general approach has a wider target group. Furthermore this information can be used for further development in other companies as well.

Introduction
One of the largest concerns related to the environment today is the climate change. Because of increased temperatures, glaciers are melting and the snow cover is decreasing which result in a rise in sea level. Additionally, a rise in temperature will be accompanied by changes in climate affecting cloud cover, precipitation, wind patterns, and the duration of seasons. The primary cause is the increased level of carbon dioxide (CO₂) in the atmosphere released mainly from the burning of fossil fuels for energy extraction. [1]

Transport is the single largest source of environmental hazards in the logistics system. It is a prime consumer of fossil fuels and therefore also contributor to the increase in CO₂ emissions. It additionally generates other chemical emissions and noise. To be more environmental responsive, the distribution should favour shorter shipments, a reduced number of departures and better space utilization. [2]

Traditionally the environmental aspect has not been included as a criterion when bringing about changes in the logistics system. Recent years, there has been a trend among companies to globalization the supply chain and to move their production to low wage countries such as China. Together with management ideas, for instance Just-in-Time, a technique that require more frequent deliveries, this has resulted in an increase in transportation and consequently also in the emissions. [3]

It is not only the businesses that affect the climate; the climate change also has an affect on the businesses. For businesses that early adopt preventative actions it can help generate marketing advantages due to the increasing demand for “green” products in the marketplace. [1] Environmental regulations also force actions to prevent further climate change. The leaders of the world are
now working together towards the same goal, to reduce the environmental impact of human activity. Important to consider is nevertheless that the environmental steps taken must satisfy not only the demands of society but also those of profitability. Environmental goals must therefore be weighted with economical ones. [4]

**Purpose and problem formulation**
The purpose of the thesis is to identify means to reduce the carbon footprint within outbound logistics. In order to do so the problem statements are as follows:

A. What trends within the external environment influence SEMC’s work within logistics and the environment regarding:
   - Competitors and other global companies?
   - Regulations and market incentives?
   - Technological development within the transport sector?

B. What are the currently studied and used methods for reduction of carbon dioxide emissions?
   - Current logistics research in the area?
   - How do the major transport providers work?
   - How are other companies working to decrease the emissions within logistics?
   - What were the effects of the studied companies’ efforts? E.g. how have emission levels and other factors such as lead-time, cost and safety been affected?

C. With help from the findings in previous statements, what are potential means to reduce the carbon footprint from the outbound logistics?

**Focus and delimitations**
The study will provide a broad background and give guidance for further development. However, in order to make it more thorough, the focus will be specifically on the outbound logistics of finished products from global production facilities to the customers.

The greenhouse gas used to measure the environmental impact in the study is CO2. It is considered to be the largest contributor to the greenhouse effect, and it is also directly related to the fuel consumption.

**Methodology**
The working procedure used in the thesis is to initially create a theoretical frame of reference. It is followed by an empirical study containing an investigation of external factors affecting the outbound logistics, a mapping of the current processes at SEMC, a study of three major freight forwarders and a multiple case study of six companies. Finally an analysis is conducted which results in the recommendations to how SEMC can reduce their carbon footprint.

**Theoretical frame of reference**
The theoretical frame of reference includes the causes and effects of climate change, an investigation of external factors affecting the work within logistics and environment and finally theories within green logistics management, logistics structure, mode selection, carrier selection and fill rate.

**Conclusions**
A. What trends within the external environment influence SEMC’s work
within logistics and the environment?

The concern for climate change has increased and national as well as supranational institutions such as the EU are making investments and form regulations to promote more environmental practices. The by the UN assigned Kyoto Protocol is one of the initiatives requiring countries to take actions towards preventing further climate change. Consequently, the world is experiencing increasingly stricter regulations on activities adding to the emission levels, especially those of carbon dioxide. The concern for environmental issues has also increased among other companies and among the transport providers.

A distinct trend within the external environment is the shift towards rail and sea transport. This shift is also promoted by the European Union to thereby reduce the congestion on roads and control the growth in air traffic. Investments are made in the development of infrastructure and to increase energy efficiency. Within the rail sector investments are also made for standardisation among countries within Europe. These initiatives are likely to improve the performance of these modes. Heavy investments to improve energy efficiency, introduce alternative fuels and improve utilization of resources are also made within the road and air sectors. This makes it difficult to predict how much the price for transportation will increase in the future. Due to the stricter regulations, transportation cost will nevertheless most likely be a larger factor to consider when selecting for example logistics structure.

B. What are the currently studied and used methods for reduction of carbon dioxide emissions?

Green logistics management is becoming more and more common, and it is a prerequisite for creating an internal awareness and initiate actions for reduction of the carbon footprint. Examples of initiatives within green logistics management are the creation of a baseline, to set targets for emission reduction and an action plan for achieving them. Furthermore, memberships of organizations within logistics and the environment are common in order to share experiences and best-practises. This and other initiatives are reported publicly in order for companies to profile themselves as green.

Changes in logistics structure are considered to bring the largest possibilities for emission reduction as they can reduce the overall logistics significantly. Initiatives identified in the study are to regionalize both warehouses and/or production to reduce the total transport work. Furthermore, a more regionalized structure enables postponement and the use of more environmental friendly modes. The shift of mode is a strong focus area among the studied companies. The shifts from air to other more environmentally friendly modes are seen as providing the largest potential for reducing the carbon footprint, especially the shift from air to sea. A large container vessel emits approximately 10 grams CO₂ per tonne-km compared to 500-600 grams for an aircraft. Another common shift is the shift from road to rail. Apart from changes in logistics structure, initiatives to improve the sales- and order planning process, dialogue with customers about
the environmental impact from the logistics decisions, segmentation of orders etc. were identified in order to enable a more environmental mode.

Further initiatives identified were to incorporate environmental demands in the selection of forwarders and to work for increased fill rate. Findings from the study indicated that most companies only recently have initiated emission reduction activities and therefore not many results from the efforts can be seen today. However, it can be established that reduction of the carbon footprint often go hand in hand with reduced costs and that it generates good publicity.

C. With help from the findings in previous statements, what are potential means to reduce the carbon footprint from outbound logistics?

A prerequisite for bringing about changes to reduce the carbon footprint in an organization is to create the support needed internally and increase the internal awareness. Additionally, a baseline needs to be created and key performance indicators and emission reduction targets should be set. Furthermore, an action plan for how to achieve targets should be formed and the performance must continuously be measured. The described initiatives lay the platform for further actions.

After the platform has been created, the preparation for long-term impact can be initiated. This is where the activities in the outbound logistics are reviewed in order to identify possible areas for improvement. From the theory it has been concluded that it is the decisions concerning the product and the logistics structure that creates the largest opportunities, but they also set limitations for emission reduction initiatives in other areas.

The sales-, order and planning process is another area to be reviewed. Discussions with customers could be initiated on how they can reduce their environmental impact by e.g. placing orders that fill a complete pallet or how the acceptance of a longer-lead time enables a more environmental friendly mode of transport.

Many companies today use freight forwarders for the transport of their products. It is therefore important that environmental factors are incorporated in the selection and in the demands on the suppliers of transport services. Demands can be of general character such as that the forwarder has environmental targets and an action plan for emission reduction, or more specific, such as the use of alternative fuels, fleet standard etc. The demands should be followed up on.

The preparation for long-term impact leads to actual actions being taken, such as reducing the demand for transport, shifting to more environmental modes, using the greenest option in each mode and introducing new technology. This in turn results in a reduced carbon footprint. To gain a reputation as being an environmentally friendly company is also desirable for many companies, including SEMC, whereby an external promotion of the initiatives and achievements is necessary. Becoming a member of organizations can guide the work, provide benchmarking opportunities and help in selection of forwarders. Important to consider is to conduct a regular follow-up on the progression of the work. The
recommendations are illustrated in the below figure. It was developed specifically for SEMC but can as well be adopted by other companies.

List of references


