

Logistics and Transport Management

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Road Tolls: How will it affect the modal split?

A study of the effects of the new German Road Toll
on transports to and from Sweden

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Abstract

Transportation is an important and vital mechanism of today's business machinery. It has slowly, and overtime, developed and now encompasses several different modes and means of actually physically moving people and goods over longer or shorter distances. In today's world the road transportation industry is the largest one, and it is growing with a tremendous rate every year. This growth is rapidly creating problems with maintenance, congestion and environmental impact.

The ways in which to counter the expanding road mode are plentiful and range from charging vehicles and fuel with extra taxes to charging the actual roads used. The various methods have different effects, but it is vital that people understand that road is the most used, and the most important, mode, so a sudden shift can actually make the economy slump since it is so dependent on cheap and effective transports.

Over the years different systems have been discussed to reach the goal of a good spread, or mix, of transports between the most common used modes of sea, rail and road. But the approaches to this vary by country and people involved. However, it is understood that the road mode needs to adopt similar charging systems as rail where operators charge for usage of infrastructure.

This thesis addresses the issue of how the modal split will be affected by implementing road pricing. By interviewing various organizations, and companies, involved in physical transport or transport planning it is hoped that it will give a view of the future and the possible ways in which present day policy or policy suggestions might inference the transportation industry.

Key-words: Modal Split, Road Usage Fees, Road Tolls, Intermodality, Eurovignette, Marco Polo, Toll Collect, Germany

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Introduction

Background
Company Presentation
Research Problem
Purpose
Perspective and Relevance
Delimitations
Disposition

The first chapter of this thesis will give a description and provide general information about the research topic and problem background. The main problem will be stated and related areas of research will be discussed. In addition to this the purpose of the thesis as a whole, as well as delimitations will be stated and discussed. Finally a general overview, or disposition, of the entire thesis will be presented.

1 Introduction

1.1 Background

The transportation industry in Europe today is focused around the four modes of transportation; road, sea, air and rail. These modes have different characteristics, and all operate according to their special niche and competence. However, environmental issues, and concern, are more and more governing this industry, and the growth of road transportation over the last decades, has produced an environmental problem of epic proportion across Europe.

The problem is not only exhausts of greenhouse gazes and different acids, but road transportation also causes other problems. These problems include accidents, congestion, noise pollution, loss of productivity, increased costs for infrastructure etc. The increase in the road transportation area has now reached a critical level, and corrective actions must be taken to alleviate the situation.

The main focus is on the transportation industry, and when it comes to road transports this means trucks. According to the EU transport authority truck transports across Europe has increased its share of the modal split from a 52 % share in 1997 to an almost 75 % share in the year 2000. This is perhaps one of the answers to why the situation is getting worse by each passing year. (European Commission, 2002)

The difficulty when it comes to road transportation is that in order to reduce or control traffic flows either legislation must be put into place, or other means of control such as tolls or taxes. This is rarely looked favorably upon, since it hammers business and increases costs for both businesses and consumers. However, the EU has in its White Paper stated that a shift from road in favor of shipping and rail is of the outmost importance if environmental concern and corrective action is to be taken. It also acknowledges that congestion is the effect of an imbalance between the different modes of transport. (European Commission, 2001)

Germany, a well-known hub for road transportation in Europe, has decided to make a change, and a new road toll system will be introduced on all German

motorways. It looks as if the consumer is about to pay for the lack of environmental concern showed by businesses in the past.

1.1.1 Current policy

The current European, or EU, policy in the road taxation/pricing field was adopted in 1999 it specified common rules when it comes to adopting usage tolls for heavy vehicles that use infrastructure. This has resulted in several countries collecting vehicles usage fees in Europe. France and Spain have implemented a system where new roads can be funded by user charges; it is not however based on all roads, but on rather new motorways. Switzerland and Austria have, or are planning to have, their own kilometer based usage fee collecting systems, while the north European countries of Belgium, the Netherlands, Sweden, Denmark, Luxembourg and Germany have introduced the Eurovignette system. Here the users pay a fee according to the amount of time (for instance days, weeks, months, years, etc.) that they will use the member states roads and infrastructure. Every member country is responsible for collecting and supervising vehicles on its own territory. On the 31st of August, 2003, Germany left the Eurovignette system, and they will establish a road pricing/fee collection system of their own.

1.2 Research problem

In Europe today various discussions have arisen due to the fact that road transports is growing at an alarming rate. To make sure that a sustainable development is reached from an environmental, congestion and economic standpoint, action must be taken. The answer might lie in the fact that a change of the modal split is necessary, which would mean a switch from road, to other modes of transportation. One way of trying to attain this goal would be to implement road pricing in the form of toll and road usage fees.

The reason behind such a drastic change of the road transportation policy probably lies in the fact that no one will change unless forced to. This is due to the fact that the system of today works acceptably if simply looking at it from a

process approach. However, if people want changes it is perhaps necessary that there will be changes in legislation, taxes and road tolls. These changes might be the tools that are used to shift transports from road to sea and rail. It is also understood that investments will be needed in the rail and sea area, since a rapid high increase in these modes will possibly cause problems as well.

However, one should not forget that the action of enforcing a new road pricing scheme will cause a reaction, which will lead to uncertainty and unknown consequences. This will cause problems in the research area, since there is no one right way, and not clear path to follow. The action is new, and so the reaction is new and thus unknown at the moment.

With the background and problem discussion in mind we have been able to state the following main problem;

<p style="text-align: center;">Main problem How will road pricing affect the modal split?</p>
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To be able to answer this question we have decided to use both data collection in the form of known facts from second hand sources, and first hand data in the form of interviews. The problem will have a purely opinion based answer, since no research is available in this area of the effects, and so theories will only be used to support ideas and to explain ideas, not for drawing conclusions or results.

This will hopefully lead to the answer to the question: Is this toll going to change routes or modes in the transportation of goods, and if so can DFDS benefit from this?

1.3 Research model

The research model that we present in figure 1 shows how the problem will be solved by using different types of data. The first set of data will be current situation data collected via Governmental agencies such as the German Road Administration, the EU and the new German road toll agency so that the basic facts about the current situation are known.

The second stage of the process will be interviews with Swedish companies and organizations so that their views and opinions about the impact on Swedish transports are known. These interviews will then be compared and analyzed to find out what possible effects are foreseeable in the Swedish transportation industry. This will give us the tools necessary to come up with a result that answers the main problems question.

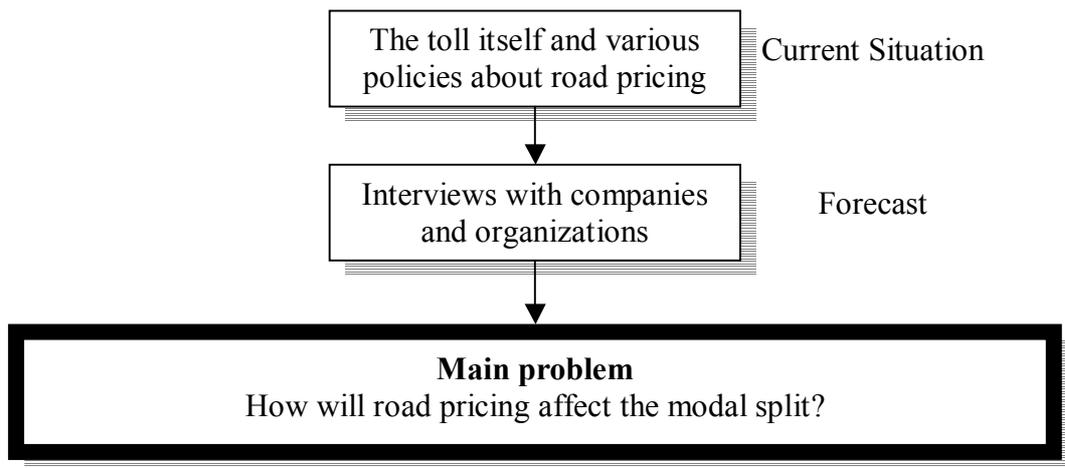


Figure 1: Research model

1.4 Company presentation

This thesis is being performed in cooperation with DFDS Tor Line which is a major ro-ro operator on the North and the Baltic Seas. The parent company of DFDS A/S was founded in 1866 in Denmark, and it is listed on the Copenhagen Stock Exchange. DFDS Tor Line A/S in Denmark has subsidiaries in several countries, including Sweden, Norway, the United Kingdom, the

Netherlands, Belgium, Germany and Lithuania. The company employs roughly 1,300 employees, and this figure includes both sea and shore personal. The ships are operated on 19 different market areas. The company operates as mentioned before ro-ro ships, but also lo-lo and ro-pax ships. The bulk of the volume, or approximately 70%, is transported on trailers. During 2002 roughly 7 million tons of cargo was transported, the turnover of the company as a whole was roughly 3 billion DKK. (DFDS TorLine)

1.5 Purpose

The purpose of this study is to come up with a possible forecast on how road pricing in Germany will affect the modal split of the Swedish transportation industry. This is done in order to help DFDS understand what may lie ahead, and how this change will affect them. This is important for the company since they need to be able to understand the situation, so they can make changes to their own way of doing business accordingly.

1.6 Perspective and relevance

This study is of usage to the entire transportation industry and will thus be relevant to many companies and organizations. The study itself is written in cooperation with DFDS and their need for information has been the obvious starting point, but the study itself is not company specific. The results could be equally valuable to any other company, that also needs to prepare for this coming change in the transportation industry. Germany is the first country within the EU to introduce a kilometer based road charge specifically for the transportation of goods, but other EU and Eurovignette countries are also planning similar tolls. Due to this fact the study may help companies to be prepared for a wider change in transportation strategy within the EU.

1.7 Delimitations

This study will discuss how a possible modal shift might occur in the Swedish transportation of goods that uses Germany as a leg in the transportation chain. We will not be taking any financial aspects into account, other than as opinions, expressed by either transport companies, producing companies or governmental agencies. This study is based on opinions and will focus on transportation of goods that has Sweden as either the country of origin or the country of destination. However, the transportation must have Germany as the link between Europe and Sweden. Economic and time constraints hinder us from doing a more extensive study. Therefore, the extent of modal shift will be based on what these Swedish transporters will, or will not, do.

1.8 Disposition

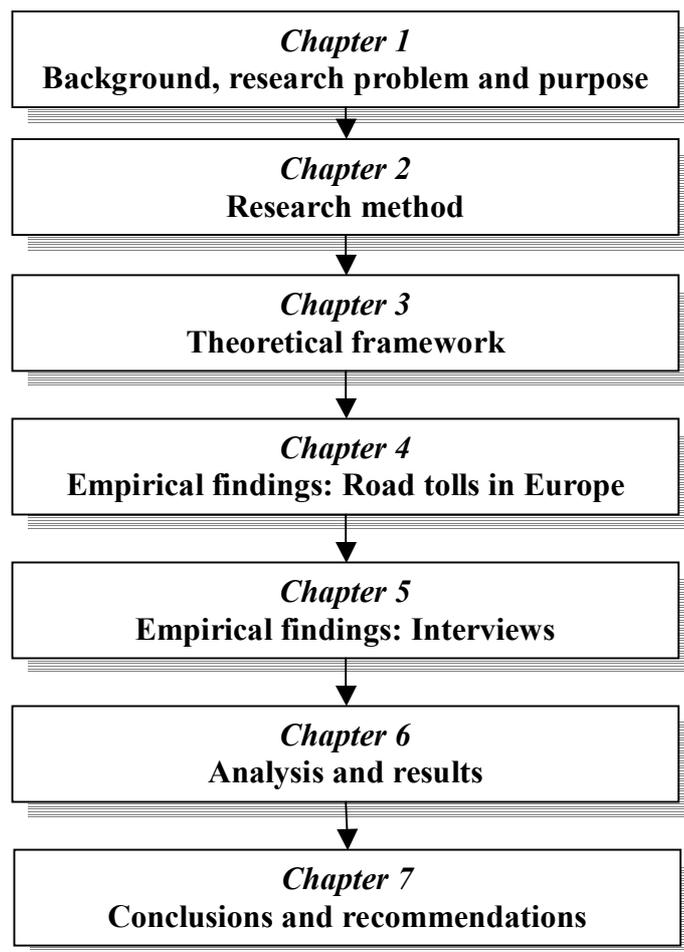


Figure 2: Thesis outline

Methodology

Research Approach

Research Method

Scientific Reasoning

Data Collection

Data Quality

***T**his chapter will mainly discuss various approaches to performing research studies. The chapter will also contain information about different types of data collection procedures, or methods. There is also a section about the quality of data and this section also contains what methods or approaches we intend to use.*

2 Methodology

2.1 Research approach

The research approach chosen is dependent upon what kind of study is being performed, and also upon what type of answers, or conclusions, the said study should deliver. According to Wiedersheim-Paul and Eriksson (2001) there are 3 major approaches that one can choose from;

- Exploratory
- Descriptive
- Explanatory

Each of these approaches will give a different set of tools to work with, and thus each will give a different study.

The *exploratory* approach is mainly a tool when initial data is needed or when dealing with initial, or preliminary, stages in a process. The information is collected from a wide variety of sources, both primary and secondary. The goal of the approach is to give an insight into, for instance, management problems or perhaps it is a way of identifying different courses of action. (Kinnear & Taylor, 1996)

The second approach, which is the *descriptive* approach, is different in that it assumes that some information, or knowledge, of the problem is already known. Thus it is not a preliminary study but instead the research has a clear goal and the answer for this clear goal is what needs to be found. (Wiedersheim-Paul & Eriksson, 2001)

The last approach is the *explanatory* approach which is somewhat related to the descriptive approach in that a clear goal, or structure, needs to be worked out. However, the study itself is usually based on a cause-and-effect structure. When using this approach it is common that one relies on experiments. An example of this can be that one look at a known process, by changing the process by either adding or subtracting stages one might gain or lose

productivity. Through the experiment you can explain the process more in depth. (Wiedersheim-Paul & Eriksson, 2001)

However, simply explaining the different approaches will not necessarily make the matter easy. In complex studies it is rather common that at least two approaches are used, and through this a higher degree of success can usually be gained. This is the case with our study where elements from both the explanatory and descriptive approaches will be used. The descriptive approach will be used to describe the study and the different theories used, and secondly, the explanatory approach will be used when interviews will be presented to various parties, and their input will be analyzed to explain the possible new situation.

The area of study is heavily debated though-out Europe and this gives us a huge amount of up to date information that we can use in describing the problem. The information can be gathered both in primary data form and secondary data form via transport companies, magazines, etc. This will give us the information and knowledge that we need in order to perform the interviews.

The thesis will be divided into two distinct sections, or parts comprising of empirical studies. The first part, the German road toll system, will deal with the new toll system and describe the what, when and how aspects. This will give an understanding of the changes in the German transportation sector, as well as giving us invaluable knowledge when preparing for interviews and questionnaires.

The second part will consist of interviews, depending on whom we will interview and where they are located. The answers given to us in this section will naturally be compared, summarized and analyzed. This will be the exploratory part of the study, and since the toll is quite new this will possibly be the first time that such an investigation or study is being performed in this specific field of study.

2.2 Research method

The research method is simply trying to explain what type of data that is going to be used in the study. There are two distinct methods and those are quantitative and qualitative. The quantitative method analyzes data that can be measured in figures, or numbers, while the qualitative method tries to do the same with non measurable descriptions. (Wiedersheim-Paul & Eriksson, 2001)

It can also be said that qualitative research is geared towards a process and perhaps not towards a product. What is really going on? It is also looking at what a process actually means, and the possible result of this. (Merriam, 1994)

Our study purpose is mainly geared towards finding the results of what a change in the German transport industry can cause, and this is mainly from an attitude and opinion based interview. This is definitely an example of non-measurable or non-quantifiable data, and thus the qualitative approach seems to be the perfect fit for our study. We are interested in what is going on, and what the result of this will be. On top of this we will not collect any kind of mathematical or statistical data, simply due to the fact that we seek companies' opinions about a change in the state of nature. Companies, on the other hand, might base their opinions on quantifiable data or facts, but our purpose is to analyze their opinions, not the underlying facts that support their specific view.

2.3 Scientific reasoning

In performing a study defining the relations between empirical findings and the theories is of importance, a research can take either a deductive or inductive approach. The deductive approach is when a researcher uses empirical findings on the theory in order to strengthen or weaken the theory. The theory itself is usually a simple model that tries to explain a process. The theory can be made more complex by adding new variables and the like. The inductive approach, on the other hand, is when a researcher uses the empirical findings in order to construct a theory. In short the deductive tries to either prove or criticize an already existing theory while the inductive uses data to construct a new theory. (Holme & Solvang, 1997)

It is also possible to add a third type of approach and that is the abductive approach in which a scientist actually uses both old and new theories. In figure 2 the differences between the approaches is explained. (Merriam, 1994)

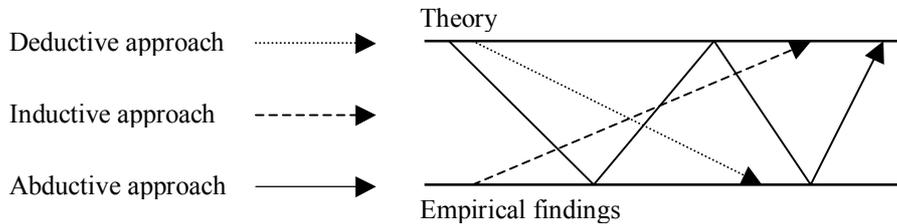


Figure 3: Scientific reasoning approaches

In this study we focus on the new German road toll from a Swedish perspective. We will therefore, mainly use an inductive approach in that the data itself will provide us with what kind of theory we will use. However, some already conceived theories may be used, which would give us an abductive approach. In this case we believe that it is fair to say that the approach used in this study will be an abductive approach, perhaps geared towards a more inductive approach in that the empirical findings will be the sole determinants of the theories, and it is not the theories that govern any results or conclusions.

2.4 Data collection

When it comes to data collection several approaches can be used, but a more interesting aspect is if the data is of primary or secondary nature. The difference is important, since it might bear some influence on the final analysis and conclusion. However, the need for data must also be put into a formula containing the cost of acquiring the data, the quality of the data, and the availability of the data. Usually constraints exist both in money and time, finding the right mix between cheap sources of data (books) and more expensive (interviews) is key to success. (Wiedersheim-Paul & Eriksson, 2001)

2.4.1 Primary data

Primary data is data collected as close to its source as possible (Holme & Solvang, 1997), and this usually means that it has been collected first hand in one way or another. There are mainly three forms of gathering primary data and those are;

- *Observations* are performed by the individual scientist by recording what he or she sees, hears, feels, experience, etc. Since this is a highly subjective approach the scientist should be aware about validity and reliability problems, it is also important to plan the observations so that a maximum of data can be extracted during a minimum of time, otherwise this type of process tends to be quite lengthy. (Befring, 1994)
- *Interviews* can best be described as a controlled conversation, or talk, between for instance the scientist and the one being researched. An interview is rather flexible and can be performed indoors, outdoors or via a phone. However, direct contact is at the heart of an interview. Questions are usually prepared before, and if more than one is being interviewed the same questions are usually used, so that similarities and connections can be found (within the same interview group). (Befring, 1994)
- *Questionnaires* are sometimes described as a spin off from the more traditional interview. Here everything must be precisely prepared, and the need for structure and ease of use are at the forefront. The formulations of the questions are important, so that the correct information is being retrieved. Usually questions should be short and concise, and the answer choices should be clear and easy to differentiate. (Befring, 1994)

The primary function of these three forms of collection is to give data that can be analyzed and used in the study. In our study we have decided to use the interview option only. We will conduct the interviews as personal interviews with prepared and non-structures questions. This will allow the interviewee to freely answer the questions as he sees fit, and not be constrained by different choices of answers. The interviewing material or namely our questions will change with the type of company or authority we interview. Transport companies will have one set of questions, state authorities another, etc.

2.4.2 Secondary data

Secondary data can be described as using data that has already been collected by someone else. It is important to treat this type of data as second hand data, and not be too quick, or eager, to use the data. The approach to secondary data is to find specialized data in ones field, and then critically go through the data collection process, as well as the data, and then make a decision to see if it fits or not. However, government statistics and corporate information are also regarded as secondary data, even-though these kinds of data are generally considered more ‘safe’ than for instance what a scientist might find on an obscure page on the Internet. The best way to handle this data is by simply, critically, going thorough the data. (Befring, 1994)

In our study we will use secondary data in the descriptive part about the German road toll system; this data will be supplied from the authorities in questions, so we feel that the reliability and validity aspects of this data are high, since government documentation usually has a high quality level. This data would not be possible for us to collect as primary data basically since we have limited time and money resources.

2.5 Data quality

When it comes to data collection, and especially the analysis of collected data, it is important that the data retrieved is valid for the study, and that what you have collected actually helps you in your analysis effort. The data must also be reliable so that people actually can believe in what has been collected, and in the end believe in your analysis and your conclusions. These two quality marks of a paper, or study, must always be kept in mind. If a researcher can not uphold them the entire process will fail as a result of it.

2.5.1 Validity

Validity is the ability to measure, or collect, what actually is supposed to be measured or collected. Validity is actually a measure of credibility, and to uphold the validity or the credibility will mean that the paper, or study, is better received by the public. (Wiedersheim-Paul & Eriksson, 2001)

One must also consider that the threat to validity is greater in qualitative studies, simply because of the fact that the researcher is so close to what or who is being studied. It is also possible for the one being studied to actually control or guide the study in a certain direction. This closeness between the researcher and the problem can cause validity issues and corrective action to prevent this must be taken beforehand. (Holme & Solvang, 1997)

According to Yin (1994) validity has to be constructed in the sense that one should use multiple sources of data or evidence. Also, a clear chain of data needs to be established so that the progress can be followed easily. When this is done two other validity aspects needs to be addressed, internal and external validity.

The internal validity is mainly a concern for explanatory studies and is geared towards pattern matching and explanation building. These two methods will tie in with the clear chain of data and produce a valid source of information and a valid conclusion. The external validity, on the other hand, is a tool for knowing if the finding of a study can be considered as general beyond the immediate case study. In short, can the findings be used in a broader perspective, or is it simply only applicable to the study at hand. (Yin, 1994)

In this study a clear focus will be kept on the validity issue, and we feel that we are able to uphold a high standard of both validity and credibility. The validity of the descriptive data is high, since it is prepared and put together by the actual company who operates the toll system. The interviews have also been modeled with high validity in mind, and as mentioned before different types of interviewees receive different questions, each constructed with his or her expertise and area of business in mind. The questions are also open-ended in the sense that the interviewee can answer in any way he or she likes. The interviews are also personal, which will lower the risk of misunderstanding.

2.5.2 Reliability

Reliability differs from validity in that it looks at the actual measuring or collecting procedure. This is basically a measure to see that the actual collected material is objective, and not colored by the people who collected the data. This is especially hard to control when the way a study is being performed leaves room for personal opinions and the like, as in our case with interviews. However, straight numbers and figures can also some time give a more stable image, than they should. (Wiedersheim-Paul & Eriksson, 2001)

The reliability of a study when it come to a qualitative study is perhaps not the most significant one simply because of the fact that the goal of the study is to increase understanding, and to actually show what is going on. This is based more on opinion from the ones being researched rather than on statistical facts. However, the researcher should always try to keep his or her personal influence on the material to a minimum. (Holme & Solvang, 1997)

The way in which reliability can be kept high is by trying to be as objective as possible, and to reduce personal input to a minimum in both the interviews as well as in the actual analysis of the data collected. To do this we will use a tape recorder during interviews to reduce our dependability on notes and memory, and simply being able to get what the interviewee actually said. We feel that these measures will give the study reliability, even though we are aware that issues can arise that is dependent on this very important and specific issue. Furthermore, interviewees can also sometime dislike tape recorders, and the result is an interview that could have give more and better data, due to the fact that the interviewee feels constrained by the presence of the recorder. This we intend to solve by writing down the interviewees answers from the tape recorder, and send it back to the interviewee so that he or she can go though the answers in private, and then give us an updated set of notes. This we feel will reduce the reliability problem to a minimum.

Theoretical framework

Road Pricing
Infrastructure
Road Transport
Intermodal Transport
Modal Split
Supply/Value Chain
Conceptual Model

This section will explain the concepts, models and theories that are going to be used when trying to solve the research problem. This framework will facilitate the collection of data as well as giving valuable help in the analysis of the material. This chapter will first of all explain important concepts such as tolls, modes of transport, modal split and the shipment of goods. Secondly, a conceptual model will be presented based on the concepts presented.

3 Theoretical framework

3.1 Road Pricing

The history of pricing road use for infrastructure financing, congestion mitigation and air quality improvement is not new. The idea has been used all over the world, and in recent years interest has grown for its potential tremendously. Over the last three decade the improvements and expansion in roads has more and more become restricted by tighter fiscal budgets and physical and environmental constraints. (Button & Verhoef, 1998)

Recent breakthroughs in technology have made automatic road charge systems available, thus making the actual monitoring and payment of road usage much easier to control. These electronic road charge systems are currently in use in several countries all over the world. The tool to price usage of roads usually has one of two causes, and that is either to control congestion or to alleviate an environmental problem. (Button & Verhoef, 1998)

3.1.1 Road pricing to control road traffic congestion

The idea of reaching an efficient usage of roads by requiring users to pay for the traffic congestion cost is not new. It was first discussed in a study made in 1920 by Professor Pigou. He calculated that such payments calculated at its optimum and strictly enforced should optimize the usage of roads and that it would restrict road access to those individuals or companies that were willing to pay for the congestion cost in extra travel time. (Button & Verhoef, 1998)

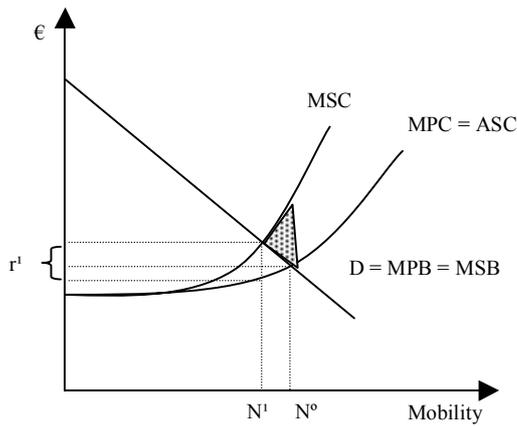


Figure 4: Pigou's economic analysis of road pricing
Source: (Button & Verhoef, 1998)

In figure 4 the basic principle of road pricing is explained. In this figure the demand of road users is equal to the marginal private benefit and marginal social benefit¹. Due to, for instance, congestion MSC² exceeds the MPC³ which is equal to ASC⁴. The free market equilibrium is found at point N° and the social optimal road use is at N¹. The road price that will accomplish the optimum is the charge of r¹ and this is equal to the marginal congestion cost⁵ at the optimum. The welfare gain is in the shaded area. (Button & Verhoef, 1998)

However, there are a few issues that would argue that this might not be the best approach in all scenarios. For instance, if the system is only adopted in certain areas it might actually distort the traffic pattern, and the flow, making the change unnecessary. The idea has to be fully implemented in an entire network to actually show effects in traffic pattern and flow behaviour. (Button & Verhoef, 1998)

The congestion pricing might also prove to be economically expensive and politically devastating. A traffic system can control congestion problems by other means such as higher parking charges, public transportation subsidies, higher fuel taxation; subsidies to other modes, higher vehicle license fees and in the end actually build more and better roads. (Button & Verhoef, 1998)

¹ D = MPB = MSB
² Marginal social cost
³ Marginal private cost
⁴ Average social cost
⁵ MSC-MPC

When it comes to actual fiscal alternatives for collecting the taxes or tolls two distinct approaches can be seen. One can collect the money either by high fixed prices paid by anyone with, for instance, a licensed vehicle (vehicle tax) or one can pay a toll or tax that is directly linked to road usage, and it is paid by the actual usage of the roads. In either case careful studies must be made in order to determine optimal price, and coverage, of the system. (Button & Verhoef, 1998)

3.1.2 Road pricing to promote environmental and sustainable development

The problem with environmental impact due to transportation has been known for many years, but it is only during the last few years that actual steps and measures have been taken to tackle the problem. The environmental problems can be divided into three categories; global, regional and local problems. (Button & Verhoef, 2000)

The issue of a global problem is mainly air pollution such as CO₂⁶ emissions; this is due to the fact that no matter where the emission takes place, it will affect the global atmosphere and contribute to the green house effect. Also, since the CO₂ emissions are tightly connected to the usage of fossil fuel, and thus covered by fuel tax, it is not an argument for environmental road pricing, although the problem is of great concern. (Woxenius, 2002)

The regional problem level is mainly affected by the fall of acid rain, however this cost or effect varies with the location since different soils, bed rock formations and ecosystems reacts differently to acid rains. Emissions might also cause regional air pollution and water pollution. This is however, hard to measure and regional studies will have to be made to be sure of the regional cost for acid rains and the like. (Woxenius, 2002)

⁶ Carbon dioxide

Finally, the local problems include air pollution, smell, noise, land use, congestion, etc. It is however important to realize that environmental impact on a local level fluctuates with when and where the road transportation takes place. Different vehicles in different settings cause different problems; inner-city traffic is not the same as countryside driving. It is for the local conditions that special environmental tolls and taxes can have the greatest effect. (Button & Verhoef, 1998)

3.1.3 Impacts of road pricing

Road pricing will impact the transportation industry and everyone associated with it. As costs increase in one segment of the distribution chain it will affect the other links in the chains well. To summarize the impacts they can be divided into three distinct parts; *distributional impacts*, *impacts on travel behaviour* and *impacts on land use*. (Ramjerdi, 1995)

- *Distributional impacts* means that as the tax or toll increase there will be a loss in welfare to the road users while at the same time maximizing the social benefits. What this means is that the cost for using the roads will impact transporters, and in the end consumers. It will impact transport patterns and flows and reduce them, this will lead to less congestion, less noise and lower emissions, and that is the maximization of the social benefits.
- *Impacts on travel behaviour* refers to the fact that travel demand is dependant upon such factors as vehicles availability, which mode of transport, what destination and when. Then the actual cost has to be calculated and such factors as transport time, speed comfort and service level needs to be taken into consideration. The mode that can offer most beneficial factors at the lowest cost will prevail, and as cost of road usage increase other modes such as rail and sea might become more attractive.

- *An impact on land use is perhaps the most difficult impact to document and foresee. It is often considered a truism that when prices for road usage increase there will be a relocation in space. However, researchers are not certain if this means centralization or decentralization. Land use is dependant on accessibility and quality of environment, and an increase in road usage fees will change these factors. One should however be careful and know that land use will be impacted when tolls are introduced.*

3.2 Fiscal policy

The fiscal policy when it comes to road transportation can be divided into four different areas; *fuel tax, kilometre tax, annual vehicle tax and vehicle sales tax*. The different methods of implementing infrastructure is what guides governments when deciding about fiscal policies within the road transportation sector. The different ways of implementation also cause the operating cost of road hauliers to differ between different countries. (Gunnarsson, 1997)

- *Fuel tax* – has historically been the most important fiscal or economical policy instrument for controlling traffic flows and generating revenue for the government. Fuel taxation is perhaps the best policy to use when trying to deal with global warming, since fuel consumption stands in direct proportion to amount of carbon dioxide emitted. However, this policy does not take for instance noise and congestion into consideration. Therefore, it is not a tax dependent on distance travelled, but rather it is based on the amount of time the car is running.
- *Kilometre tax (road usage)* – This is by most researchers considered to be the best, or superior, way of dealing with traffic flows and their external costs. It is generally based on the distance travelled and the number of axels and environment class. It can also easily be differentiated so that low fuel consuming vehicles pay less, and so both traffic flow and the average age of the vehicle fleet can be controlled.

- *Annual vehicle tax* – this is a tax system that exists in most industrialized countries. As mentioned in the kilometre tax it can also be differentiated. One can either use a flat rate over a year, or it can be dependent on such variables as weight, displacement, engine power and environmental class. Since this is not based on actual usage the tax has to be calculated on expected external costs.
- *Vehicle sales tax (VAT⁷)* is applied to new cars being sold to the market. This can be seen from two perspectives. First you can believe that the higher the tax, the fewer cars will be on the roads thus reducing flows and emissions. The second view is that as the tax increase the older average age of the vehicle fleet one will have. This will mean that less clean cars will be on the road. No matter what view, or position, you take this tool for traffic control is fairly unproductive, and it is generally seen as direct revenue for the government, even though some incentives or differentiated pricing might be applied to more environmental friendly alternatives.

Fiscal policy will have affect on the traffic flow, but some tolls are better than others. According to most researchers and experts all tolls will have some effect, but it is generally considered that the kilometre based tax will achieve the highest rate of success, even though well planned fuel, vehicles and sales tax can work out as well. (Gunnarsson, 1997)

3.3 Transportation costs

The transport costs are costs actually associated with the transportation of goods via the road network. These can be divided into four distinct categories; *direct delivery cost, terminal cost, time cost and external costs*.

The *direct deliver cost* refers to costs that occur with the delivery such as the cost of the vehicle, the operation of the vehicle, etc. *The terminal cost* is the costs associated with pick up and delivery such as cross docking, consolidation, etc. The *time cost*, on the other hand, refers to costs associated with the time it

⁷ Value Added Tax

takes for the goods to reach its destination. This cost is usually calculated from an interest perspective, in that capital is tied up for an extended period of time. The last cost is *external costs* which refers to cost associated with road damage and environmental impacts such as emissions, noise levels, congestion, etc. (Lumsden, 1995)

3.3.1 External costs broken down

The external cost of road transportation is usually a cost that is not paid by the one who causes it. Examples of these, as stated above are noise, vibrations, emissions, congestions and other problems associated with transports. The effects on the everyday life of people are threefold. First, the quality of life is reduced due to noise and pollution, second pollution is contributing to acid rain which affects all of Europe, and third transportation and the usage of fossil fuels contribute to the green house effect that will ultimately raise medium temperatures, melt the ice caps and change our climate. (Lumsden, 1995)

There are however, ways to reduce the external impact on transportation, but it is costly. These investments usually lead to a ‘profit’ for society, whereas other groups will suffer from their effect. This is why the reduction of external effects must always be put into comparison to the value and the benefit of the actual transportation. This leads governments to assuming the optimal level of reduction, or in some cases the cost of reductions and investments is pushed to the ones who cause the problems in the first place. (Lumsden, 1995)

3.4 Infrastructure

The concept of infrastructure can be described according to the following characteristics;

- A network that provides interactions and means of transportation and delivery to people and companies.

- It has a vital role in the total cost of all products produced and used. A minor loss in the service will result in high relative cost for the consumers.
- It is basically a natural monopoly. It is usually protected by law and the high investment cost makes it usually unprofitable for any private interest to invest.
- The capital cost of infrastructure is large compared to its running cost
- The sunk cost, or barriers of entry, in establishing infrastructure is high. The largest portion of the total cost has already been paid before actual service can be offered.

Infrastructure can have all of these characteristics or only a few of them. Usually road and rail meet all the characteristics. Other systems, that only meet a few of the characteristics, can sometimes be viewed as infrastructure such as financial, postal and distribution systems or services. However, all of these involving different networks have high sunk costs and are strategic and indispensable. (Bannister & Berechman, 2000)

3.4.1 Investment methods

Infrastructure is traditionally a concern and responsibility of the public sector, which can mean local, regional or state government. This is the case if one explains infrastructure explicitly by the five steps mentioned above. However, this statement is not totally true in that a lot of supporting activities for infrastructure is paid or invested via private organizations. This includes terminal facilities, parking lots and in some countries rail stations and airports. Also, actual means of transportation like vehicles is privately produced and communications systems is also usually produced and developed by private interests. (Bannister & Berechman, 2000)

What should also be mentioned is that in many western countries the bulk of the infrastructure investments have already been made, and in recent years as well as in the future, usually small scale additions will be invested such as city bypasses and a few new road and rail connections. This is why most investment goes into upgrading and replacing existing infrastructure, in some cases capacity is also increased by adding lanes. The question at the moment is if

demand should be unconstrained or if it should be constrained, the latter giving a greater controlling ability when it comes to traffic flows and capability to foreseeing future development and investment needs. (Bannister & Berechman, 2000)

The actual question of investment financing has mainly three different approaches; public financing, privatization, or joint projects between the public and private sectors. (Bannister and Berechman, 2000)

- *Public financing* is the usual way of financing infrastructure projects. The size and high investment cost of the projects usually makes this option the only viable one. It is however, possible to combine this approach with a collection of road usage fees or tolls, even though the most usual cases is simply an investment free for all to use and paid via normal taxes.
- *Privatization* is a rather new form of major infrastructure investment. Usually a group of investors decide to build a smaller part of an infrastructure network such as a tunnel, bridge or ferry line. The investment is paid via traffic charges for usage. This type of investment is usually very long-term and payback periods of up to 30 years are not uncommon. The high sunk cost makes it rather risky and there might be a substantial political risk involved. This method however, is on the rise, usually with some kind of government support or subsidy.
- *Joint projects* are also a new approach to infrastructure investments. This way of investing is simply a division of authority and a division into areas of excellence. Each party concentrates on what he does best. It is common that the public sector invest the majority of funds while the private sector contributes with transport planning and supporting facilities. The French TGV high-speed railroad has been financed through joint projects.

What should also be mentioned is that when the maintenance cost of existing infrastructure grows usually the allocated funds to new projects tend to get smaller. In order to overcome this, new approaches must be used. New funds will be needed for both the existing network and for planned new infrastructure

investments. In the future there will be more and more private initiative and join projects in this area. (Bannister and Berechman, 2000)

3.5 Road transport

Road transportation is today the most important mode within the transportation industry when looking at tonnes hauled and kilometres covered. In order to better understand this mode this section will deal with its history and characteristics of the industry.

3.5.1 History

Road transportation has for a very long time been at the core of human transportation. The Romans who were not very interested, or good for that matter, in sea transportation saw the benefits of road transportation and they therefore constructed many roads throughout the Empire (several of which still exist, like the Apian Way). It is from their interest in building roads that we have the old proverb "*all roads lead to Rome*".

From ancient history until early the early 20th century road transportation was considered as supporting sea and rail and not as a competitor. This was mainly due to the state of the roads, as well as actual transport technology. Since all land transport was carried out with human or animal physical labour, hauling goods proved to be a slow and time consuming endeavour. (Woxenius, 2002)

In the mid 19th century the railroad spread across the western world, and roads were perhaps even more considered as a supporting function since it carried goods from rail stations and junctions to factories or consumers. This did not change until the automotive industry started to produce trucks in big numbers, and the boom in the road transportation industry started after WWI⁸. Since then both sea and rail transporters have changed their mind about road

⁸ World War I

transportation. Nowadays it is not only seen as a supporting function and it is definitely seen as a competitor. (Woxenius, 2002)

As time passed the transportation pattern changed rapidly in favour of road transportation. This was mainly due to specific demands such as speed, smaller consignments, JIT⁹ and flexibility. This was something that no other mode could supply. The low entry barriers also worked in favour of road transportation and road transportation companies, since the sunk cost of investment was low. (Woxenius, 2002)

3.5.2 Characteristics

The flexibility of the road transportation mode has its source in the actual infrastructure, the design of the vehicles and the actual carrying out of operations. The road infrastructure is the most extensive transport infrastructure ever built by man, and you can reach almost any house in the entire world by roads. The design of the vehicles is also promoting high flexibility since different types of transports can use different vehicles. For example if you are shipping 10 tones of goods you do not need to use a truck capable of handling 40 tons, you simply use a smaller truck capable of handling 12 tones for the job. Another important aspect is that road transportation is highly advanced and shipments can be *consolidated*¹⁰ in one place and at the destination a *break bulk*¹¹ takes place. Transporters can also make use of *TL*¹² and *LTL*¹³ and send shipments in any size and format they want. These aspects of infrastructure, vehicle design and operations make the road transportation highly flexible and adaptable. What should be mentioned though is that road transportation can have a heavy impact on the external environment such as emissions, noise, and congestion and in some cases it can pose a threat to the safety of people. (Coyle, 2000)

⁹ Just In Time delivery – The goods should be delivered precisely when they are needed in production/value chain to avoid unnecessary stock keeping.

¹⁰ Smaller shipments are put together to form one big shipment

¹¹ A consolidated shipment is reverted to its smaller shipment status

¹² Truckload – shipment uses an entire truck

¹³ Less-than-TruckLoad – shipment uses less than a full trucks space

3.5.3 Structure of road transportation

As the main transport mode, and also the most studied in this research. The idea of this section is to introduce the reader to a simple explanation of the road transport structure.

3.5.3.1 Layers in the transport system:

First we will identify the different layers in the transport system (OECD, 1992):

- *Material flow* – The production, manufacturing or trading creates a need of material flow between nodes, transported via links. These nodes are production, assembly, storage and selling points (i.e. stores).
- *Transport operation* – It is the flow of unit loads between the links, which are modal change, trans-shipment, sorting, consolidation and deconsolidation.
- *Transport infrastructure* – it is defined as the physical infrastructure, guideways and the management of its usage. The guideways are roads and intersections. The infrastructure is the terminals and mode transfer equipment. The management can be defined as the traffic control, restrictions and regulations, road charges, etc.
- *Informatics operation* – the three previous layers require exchange of information to work properly. Exchange of data such as delivery time, product type and quantity, road conditions, stock level, etc.
- *Telecommunications infrastructure* – it is all the structure responsible for the flow of information such as radio towers, central receivers, satellites, etc.

3.5.3.2 *Types of transport networks*

There are five types of transport network identified by different names given by different authors. We chose the definitions explained by both OECD¹⁴ and Woxenius.

- *Point-to-point or Direct connection* – between two defined points. Provided by normal truckers, it is a simple type and does not require logistics studies. Usually the truck performs one of the trips empty.
- *Multistop or fixed routes* –it requires structured and defined routing and planning. The truck performs some deliveries and loading along the way.
- *Trans-shipment* – this can be identified as two multistop networks linked by a terminal, responsible for the reallocation of the goods to achieve a better utilization of units and vehicles.
- *Inter-terminal* – it uses two terminals for each LTL shipment. It can include another mode of transport besides road. It results in higher frequency of movements and a better use of vehicles since the goods are rearranged at terminals to a better route.
- *Hub and spoke* – it is the most complete type. It requires good planning, greater quantity of terminals and goods volume as well as great investment. It links terminals in one or more big hubs.

3.6 Intermodal transport

The term intermodal transport refers to transportation of goods carried out in cooperation by two or more modes of transportation. This way of transportation most commonly uses the container as the carrying vessel for the goods. The container can then easily be transferred to ship, rail or truck with few simple manoeuvres. The intermodal system tries to combine the advantages of each mode while at the same time trying to reduce the disadvantages of each mode.

¹⁴ Organization for Economic Co-operation and Development

This usually gives fast and reliable service over great distances, such as cross continental shipments, but it is also used on a more local stage. The most common combinations are road – rail and road – rail – sea. (Coyle, 1999)

A more suitable definition of intermodality for this research might be: *Intermodality is the use of two or more different modes of transportation in an integrated manner in a door-to-door transport chain.* (OECD 2001)

With this integrated system, it is possible to obtain the best feature of each mode in order to improve efficiency, reduce costs and time, and also to reduce environmental and social impacts. It allows consolidation, more frequent and faster transports from many links creating interconnection between central and peripheral regions. (Kiriazidis, 1994)

Road transport is understandably the most used one nowadays. That is mainly due to its flexibility, the relatively *low sunk cost*¹⁵ to enter the market and, most important, the accessibility to places where other modes cannot get. Road transportation makes a door-to-door delivery system possible, and will always be important as the initial and final leg of the transport chain. These features have allowed road transportation to grow fast and excessively creating subsequent problems such as congestion, accidents, and noise and pollution disturbances. (Kiriazidis, 1994)

The objective of the EU is to reduce the amount of vehicles, especially the ones that cover long distances and heavy volumes from road routes. The key transport policy is to transfer goods to less congested and more environmental friendly modes. For that, it is necessary to create a structure to enable multi-modal transport, but EU cannot decide on investment priorities in infrastructure since it depends on regional and national projects. Such transfers should be stimulated without coercive policies. (Kiriazidis, 1994)

¹⁵ Cost of entering a new market for the first time and usually unrecoverable

“It is possible to promote multi-modal¹⁶ transport through:

- Reduction or remission of taxes which are applicable to road vehicles when routed in combined transport by a standard amount or in proportion to the journeys that such vehicles undertake by rail (Directive 7 December 1992)
- Liberalization of the combined transport operations from all quota restrictions and systems of authorization
- Aid to rail links with multi-modal transport potential
- Technical harmonization by defining swap-bodies and their minimum specification
- Drawing up reports that analyze the economic development of multi-modal transport, the application of the Community law in this area and the definition of further measures to promote combined transport operations.” (Kiriazidis, 1994, p. 98 -99)

In Europe, the traffic passing by multi-modal transport systems is less than 4% of the total international road flows. This is due to the often short distances between origin and destination sites. The high terminal transfer costs between modes are the main obstacle to the development of intermodal transportation. According to studies, a 500 km transport is necessary to justify a combined system, but 90% of transported items in EU have an average distance of 200 km. (Kiriazidis, 1994)

The logistic efficiency of intermodal systems depends on some improvements such as existence and compatibility of advanced communication systems, technical harmonization, standardized containers and operations to create a seamless network and facilitate the transfers between connecting transport modes. In short, support of economic growth, improvement of transport costs effectiveness, reduction of social and environmental impacts are the main justifications for the adoption of intermodal policies. With all modes performing with compatibility, industry benefits from provision of choice, potential cost savings and greater competition. (Kiriazidis, 1994)

¹⁶ Intermodal

3.6.1 Rail

Rail transportation has been an important mode since it was first used in large scale in the mid 19th century, and it is a highly efficient mode of transportation and when comparing rail transports to air and road transports it is more than twice energy efficient. Rail is also environmentally friendly and one of the safest modes of transportation. However, it is not very flexible and only operates on fixed routes according to fixed time tables. (Woxenius, 2002)

The flexibility issue together with the fact that one country's railway is not compatible with another country's railway makes it a very inflexible system. Today railroads are usually used by companies transporting bulky goods such as iron ore, timber and the like, and it is usually unbeatable on fixed links. (Woxenius, 2000)

3.6.2 Sea

Sea transportation is the oldest form of shipping goods in a somewhat larger scale. The old cultures of the Egypt and Mesopotamia relied on their inland waterways for both communication and transportation.

Today, sea transport has been divided into several different types of transports. First of all we have short sea shipping which is usually within countries or in some cases between countries but it is not very far when it comes to distance. Secondly, we have inland waterways which are sea transportation on rivers and canals. Third, we have ordinary sea shipping which is sea transportation on both a larger scale and at longer distances like between continents. (Coyle, 2000)

Shipping on a continental basis has developed ships into huge crafts roaming the seas, and the super tankers of today is usually longer than 300 meters and can carry unprecedented amounts of goods. Sea shipping is usually used for cars, bulk goods and basically any other good that needs to be transported between continents. (Coyle, 2000)

3.6.3 Air

Air transportation is the newest mode of transportation. It is also the smallest when it comes to actual tones hauled. However, air transport is also extremely fast. This trait has made air transportation ideal for transporting commodities. The distance is usually not the issue, but it is rather the value of the product that determines if it is going to be transported via air transportation or not. (Coyle, 2000)

3.7 Modal split

Modal split refers to the actual percentage share of each mode in a transportation system. To be able to state the modal split a system has to be chosen, for instance by the EU, and then each mode will be evaluated to the same standards, or parameters, such as for instance TKM¹⁷, and by comparing the total numbers a percentage share of each mode can be established, thus one can easily see how big a portion of the total system each mode has.

3.8 Supply/Value Chain

Supply chain management or value chain management was something that Michael Porter saw as important for every company to master. The value chain consists of two different chains and those are respectively the supply and the demand chain. Logistics however, is as important for both parts of the chain. The supply chain focuses on resource utilization operation and logistical processes, in short it is the process of procuring supplies, transporting them to a warehouse or factory and change it into a good or service. The demand chain, on the other hand, is the activities connected to the market and the customers. Briefly, the demand chain is the activities of getting the products or services from the company to the customer. (Hoover et al, 2001, p 3.)

¹⁷ Tones Kilometers

Logistics is equally important in both chains, and therefore it is perhaps better to talk of the value chain and how it will affect the company and the logistical operations. In figure 5 an example of a value chain is presented.

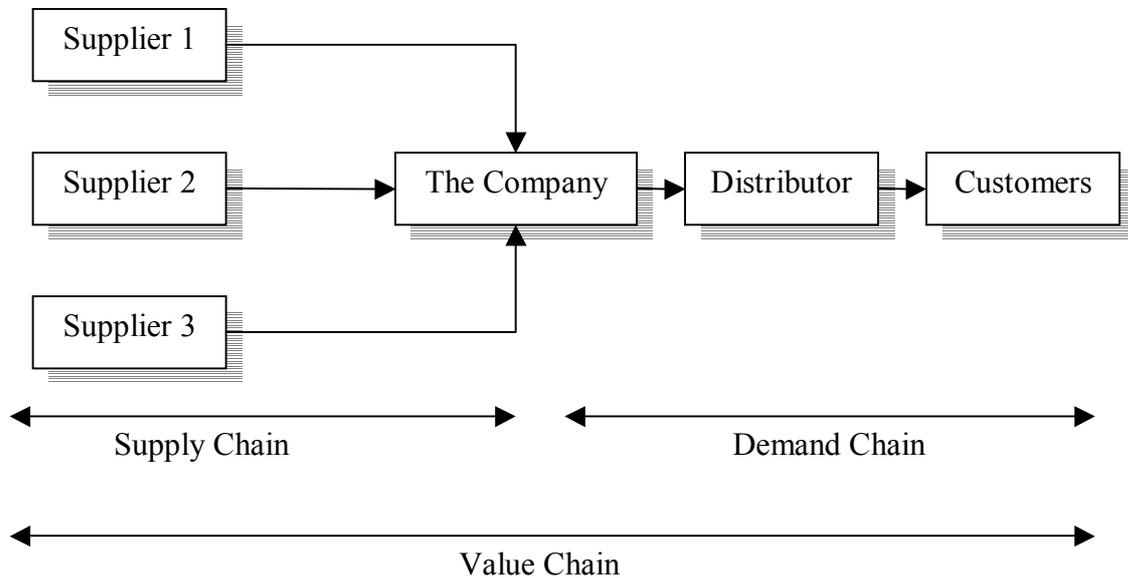


Figure 5: An example of a value chain

Source: Hoover et al, 2001, p 3.

However, when adding the logistical operation the model becomes a bit more complex. Then it is possible to speak about inbound and outbound flows. The inbound flows represent the supply side of the value chain and the outbound flow the demand side of the value chain. (Coyle et al, 2000)

3.9 Conceptual model

This study will mainly use an own model based on the theories supplied in this chapter. This model will be the basis for collecting empirical information and for conducting the analysis. Since our aim is to identify the possible changes in the modal split the model has been developed to reach an understanding in what and how this specific area will change with the introduction of the new German road toll. The model, figure 6, is divided into four separate parts, and will be described further below.

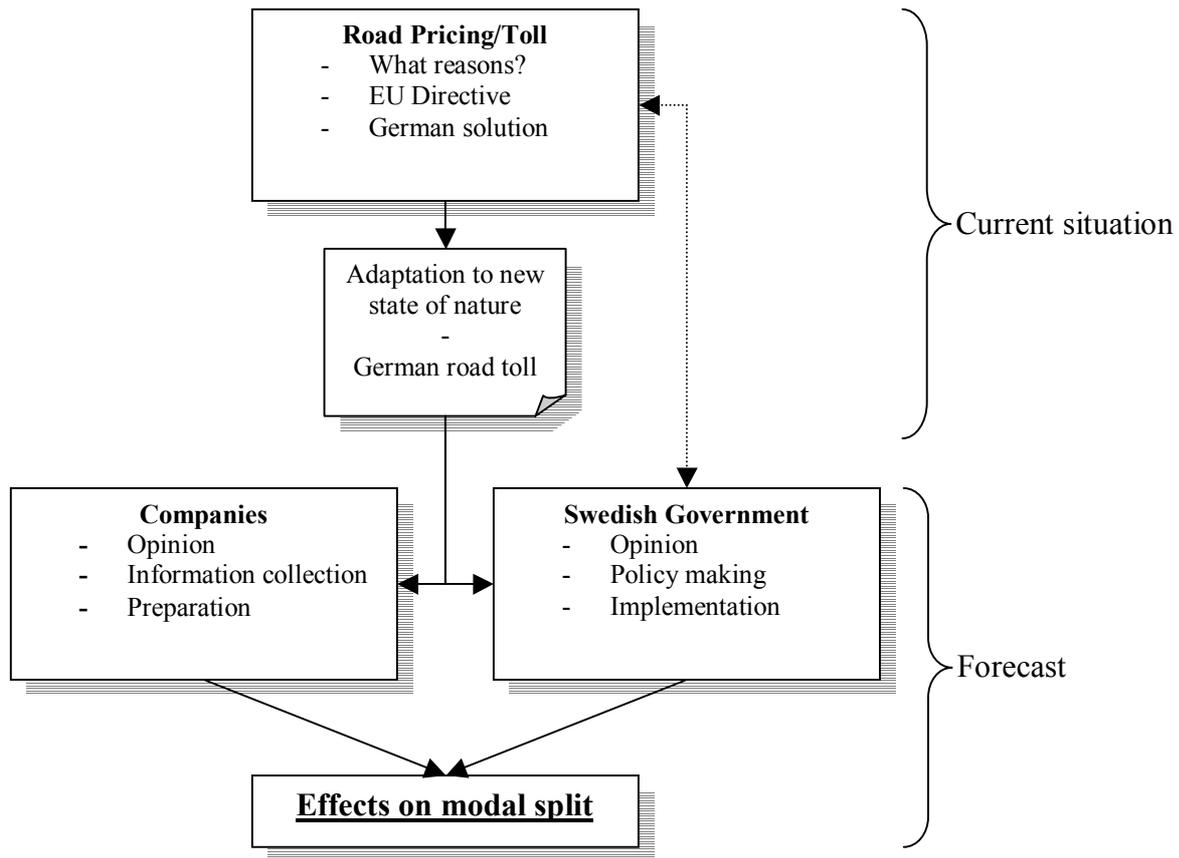


Figure 6: Conceptual model suggestion

The conceptual model is based upon the main problem that this study should be able to answer. The toll itself will be a state of nature that will be needed to address by companies and governmental agencies in Sweden involved in shipping goods to, from and through Germany. The reason behind the toll itself is a current situation and therefore a state of nature. The toll will then simply be described.

After the state of nature is in place companies, and the government, will need to adapt to it, and their behaviour, company policies and customer wants and needs will direct them to the mode or way of transport that they deem fit both from a service and cost point of view. When this is decided the effects on the modal split will be visible, thus connecting our conceptual model together with our stated main problem from chapter 1. Below the different parts, and how they will be analyzed, is described more in detail.

Road Pricing/Toll – This section explains a current situation, and will therefore be acquired by gathering secondary data from the EU and Germany concerning the German road toll and the situation for road pricing as a whole in Europe.

Government – This part of the study will be interview-based, and thus the results will be a forecast on what will happen in the future. It will act as the supporting fact for what may lie ahead.

Transport companies – This section will develop the view of the individual transport companies and how the actual modal split will affect the business. This part will be based on interviews and the supposed behaviour of the companies expressed in these interviews. This part will act as supporting facts and evidence for the main question of effects on modal split.

3.9.1 Influence model and interrelationship

The separate parts of our model are interrelated and the aim is to clarify how the changes from Eurovignette motorways to kilometre based tolls motorways will affect the modal split for Swedish transports passing through Germany. There are ties between all the different elements, the road transportation industry is something that is important for the government, and so it is influenced by it.

The different problems associated with road transportation are also acting as an influence on the government who will be the ones who initiates a road toll system. This system will also take into consideration the various problems, and from these set of problems formulate a correct fee for optimal performance. Finally, the road toll or price will affect the transportation industry and the modal split might change because of this. This change might also give changes in the different problems associated with road transportation. This influence chart is shown in figure 7.

Theoretical Framework

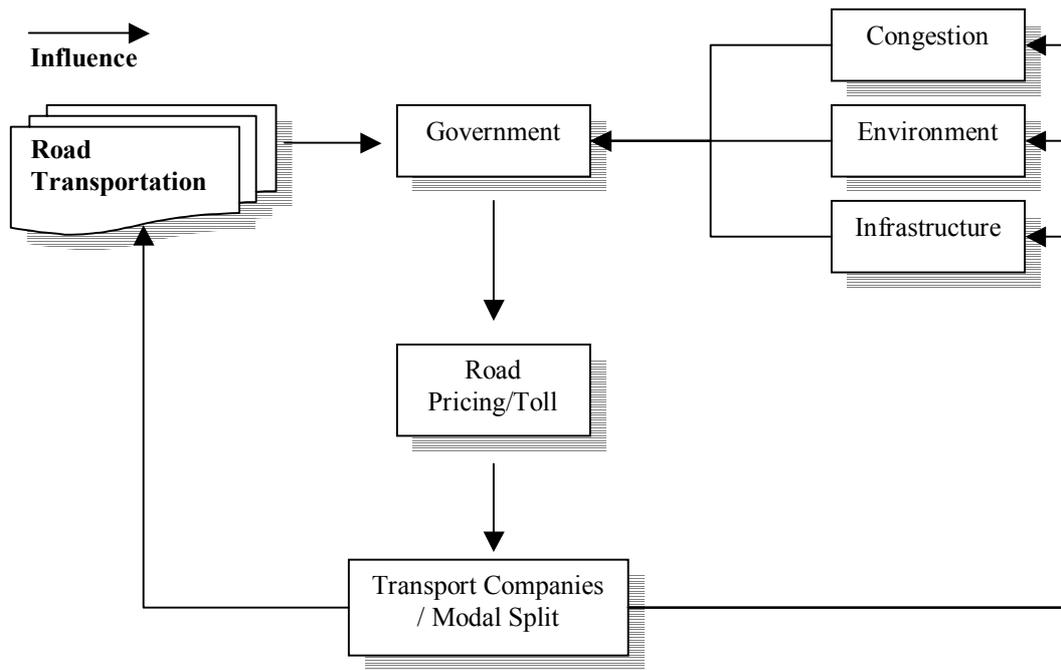


Figure 7: Influence indicator model for road tolls
Source: Own model

Empirical Findings: Road Tolls in Europe

**Eurovignette
The White Paper
Marco Polo
Toll Collect GmbH**

In this chapter data collected about the German road toll network will be presented. It will also contain information regarding the collecting company, collecting procedures, payments methods and the like. This section will also look at the historical perspective and the reasons for implementing the toll.

4. Empirical findings: Road tolls in Europe

4.1 The Eurovignette system

The system of collecting road tolls in the EU is most often referred to as the Eurovignette system. The system, and the way in which a country within the EU can start collecting road tolls/usage fees is laid down in an EU directive. The present day directive is from the 17th of June, 1999. However, there are talks about changing the directive, and it is believed that a new directive will soon be presented that will change the Eurovignette policies. In this chapter we will discuss both the present day directive, and the possible changes that might occur in the soon to be new directive governing road usages fees.

4.1.1 The present directive

The present directive 1999/62/EC was passed in June of 1999 by the European Parliament, and the Council of the European Union. It is a directive that sets common standards throughout the EU zone when it comes to distance based tolls and time based user charges for heavy vehicles (above 12 tonnes). The directive has three main goals or aims, and those are (Directive 99/62/EC):

- To make the Euro zone more harmonized and functional by reducing the differences in the levels and in the systems of tolls and user charges within the member states
- To help in the process of creating fair and efficient pricing policies by granting the chance of differentiated prices in line with actual road usage costs
- To help move towards the principle of territoriality

The directive also gives rules and regulations that member states need to follow to introduce tolls/user charges. The most important rules are as follows:

- Tolls will be collected in comparison to distance travelled and user charges collected depending on time usage.

- Tolls and user charges can only be taken on motorways or multilane roads, as well as on bridges, tunnels and the like.
- The system can not be discriminatory to other member states, and it should not hinder the free movement of goods.

The directive also laid down rules for the maximum of tolls or charge that could be levied. However, member states are free to act within these limits to make differentiated price according to emission class and time of the day.

4.1.2 The future Eurovignette

With the presentation of the EU white paper for sustainable transports it was concluded that transports do not pay the associated costs within their respective modes. The Commission saw that rail already pay quite substantially for the infrastructure, so the new directive is geared towards road transportation. It was decided that an amendment was needed to the old Eurovignette directive 1999/62/EC (Proposal for amending Directive 1999/62/EC).

The new proposal for a directive includes 4 main areas of change:

1. The tolls should better reflect costs associated with transports
2. A more differentiated system of charging
3. The networks and users concerned needs to be better specified
4. Using the revenues of fees needs to be better specified

These four areas show that there are question marks with the old system, and that specifications are needed to better guide member states when introducing the policy of road usage fees or tolls. The first proposed change is that the tolls should reflect actual costs associated with road usage. It is said in the new proposal that the toll should reflect the following costs:

- The cost of constructing, operating, maintaining, and developing the network
- The uncovered costs of accidents

- Estimating costs¹⁸

The second change is to be able to differentiate more when it comes to the actual charge. The new directive would give member states the possibility of varying the toll according to the following factors: distance travelled, place, infrastructure type and road speed, vehicle characteristics, time of day and congestion levels.

The third area of change is the network and users concerned and it gives more specific rules on what needs to be targeted for tolls. The new proposed directive says that it should concentrate on lorries above 3, 5 tonnes and the main routes for transports. This would mean a lowering of the toll limit from 12 tonnes to 3, 5 tonnes. It is also directly concentrating on the trans-European network with roughly 60 000 kilometres of motorways, see figure 8.

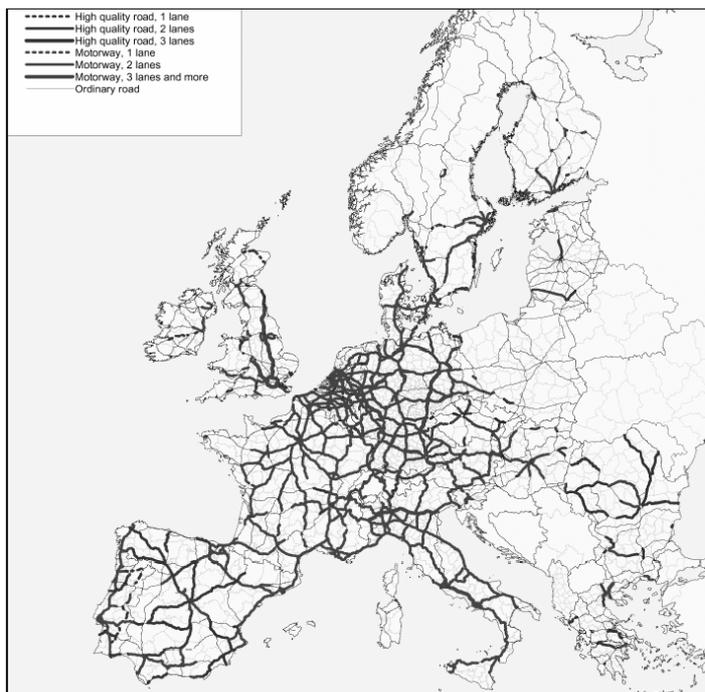


Figure 8: The trans-European Network of motorways

Source: EU Commission proposal for a directive amending directive 1999/62/EC

¹⁸ Some costs are hard to measure, so estimations need to be made constantly and updates of the costs needs to take place.

The fourth area of improvement is set to govern the uses of the actual collected fees. The new directive will state that all tolls must be returned to the maintenance of the roads on which the tolls are being collected. The member states can according to this not see it as extra revenue for the national treasury. The new directive will also stress that the different national toll collecting systems must be interoperable all across Europe to avoid difficulties to transports and drivers. It is also an aim to create a single European system, although it is not a requirement, only the interoperability of the systems is a requirement.

4.2 The White Paper

The White Paper is a transport policy proposition made by the EU for the promotion of sustainable transports for people and goods throughout the EU zone. The main aim of the paper is to shift transport from road to the other modes of rail and sea by the year 2010.

The paper is proposing adjustments in 60 different areas, the most important being;

- Improving road safety (halve the number of road deaths by 2010 from the year 2000 figures)
- Making safety a priority
- Prevent congestion
- Make sure that infrastructure work is carried out
- Implement the Galileo project (Europe's own GPS navigation system)
- Shift transports from road to other transports such as sea and rail

Other main ideas is to revitalize the railways and harmonize them throughout Europe so that the mode will work better and become flexible and a more reliable competitor to the road transportation industry. It is aimed at promoting transport by sea, and this is also the case for inland waterway transports. However, the paper is very keen to point out that even though a shift is necessary for Europe investments need to be made in the road sector to improve quality.

By doing this the Commission hopes that intermodality will be a reality in a few years, and that the difference between the modes will be reduced. This will lead to lower congestion, a better environment and a sustainable development. (White Paper)

4.3 Marco Polo

The PACT¹⁹ program was launched in 1992 as a support program to pilot projects in combined transport. Its objective was to start a common policy for intermodal transport, and to encourage operators to develop new services in combined transport. Funding was provided to improve operation of combined transport services and also to integrate the operators into one logistics chain. The PACT program was completed at the end of the year 2001. Its successor, Marco Polo program is already running this current year. (Mingzhi)

EU is hoping to achieve reductions of the long road transportation encouraging a major shift to rail and short seas shipping. The program will provide support for the non-road transport services not only for the EU transport projects but also for the projects linking the EU with the neighboring countries. It will also encourage the factory-to-factory logistics willing to eliminate road link. (Trans Scan)

The Marco Polo Program will focus on international combined transportation. It is broader in scope and budget than PACT. The Program runs from 2003 to 2010, with a budget of 75 million euros for the period of 2003 to 2006, which is less than the annual 30 million euros stated in the White paper. The budget for the remaining period will be discussed in 2006. Such commercial support given by Marco Polo Program is different from the research or development programs and the Trans-European Network program. The subsidiary principle will try to help to improve the modal shift projects in all segments of the freight transport market. The shift of present transport and an achievement of logistics industry to a sustained intermodal will help to reduce road congestion and environmental effects. It is open to all feasible proposals to shift freight to other more environmentally friendly modes. (White Paper, Marco Polo, Mingzhi)

¹⁹ Pilot Actions for Combined Transport

Three major actions taken by the new Marco Polo Program:

- Modal shift actions – *“To support measures proposed by players on the logistics market, with particular emphasis on starting up new services which will be commercially viable in the long term and will lead to substantial shifts from road to other modes, without necessarily being technological innovations. Community aid will be limited to the startup phase for these services”*. (White Paper)
- Catalyst actions – *“The support for setting up the freight services or facilities of strategic European interest and improve the operation in the whole intermodal transport chain”*. (Marco Polo)
- Common learning actions – *“Improving the co-operation in the freight transport and logistic market”*. (Marco Polo)

Marco Polo will create favorable technical conditions, in other words, improving the harmonization between modes for a faster, easier and cheaper transshipment in order to be more competitive with road transport.

4.4 Toll Collect GmbH

Germany has, as the first country within the EU, proposed a new road toll that hopefully will bring road traffic and congestion down. This will affect transportation on the roads, and more specifically the long hauls, since short hauls will still be carried out via road in the future. However, the politicians hope that long hauls can be reduced on roads in favor of other modes, such as sea and rail. This tax will probably hit road hauliers hard, and it is foreseen that this will affect the usage of sea transportation in a positive manner.

When final testing is done and the system is deemed fit for service all vehicles with a permissible gross weight of 12 tons, or more, must pay a certain toll based on the distance traveled on the German autobahns (motorways). The reason for this being, according to the German government, is that Germany's position in the center of Europe, as well as its capacity as a hub for international commercial trucking, has had a negative effect, or impact, on the German motorways which requires high investments for maintenance and

construction. This situation has led to a decision where heavy vehicles (above 12 tons) will pay for the damage caused on the motorways.

The responsible party for the new toll system is the newly founded company Toll Collect, which is owned and operated by Deutsche Telekom and Daimler Chrysler with the sole purpose of making the system work. The income from the operation is directly transferred to the German Federal Treasury.

The presentation of the new toll system will be divided into 2 parts; legal basis and vehicles required to pay, system for collection and payment methods.

4.4.1 Legal basis and vehicles required to pay

The legal framework that has been passed in Germany to make the tolls roads possible first took effect on April 12 2002 when the Motorway Toll Law for heavy Vehicles (ABMG – AutoBahnMautGesetz für schwere Nutzfahrzeuge) was passed. This law forms the actual legal basis, and specifies which vehicles must pay the toll on which motorways. It also defines who owes the toll, how it is collected and also how collection is going to be enforced. The ABMG also specifies that the German government is authorized to set the amount of the toll by regulation. This has created the Toll Rate Regulation, which is controlled and changed, as stated by the government.

The vehicles that are required to pay the toll are, according to the ABMG, all vehicles, or vehicle combinations, with a permissible gross weight of 12 tons or more which is exclusively used in hauling freight. Thus, all vehicles that fit the above mentioned criteria must pay the toll according to distance traveled on the German motorway network. This means that there is no direct connection with weight of cargo hauled. The rule applies to any, and all, countries of origin and whether or not the truck is empty or full, as soon as a vehicle that falls into the above mentioned parameters uses the motorways, the toll has to be paid.

The actual payment is decided by two different criteria. First the truck is either category A, B or C, depending on the emissions class, and secondly the number of axels. Vehicles are assigned to one of the three categories, and this is also meant to be an incentive for truck owners to convert their fleets into ones with lower emissions class. The actual categories and requirements, as well as actual payment per kilometer can be seen in tables 1 and 2.

	Category A	Category B	Category C
Until 30 Sept. 2006	S 4, S 5 and EEV Class 1	S 3 and S 2	S 1 and vehicles not belonging to any pollution class
1 Oct. 2006 to 30 Sept. 2009	S 5 and EEV Class 1	S 4 and S 3	S 2, S 1 and vehicles not belonging to any pollution class
Commencing 1 Oct. 2009	EEV Class 1	S 5 and S 4	S 3, S 2, S 1 and vehicles not belonging to any pollution class

Table 1: Classification of vehicles into categories

Source: Toll Collect GmbH

Number of axels	Category A	Category B	Category C
Up to three axels Euro-norm ²⁰	€ 0,09	€ 0,11	€ 0,13
Four or more axels	€ 0,10	€ 0,12	€ 0,14

Table 2: Amount of toll per kilometer

Source: Toll Collect GmbH

²⁰ Tandem axel counts as two axels

4.4.2 System for collection and payment methods

The collection system for the toll is highly advanced and it has been developed to be able to record the kilometers driven and calculate the actual toll. The system also makes sure that the flow of traffic is kept, and no hindering barriers is set up along the way, unlike so many other toll collecting systems this new system does not require vehicles to slow down, stop or be restricted to certain lanes.

There are three different services that the system offers customers who want to use the German motorway network;

- Automatic log on via the On-Board unit
- Manual log on via the Internet
- Manual log on at more than 3,500 toll station terminals.

The user is free to choose what log-on option he would like to use. From a general perspective, the manual log-on is best suited for customers who rarely or infrequently use the German Motorways, while the automatic is designed for customers with frequent usage of the German Motorways. Registration with Toll Collect is required for the automatic log-on, Internet log-on and for certain payment methods.

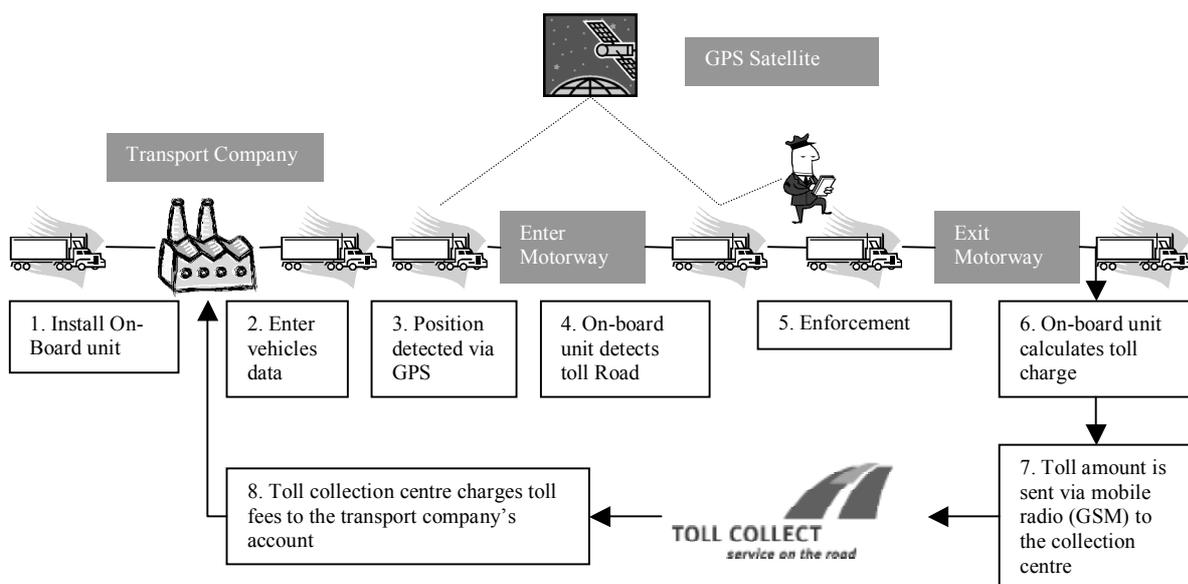


Figure 9: Automatic log-on
Source: Toll Collect GmbH

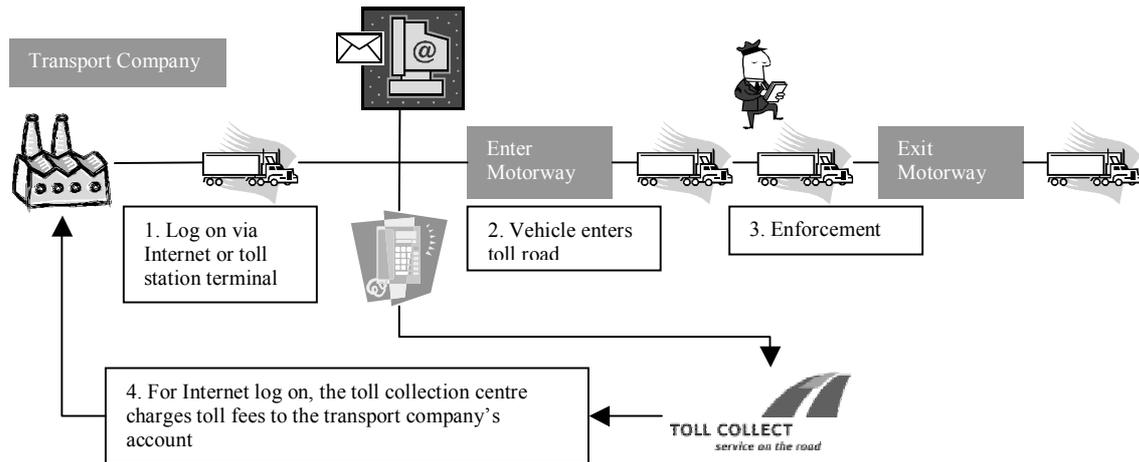


Figure 10: Manual log-on
Source: Toll Collect GmbH

The main difference between the two log-on options is that the automatic one requires less planning, the driver simply drives the truck, and the system will take care of all the billing and accounting, thus speeding up the process, and basically, from the driver's perspective, nothing will have changed.

The second alternative with manual log has two possibilities. The first one requires a route planning via the internet where starting-point and end-point is indicated, and thus you pay for that specific route. By doing this the user will receive a pin slip, which is the identification number that needs to be kept within the vehicle during the duration of the route, in case of a payment control along the way. The second way is to simply pay before entering the motorway at one of the more than 3,500 payment stations which are located at truck stops, gas stations, etc. Here the driver fill in the truck specifications, the start and end points, and the toll is paid via a bank/credit card, and a pin slip is received.

The different payment methods depend on if the user is registered with Toll Collect or not. There are mainly four ways; bank/credit card (does not require registration), direct debit procedure, fuel card or credit account.

- *Bank/Credit card*: this way of payment is only available when paying directly via a toll station along the way, but is a good compliment for the users who rarely uses the motorways.

- *The direct debit* is basically that the toll is directly withdrawn from the users account. The user, however, must have a credit rating approved for a minimum of twice the maximum toll billed per period.
- *Fuel card* is a procedure in which the toll is charged to a normal user fuel card; however, as above the credit rating must be at least approved for a minimum of twice the maximum toll billed per period.
- *Credit account* if a user's credit is not sufficient a credit account can be set up, here the user pay in money in advance, and this money is then used to pay future toll charges. Empirical Findings:

Interviews

Ministry of Industry

SIKA

Swedish International Freight Association

Schenker

DHL

RailCombi

Confederation of Swedish Enterprises

Volvo Logistics

Volvo Technology

***I**n this chapter interview material from our interviews will be presented. It will be divided into three specific parts; governmental agencies, transport companies and the business sector. This section will give the information and data necessary for conducting the analysis.*

5 Empirical findings: Interviews

All interviews were carried out using the main interview guide found in the appendix chapter under section 9.1. The interviews in this chapter have been divided into three categories; governmental agencies, transport companies and the business sector.

5.1 Governmental agencies

In this section the views and forecasts of Swedish governmental agencies and ministries will be presented. This will give us the facts necessary to gain the governmental perspective in the analysis part of the study. The data collection was carried out at the Swedish Ministry of Industry and the SIKa Institute.

5.1.1 Ministry of Industry

The Ministry of Industry is governed by a politically appointed minister, and the current minister of industry is Leif Pagrotsky. He is appointed by the Prime Minister, and he is given tasks to work with. The Ministry is, therefore, a political tool for the current government. However, most members of the Ministry are not politically appointed, but have civil appointments within the Ministry, they need however to follow the guidelines presented by the minister. (Regeringen)

Gunnar Eriksson is the Deputy Director at the Division for Transport Policy of the Ministry of Industry, Employment and Communications of Sweden. The interview was performed on September 1st, 2003, in Gothenburg.

5.1.1.1 The Swedish governmental view on the new toll

The Ministry does not have a specific view about the effects of the new German road toll on transports to and from Sweden. It is known that some interesting effects will happen, although it is not clear yet. The modeling performed at SIKKA indicates that maritime shipping from the south of Sweden to Germany and Denmark will decrease somewhat, while others might increase, such as from Gothenburg to Belgium, etc, which is a link that could be beneficial in the long run.

The price of road usage will be a deciding factor in how to conduct long haul transports in the future. The Danes have done a study, where they estimated, or rather, they have looked at the price increases that the German scheme would imply, and they concluded that this increase is quite high, and if they suggested similar charges all over Europe it would mean a 15% increase in transport pricing/cost. This, the Ministry think is high, and so it expects some changes. However, there will be different kinds of changes; increased load factors, better utilization of capacity, and usage of other modes.

When these issues are discussed from a more strategic level at the Ministry it considers ways to get around central Europe, and then the shipping routes from Western Europe are one of the alternatives. Focus is also on high capacity corridors through the new member states (Poland and Eastern Europe) as an option. However, those countries have problems when it comes to infrastructure and they need heavy investments in infrastructure.

A change in the modal split due to the toll depends on issues like capacity on rail and sea transports, and whether or not it can manage increased usage. This is a major issue, but there are also infrastructure issues. Most problems can be found with the rail infrastructure within the EU which has a history of 15 different rail systems, and now they try to tie them together. This is difficult and there are all kinds of problems, like languages (you have to know the language of the country in which you drive), there are traction problems and also a number of different standards. The harmonization is priority work within the EU, but it is not moving very fast.

When it comes to sea they do not have the same kind of problem with capacity, rather they have over capacity in most European ports. So maritime shipping certainly has a potential advantage to other modes. The issue is mainly to deal with the cost situation.

This change in price may cause less flexibility and quality when it comes to transports. It is always a matter of pros and cons. Some firms/companies will be prepared to accept less flexibility to get a better price, but probably there will be no major shift from how transports work today, or in the future.

Before the idea of introduction of this toll, there was a commission in Germany called the Pällmann Commission. After the unification of Germany they had a considerable lack of infrastructure in the eastern parts. Road charges were the answer to the need of a basis for new infrastructure investment. So, infrastructure investment and raise of revenue are the real reason for this new toll. Germany has had the impression that a lot of foreign traffic was causing a lot of problems, and this was a way to make foreigners pay for the use of their road network. The German Parliament also passed a road-charging scheme early on, but then they ran into a problem with EU legislation and in the end they could not introduce it.

Revenue is definitely a key motivation factor, but environment and congestion comes up as part of the argument when the politicians in Germany judge what people think about the idea. The EU often speaks for the opinion that we need to change from road transportation to rail and sea, mainly because of environmental issues, but the German government originally introduced it to invest in infrastructure rather than promoting a modal shift.

Gunnar Eriksson then proceeds to talk about the Eurovignette system which up till now has been north Europe's way of collecting road usage fees. This system will not yet have played out its role when Germany leaves the system. The other five countries will continue to charge in the old system. The cooperation will exist as long as those states wish to, and it will probably last at least a few years. Maybe it is not the best system for the next 20 years, but it is an instrument that will remain for the next few years.

Gunnar Eriksson mentions two of the problems with the Eurovignette system;

- Hauliers in Sweden are complaining that foreign vehicles may use non-Eurovignette roads (TEN²¹ consisting of motorways and other major roads).
- It needs a lot of administration and it does not raise enormous amounts of revenues (a few hundred millions SEK a year in Sweden).

The advantage with the Eurovignette system is that it is a tax that hits the users of the Eurovignette network, it is environmentally differentiated and it provides an incentive for foreign transporters to use cleaner and newer trucks. Moreover, it is less distorted towards international competition than a vehicle tax since a vehicle tax is charged on all vehicles. Countries such as Sweden, Denmark and the Netherlands, using the Eurovignette system nowadays, will probably consider introducing a road toll themselves.

Introducing a distance based Eurovignette system in Sweden is still far in the future, and if the situation in Sweden is considered, a conclusion can be drawn that the scheme the Germans introduced, according to current European law, allows for charging in the Eurovignette network only and it would be very inefficient in Sweden. It would imply a probable deviation of 10% to 13% of the Swedish heavy trucks to lower quality roads from the good roads, where we should have them. The Germans have done similar modeling and considers a deviation of 0.2% to 1%. But their road network looks completely different.

Given the current situation, Gunnar Eriksson can not imagine that the Swedish Parliament or the Swedish Government would introduce it. Right now there is a discussion going on, about a proposal for a new Eurovignette directive. This proposal would allow Sweden to charge on all roads. But then, another issue pops up, and that is about costs. How much would it cost to build a system like that? This is one thing that the Swedish road tax commission is looking into, and it is about to propose a possible scheme for kilometers charge in Sweden.

To summarize, Gunnar Eriksson says that given current EU legislation, it is almost impossible to implement an efficient road toll scheme in Sweden. But, when the Eurovignette directive is changed to offer the possibility of charging on all roads, then it will be different. It will, however, take a few years to go

²¹ the Trans European Network

from discussion to implementation. The Swedish road tax commission should have a proposition by the end of 2003 for a possible kilometer toll scheme.

When it comes to the effects of the new toll, roads will still be the most demanded transport service mode and the others will adjust, so what the SIKA modeling shows is that this will actually hit, or appears to hit, ferry traffic in southern Sweden. They are not competitors. The ferries and the trucks go together so when something hits the trucks the demand of ferry traffic might go down. Changes can be expected, but at least the maritime business is very flexible while rail has the problem of infrastructure.

The Swedish Ministry of Industry has received complaints from hauliers and vehicle manufacturers. And the complaints are of two kinds;

- The system will be expensive
- There will be lack of on-board units and if Swedish vehicles do not get it or any other vehicle do not get it, that they have to pay to use less flexible alternatives like internet or use road side toll stations

The lack of on-board units in the beginning is basically a problem of logistics and planning; they had a very short time to be introduced, and it probably does not have anything to do with trying to protect their own transport industry by making it hard for foreign hauliers to get these units. But, when it comes to this electronic platform in the vehicle, the Swedish manufacturers Volvo and Scania have been dissatisfied with that. They felt that this will provide potential advantages for their competitors because they have a kind of monopoly to this technical IT platform and they have been in discussions with the German toll collector, Toll Collect GmbH.

The Swedish government has taken action to discuss this issue. The late Swedish Foreign Minister, Anna Lindh, met (29/08/2003) her German colleague and had a discussion on the issue. However, as long as Germany implements legislation that Sweden has agreed to in the EU, it cannot be criticized.

Neither national authorities, nor the EU, encourage transporters to implement intermodal transportation. There are measures to encourage intermodality like the Marco Polo programme, but the policy is to let the market decide. The final

decision-making process of shipment from origin to destination is in the shipper's hands. On top of this there is no pure aim of the Swedish transport policy to encourage a modal shift. The aim is to provide an efficient and sustainable transport to citizens and companies in all parts of Sweden. It also discusses issues such as environment, safety, the transport quality and the accessibility, gender equality and positive regional development. The answer to this might be intermodality and it might prove a way to achieve the goal of an efficient transport system.

There is a lot of consultation between the government and the business society. The freight transport commission is one of the examples. Basic rules are studied together as well as some case studies to see the changes it would imply. Anyway, the government should keep that at the general level and do not dig too deeply into the details. That is actually what the Marco Polo programs does, with some authorities looking to evaluate specific proposals more like a research, but not the government.

There might be discussions of being more involved on physical facilities. This commission sees that there is an unbalance in the sense that according to Swedish transport policy when you use the road or rail then you should pay the marginal cost and social cost. They think that if you apply the same principal at the terminals, then the charges would be lower because the marginal cost to use cranes does not cover the capital costs and then, that unbalance prevents the efficient use of terminals and the intermodality. This is a tricky issue that they are looking into. If you leave at the current state where you run terminals as businesses then you need to centralize decisions about terminals. This would fall upon the governmental agency, the Swedish terminal administration, and would probably cause some to become rather unhappy with the entire issue.

5.1.2 SIKA – Swedish Institute for Transport and Communications Analysis

SIKA is a Swedish governmental agency attached, and responsible, to the Swedish Ministry of Industry. The institute has three main areas of responsibility in the transportation and communications sector:

- Carry out studies for the government
- Develop forecasts and planning methods
- Be the responsible authority for official statistics in the sector

SIKA was established in 1995 and has 30 employees, the institute is organized into four departments, which are; Analysis, Research & Evaluation, Statistics and Administration. The work is carried out in cooperation with transport agencies, universities and other research institutes and the like. (Sika)

For this study Transport Analyst Inge Vierth, at SIKA in Stockholm, was interviewed on September 17th, 2003.

5.1.2.1 SIKAs view on German road pricing

SIKA has over the last year been highly involved in modeling and analyzing a possible Swedish kilometer based charge system, which will work in concert with the new Eurovignette policy/system. The current Eurovignette directive is being checked and changed in the EU, and the new directive will soon be released.

There has also been a discussion whether or not the new possible toll will be on the whole road network, and not only on the national and main roads. SIKA has also made different simulations with both fixed costs and social marginal costs. Similar studies have been made in Germany, but the road network is different. Thus it can not be directly converted to the Swedish road network. However, the main affect on Sweden and Swedish transportation will possibly affect several different areas of interest.

First of all, flows might be changed due to the toll, and some transporters might decide to either find cheaper solutions in other modes, or try to find alternative routes within the European road network, possibly following an eastern corridor through Poland. The toll might also affect the Swedish Government, and other countries in Europe to introduce a similar tax/toll, to counter the German initiative, thus increasing the cost of road transportation even further. The toll can also change the placing of new terminals and hubs within the EU, so that locations are optimal when it comes to the toll and its effects. This can also affect businesses as a whole. According to Ms. Vierth there might also be a competition issue, when German companies develop software and hardware, thus being able to both prepare and use collected information for their own usage.

When you look at Switzerland as an example, which has had a kilometer based system in use for about two years, the effects are mainly within the road companies. They have had very few shifts to other modes after the first few years. However, the road transportation companies were able to organize shipments better, thereby being able to counter the effects of the toll. What Inge Vierth also points out is that at the same time as the toll was introduced the maximum weight of trucks was increased from 28 tons to 40 tons. This can in part explain the efficiency gain, and render the Switzerland example obsolete or certainly not as dependable when it comes to forecasting possible effects in Germany, according to Ms. Vierth.

The current way of introducing road pricing is, according to SIKKA, in the short-term not made to cause a massive modal shift, but more a means to an end to gain revenue. This revenue can then be invested into other modes such as sea and rail, thereby in the long run making a more massive modal shift possible. The Swiss example supports this idea. In Sweden, and in other countries in Europe, passenger transportation is the primary objective when it comes to policy. Goods transport is on the rise on the agenda, but according to politicians better and cleaner goods transportation is still seen as a more secondary objective.

When it comes to planning and evaluating modes and transports SIKA tries to get real world examples and facts via cooperation from the business sector, even though this could be more extensive. The contacts as a whole are not that many, but when it does happen the results are usually better and the overall support for them are much higher.

The price of road usage is important, but it has to be accepted. Then companies need to make an assessment if the cost increase is so high that alternative solutions might be cheaper. This is purely an economic question, and costs of using different modes, and cost of shifting between modes needs to be taken into consideration before an increase in price can be deemed either too high, or acceptable. From what SIKA understands most Swedish transporters seem to accept the cost increase, and are prepared to shift the increase in cost down the supply chain to the final consumer.

When it comes to the modes that might gain from an increase in road prices it is mainly rail and sea. These two modes are also land-based and solutions already exist for a quick interchange between the different modes. However, the two modes have problems. Rail in Europe today has seen dwindling freight for over two decades, and the main lines that operate are usually working at almost maximum capacity on important routes. Adding to the problem different traction, electrical current, signal systems, language and laws in the Euro zone makes transport through several countries on rail rather inflexible and expensive; it can also lead to very unreliable services. Sea transportation does not have the same infrastructure problems as the railways across Europe, here the problems lies in frequency according to SIKA. Ships leave ports perhaps twice a week, and this together with longer time spans of actual physical movement on the seas sometimes make maritime shipping inflexible.

SIKA believes that with the infrastructure problems and investments needed in the alternatives modes the changes to come in the future will be threefold;

- Companies will increase the price of the services to counter the effects of the toll, making the merchandise more expensive to buy.
- New routes will be checked and better organization of transports will lower operational costs.
- Mode changes take place to lower the actual price of transports.

This three step plan is likely to be implemented over time, starting with higher prices for customers and ending with a more massive shift of modes in the long run. The shift is also dependant on the actual distance of the transports. Companies are much likelier to change when being subject to the toll for 400 kilometers, than if only being subject to it for 40 kilometers. Simply avoiding the tax by using strategic shipping lines like Gothenburg – Ghent might experience a higher initial change than modes in general simply due to the fact that some transports are more easily shifted.

Other possible reasons for introducing a road pricing policy might be to lower congestion and to help alleviate the environmental problems. SIKA however do not think that these concerns played a vital role in the German decision for road pricing, however if the modal shift is realized the congestion and environmental problems will become better thanks to the reduction in road transports, and possible new investments in road infrastructure might also help the situation. However, it is more a result of a policy than a strict goal itself.

SIKA also believes that the toll is introduced because of Germany's present economic problems, and this new form of revenue will help the government to keep up investments in the infrastructure field without jeopardizing the national budget goals and the Euro rules that applies for Germany's membership in the EMU²². This can also be said to be a "payment" of using the roads, something that most tax payers are starting to demand now that they see that foreign traffic creates problems and inflicts economic hardship on the government.

Ms. Vierth also believes that the present day Eurovignette system will collapse over time when the central player Germany leaves the system. The other members of the system will be forced to change their own systems in favor of a probable new Eurovignette system based on a kilometer-based system. This will be more of a necessity since the cost for maintaining and investing in new infrastructure is getting more expensive every year. The present day system is very simple, and that it is main advantage however it is not related to the actual cost connected to the transports. This will also mean that there will be different fees in different regions, and this will be made legal by the new Eurovignette directive, basically because the costs can differ depending on where it is.

²² The European Monetary Union

According to SIKA the new toll might make rail and sea systems cheaper than road but such a thing as quality, reliability frequency and flexibility must be taken into consideration. This might mean that companies with big amounts of goods can find cheaper solutions in other modes, but the gain has to be of such a scale that a shift should be economically bearable, and make transports less expensive. Another possibility is that sea and rail quality and reliability increase making the difference between road and other modes smaller, thus making the actual price/cost more important, and spurring more shifts between the modes.

The change in cost in the sector might result in a shorter distance for economically viable intermodal transport systems. The change should be minimal, according to Ms. Vierth, but none the less it should have an effect. This is also directly tied with the quality and reliability, and it is therefore not only a question of price.

The authorities in Sweden, and Europe, are the ones who create policies and establishes infrastructure, but they do not persuade transporters to shift from one side to the other. Through policy they try to create flows that are good for the systems as a whole. The authorities simply create the systems and let the free market decide in what way to use it, and through that the correct mix will establish itself.

The government tries to get the input of companies and transporters but in the end the market has to change according to the state of nature that is given. Solutions are discussed in a broad spectrum, but the market will have to realize its own goals. Direct government subsidies are not common, and will probably not be in the long run either. Problems with harmonization needs to be settled on a European level, but regional problems or high investment costs is generally nothing that the government is interested in interfering with.

The reason for this attitude is that passenger transport is prioritized, and goods transports are generally considered to handle their own business. Any costs incurred are handed down to the consumer, and he or she is the one that decided whether or not the price is reasonable. According to SIKA the market will decide the correct mix, if the possibility of using all modes is present and able to compete on somewhat similar terms.

The road pricing is a way to raise revenue to create a more similar system so that competition between modes becomes bigger, and other solutions can be created for goods transports.

5.2 Transport Companies

In this section the views and forecasts of Swedish transport companies and agencies will be presented. This will give us the facts necessary to gain the transport companies perspective in the analysis part of the study. The data collection was carried out at the Swedish International Freight Association, Schenker, DHL and RailCombi.

5.2.1 Swedish International Freight Association

The Swedish International Freight Association was formed in 1996, with 140 company members such as DHL, Schenker, Green Cargo, DFDS, Port of Gothenburg, Helsingborg, Stockholm and Stena Line which gives the association a big market share. The mission is to promote intermodal possibilities, having discussions with all modes trying to find some common standpoints. Efficient transport to Sweden is very important due to its size, the geographical location in Europe and for being the house for some big industries such as car, truck, paper and mills (Swedfreight).

Stefan Back is the Secretary General and Managing Director of the Swedish International Freight Association. The interview was performed on September 17th, 2003, in Stockholm.

5.2.1.1 Swedfreight's view on the German road toll

The first effect of the new German road toll will be that transport to and from Sweden will cost more for the Swedish industry. In order to allow road hauliers or the logistic industry to cope with this increase in cost it will simply be passed down the value chain to the customers. Germany is a hub, and so it is a “go through” country for Sweden and it is also an important area, with some big suppliers and customers. So it is not possible to go round and avoid it and compensate for this toll. However, it can generate discussions in industry to move their production closer to the market.

The increase in road usage fees may lower the justified distance for intermodal transportation. But the cost is not only the reason for this distance. The intermodal system depends on frequency and quality and a lot of goods flowing in the system. Sweden has a problem because there are not that many flows. So there are other factors besides the road tolls.

The price of transport is one of the deciding factors, but the quality of transport is also important. The shift between the modes takes time because of the level of quality needed for each transport. Some factors such as type of goods, customer, time, value of the goods vary and dictate the level of the transport quality. Price is important because the society should give the right signal to the market concerning the price for the society to use each type of infrastructure. Otherwise you come to a point where the companies are overusing one kind of infrastructure and under using others. So, it is understandable that some transport ways have higher infrastructure costs based in marginal cost. Pricing of road usage also has to do with the price in other modes. If the idea of the Germans was to promote a modal shift, they should have lowered the fees of rail infrastructure, which is much higher than most European countries today. Instead, there are rumors that the German rail fee is moving up a little bit because the market will allow that, so it is clear that the discussion is not about shifting modes, but a way to get money to cover the cost of the motorway infrastructure.

Rail and sea connections are a feasible alternative to the long haul road transportation of today depending of the type of transport we are discussing. There is a problem with a rail sector in Europe. So, it is easier to go by lorry,

because rail is too slow and not reliable due to the small number of operators. Since 1960, the rail sector has kept the same level of TKM, the same happened in the sea transport sector, while road has increased a lot. The value of the goods has increased and the quality of transport has changed so the need from consumers is higher than it used to be and only lorries have been able to meet the flexibility and quality asked for.

This is not only the case in Sweden; the rail market in Europe is more related to base industries like iron, steel, paper. This is a long-term situation and it is probably not the introduction of this toll that is going to change this global trend of today. The share of road transportation has been increasing since 1950.

The sea has a little better situation although it is slower also and it might be tricky to meet the demanded customer's time frame. The ferry companies might get disappointed in the beginning but it might increase in the long run. The transporting time is not the crucial thing. The important thing is the ability to be at a certain time in a certain place, so both rail and sea connections can gain a lot in the future. The time frame can be even longer, since the arrival time is most important. Stora Enso for instance, goes by rail from the Swedish paper mills to Gothenburg, and then by ferry to Belgium and then it is distributed from there. They have slowed down the ferries to allow lower emissions and lower energy consumption because they could do that and still have efficiency in their system. Large global industrial companies and large logistics companies, like some of the members of this association, are trying to build bigger systems of production with logistics in the transport between their links of the supply chain network. As long as they see efficiency in the logistic systems, there will be a lot of opportunities for intermodal transport. There are possibilities, but doubtfully it will happen in the next few years.

Flexibility and frequency are important, but the reliability is the most important for the JIT²³. The introduction of this new toll will not influence the quality of the transport system. Different customers need different solutions, but as long as the flow is going, it is fine. However, some companies might think that it is better to move the production closer to the market and the inventory closer as well. Whenever the cost rises, it is necessary to look for alternatives.

²³ Just-In-Time

Other transport modes, such as sea and rail, will be able to use this new toll to their advantage. It is up to operators to try to make use of the new situation. Surely the ferry sector will come quicker to solutions than the rail sector due to the problems of national administrations, and infrastructure incompatibilities, but they will not succeed in the next few years. It will take time and the road is not going to lose its market share immediately.

Talking a little bit about the Eurovignette system, just to make a comparison with the new toll system to be introduced, we can quote some advantages as well as disadvantages. The advantages of the Eurovignette system are that it is a multi-country solution and not a national. One problem, however, is that it is not a commonly European solution. It is going to be quickly obsolete once the Germans introduce their own toll. The EU has understood that, and will present a new directive to make a framework for these types of tolls and infrastructure-charging systems in order to keep it harmonized. The European Commission should make this move before we end up having lorries with a bunch of different boxes for the different road toll systems.

It is known that the Commission understands this and they are trying to harmonize the systems and principles behind it. Then you need to have something like the Eurovignette directive. The old system which charges for time is not the most effective and we will move closer to kilometer charging. The Commission should come up with the framework and the national authorities should come up with their own system, but it must be harmonized. It is a failure for the EU, but probably the Commission is not going to do anything concerning this problem during this and the next year due to some political strategies. The biggest failure was that the EU has not published any overall paper on infrastructure charging since the White Paper.

With the Eurovignette system going out, countries such as Sweden, Denmark and the Netherlands will be interested in introducing a road usage fee themselves. Probably the Netherlands is going to be the first one to introduce it, since they have been discussing it for some years. Sweden has an official investigation going on in this field.

Some questions might pop up about the validation of the German new toll. The principle of paying a road toll for using the road infrastructure is good. The member companies do not have any problem with that. The social economical

marginal cost is a good principle for charging users is a way to efficient and long-term goods transport system sustainability. The problem is not the principle but the attitude of the Germans, who are trying to get as much money as possible out of all transport modes going through the country, just because they are in the center of Europe. This is going to be unfair especially to peripheral countries, so the ideal would be sharing the income. There are more technical complaints, but not for the system itself.

The Swedish Government and administrations do not allocate much resource to discuss subjects like this, so possibly, the Swedish Government will not take any discussion against the implementation (Stefan Back was in the Ministry of Industry, Employment and Communications for many years and has not seen anything like that). According to Stefan Back the Ministry prioritizes internal problems. There is not that much contact between Swedish and other European authorities. So, usually they take action/discussion once companies start complaining.

When the Goods Transport Delegation was formed, it was the first time that all the involved parties (transport industry, customers and administration), were seated at the same table. The government understood the possibilities of these kinds of forums for discussion. There are also some regional types of delegations, so government and companies look at these problems together. Sweden is going in the right direction although priority is always given to passenger transport rather than to freight transport, and this, according to Stefan back, should change a bit.

Some years ago, this change in policy could bring some more problems. In the past, when lorries were responsible for the shipment, they would argue that they were not willing to loose the control of shipment from origin to destination. But nowadays, intermodal delivery system is a reality. Schenker, for instance, takes care of the transport logistics in all modes. The transport sector is going in the right direction, with intermodal transport logistics companies.

Important questions that arose in the Goods Transport Delegation were;

- Will the government be subsidizing the elimination of obstacles such as the lack of physical facilities to an efficient transfer between modes and the incompatibility of IT among transport companies to achieve the modal shift objective?
- Is subsidizing the way forward or just let for free enterprising?

There is the Marco Polo system on the European level. The authorities will probably give money somehow, for instance to projects to make it happen. The problem from the Swedish side is that the threshold for shifting modes for goods transport is so high that basically all goods going through Skåne will need to be able to have projects financed. Therefore, company members are disappointed in that way. There are some constraints in reaching physical facilities and one of the problems, for instance, has to do with RailCombi terminals. Some problems are related to the infrastructure and others to the service. And the shifting of lorries/semi-trailer can be understood in two different perspectives.

Some alternatives to avoid the new toll might come. In spite of the German roads being rather important for Sweden, in many cases there is the necessity of going through Germany. However, there are possibilities to go by ferry to Poland and the use eastern European road and rail services. But the infrastructure in some of these countries is not that good. Transporters can use it until Poland introduces its own toll.

It is possible to foresee some more ferry connections in the future. Stora Enso has a base port and other big companies are planning to do something similar, so probably we will see both more dedicated ferries and also more lines open for people and companies. In a long run, the open system will be more common than the dedicated, since the quality is still there. So, we will have more ferry connections, but it is unknown how many connections are economically sustainable.

The focus of this association is to show that the future does not lie in keeping together the transport modes fighting against other transport modes. The interest of the transport industry is to focus on the whole chain of freight

transport and to develop the efficiency and sustainability. It was not possible to think about combined transport ten years ago, but the mentality has changed.

Hopefully we will use intermodal transportation in a more efficient way before every country has introduced road tolls for goods vehicle. It is essential that we reach an agreement in the EU that we should have a common transport policy, and that all modes leave pricing according to the social economical marginal cost, because that is the principle that must be used to the long run. It is known that if it was fully introduced, the infrastructure costs would be covered totally, although it has to have some shifts in order to achieve that. So if the Germans were thinking in enhancing the shift, they could lower the income in the rail sector. Anyway, it is understandable that Germans are afraid of congestion once countries like Poland, Czech Republic and Slovakia join EU. They will drive their trucks east-west to Rotterdam to reach the international market and our lorries going north-south, causing a big crush in the center of Germany.

5.2.2 Schenker

Schenker is a transport and freight forwarding company in Europe. In Sweden Schenker was founded in 1998 when BTL Sweden and Schenker Transports merged. Schenker is also one of the leading transport companies in Europe with transport operations in 30 countries and with 20,000 employees. Schenker is also the leading Swedish transport company with 4,200 employees, a turnover of 9 billion SEK and 74 000 shipments per workday. (Schenker)

For this study Deputy Managing Director of Marketing and Process Ingvar Nilsson of Schenker in Gothenburg, was interviewed on September 12th, 2003.

5.2.2.1 Schenkers view on new German road toll

Initially Ingvar Nilsson says that it will be more expensive, and that this new toll will add a rather high cost to road transportation, and this is perhaps the main problem. However, he also foresees other, smaller problems such as some delays in the beginning. The price of actually using the roads is something that

Ingvar Nilsson thinks will sooner or later be a deciding factor in how to conduct transports. In the short term he does not expect to see many changes, mainly because of the limited capacity on combined transport with rail and also on the ferries between Scandinavia to the continent. This means that some volumes can be moved to other transport modes, but in rather small volumes and later on, it might be possible that increases in capacity will be available on combined transport, however that will take years. He also foresees a more extensive usage of Poland to reach southern Germany instead of going through Germany. He says that “*there will be some creative solutions for the future*”. However, in the short run little or no changes will occur.

When discussing the feasibility of using other modes Mr. Nilsson thinks that they are not an alternative but a complement. Schenker uses the ferries to Ghent, combined transport, and railway, but they use it for different purposes. So, when it is feasible Schenker uses the best suited mode of transport. This is a mixture that has been working well for Schenker in the past, and it is expected to work well in the future. However, there has been little change over the last 10 years, and the market share of different modes have been rather stable, the reason for this according to Schenker is rail service is too bad, the capacity is not good enough and prices are too high. The price, of course, will be relatively cheaper compared to road when you put the road toll on top of the cost. However, this will not suffice to bring a dramatic change in the near future.

On top of this argument you also have to place the question of the affect on flexibility and quality. This is the problem, and Ingvar Nilsson says that “*if it could be as flexible with the rail, you would have seen much more cargo on rail, because that is one of the main obstacles when talking about rail, there is no flexibility and a lot of delays. That is the problem. So, if you were forced, price wise, in another way to use rail the result would be less flexible*”. Ingvar Nilsson goes on by saying that a harmonization of rail infrastructure and regulations is vital and also capacity increases. Today the capacity is often reached, and the main reason is passenger traffic, and this is something that politicians always put before good transports according to Ingvar Nilsson What he believes is that more investment into rail infrastructure is needed, more flexible slot times given to goods transports. Flexibility is the key and road so far has the best flexibility and therefore it is more reliable and qualitative.

The same problems basically exist with ferries, but the problem here is not the actual transport time, but rather the frequency. Ingvar Nilsson says that we know that the actual transport takes some specific number of days, but if there is only one departure a week the mode is not flexible, it has to be thoroughly planned, and thus road normally wins against this mode as well. However, he stresses that not all transports needs flexibility, and so Schenker uses ferry connections when possible.

The Eurovignette system is also something that has been discussed within Schenker, and they have mostly focused on the new German road toll system, since according to him it is only a matter of time before other countries abandon Eurovignette in favor of a kilometer based system like the German one. Mr. Nilsson also stresses that the change comes mainly from EU itself. The EU will present new directives which will update the old Eurovignette directives making an EU sanctioned kilometer based road toll system available all across the EU zone. He also mentions Austria's implementation of a kilometer based system and the investigations into the same kind of system in the Netherlands. However, he expresses a fear in that all the different countries will have separate solutions, which will make EU road transports less harmonized, he also mentions that rail and sea can draw some advantages from this increases in road pricing, but in the more long-term perspective.

When discussing about the increase in road usage fees and the coming introduction of new systems Ingvar Nilsson also gave his view on intermodal transports and what may lie ahead for this type of transport. Such as the possible advantages for rail and sea he believes that intermodal transports will benefit from the change, however as in the other examples it will be more long-term, but the justified distance will possibly be lowered and that would make transports in a multi modal transport system far more desirable than today.

Mr. Nilsson also mentions that governmental authorities are trying to get transport companies to work together to establish intermodal transport solutions. However he is a bit anxious when it comes to the business climate in Sweden where different companies have monopoly on different aspects such as the actual infrastructure, equipment, etc. he believes that with more deregulations and more allowed competition the industry could bloom and making intermodal transports both cheaper and better organized than today. As

an example he says that Germany have several companies running combined transports while in Sweden we have more or less one which is RailCombi.

However, the market is rather deregulated when it comes to who can run transports but because of slot times, infrastructure problems etc., it is very difficult to start an own combined transport solution, although IKEA has been successful at this on their rail line between Älmhult, Sweden, and Duisenberg in Germany according to Mr. Nilsson. He also mentions that Schenker will discuss a possible joint venture with IKEA when it comes to their cargo trains. He also mentions that the manager responsible for IKEA Rail is an old employee of the former state owned railway, SJ, in Sweden Christer Beijbom.

When it comes to the cooperation between the government and different authorities and Schenker Ingvar Nilsson says that they are working well together, even though improvements could always help. However both Schenker and the government are discussing the future and it is a form of cooperation that Schenker likes and would like to keep and possibly deepen.

To round of the interview a few in-depth, company specific, questions were asked. Ingvar Nilsson now states that Schenker transports are totally dependent on using the German motorway network. He also adds that the entire transport system of today is created around the idea of transports being transported on roads. However, when asked about the future of transports in Schenker he said that ferry connections might increase a bit in the future due to the toll, however he stresses that the capacity must exist in order for it to work.

Schenker is also in talks with DFDS about a possible increase in cargo volumes on ship to Europe via Gothenburg-Ghent connection, and Schenker is looking a possible increase of 10 %, which he believes most companies in the business is also looking a switching to other modes which can offer good a reliable services cheaper. However, he also stresses that this is a regional problem that does not affect the whole of Europe and he says that *“talking Portugal and Spain the German road toll is of course a smaller part of the total distance/cost than simply talking German transportation”*.

The interview is rounded off by Ingvar Nilsson saying that Schenker is looking into a possible eastern corridor via Poland and the Czech Republic, this is however purely in the discussion stage and nothing has yet been decided. He

also says that Schenker is prepared for the new toll, when it will be introduced and he also adds that the entire increase in transport costs will be shifted to the customers via a new German road toll tariff that will be added, and its size will be dependant on the kilometers traveled.

5.2.3 DHL

DHL is a transport and logistics company working worldwide, with all modes of transportation. In 2003, Deutsche Post World Net, owners of DHL, placed all services together, uniting two other major Deutsche Post companies, Danzas and Euro Express, under the DHL brand. The characteristics of each of the companies are:

- DHL is specialized in air express service, operating in over 220 countries. It had 71,000 employees in 2002. “While its core business is transporting documents and packages, it also offers e-Commerce fulfillment and intelligent logistics as well as customized solutions for global customers.”
- Danzas is a provider of IT-supported logistic solutions, operating in 150 countries. It is specialized in “customized solutions, worldwide by air and ocean freight, global project forwarding, European overland transport, e-business and 4th party logistics”.
- “Euro Express is the parcel and distribution network of Deutsche Post in Germany and Europe, providing a road-based service through the European road network for both business and private customers.”
(DHL)

Kent Lindelöf is the DHL route manager for Germany, Austria and Switzerland. The interview was performed on September 24th, 2003, in Malmö.

5.2.3.1 DHLs view on the German road toll

DHL are heavily dependent of the major German roads. DHL in Germany does full-loads by combi transport, but the part-loads are taken by road. The explanation for this is the schedule of the trains, which makes it impossible to collect all the shipments of the clients and be on time to catch the combi train. It is necessary for the railroad companies to match the transporters timetables, to have more connections and to be more reliable when it comes to time.

If we compare the history of development of the modes in the last 20 years, it is easy to notice that the road sector has been developing much faster, while the rail has been in a status quo. When discussing the effects the new German road toll will have on transports to and from Sweden, we should evaluate some possibilities. If you implement it with all technical equipment, then the effects of the new toll would be the cost effects, making transport service more expensive, but if you implement it as it is today, it would be a disaster, with a lot of queues and nothing arriving on time. In the beginning, transporters were foreseeing big queues and delays. The system already started as a pilot, free of charge, and Germany is facing big technical problems. DHL has hauliers carrying on-board units to test the system and it is not working. It calculates wrong amounts, and even worse, it sometimes indicates that the truck is on a completely different motorway.

This is the main reason for the delay on the date of implementation. When it was postponed to November, it was more a capacity problem. They could not deliver all the on-board units in time. Now the delivery volume is not the main problem anymore, but the technical problems are. The company in charge of the introduction of the new toll is Toll-Collect, and their responsibility was not only to collect the toll, but also for all technical equipment. So they went to Daimler-Chrysler, which used a supplier named Grundig, who went bankrupt this year. Then, the production was running slow and the problems started. Everybody believed that it was some mistake by the German government, but it was not. Kent Lindelöf foresees that the introduction of the toll will be postponed to between the end of this year and February of 2004.

With the toll, there will be an increase of price in the usage of the German road infrastructure, but we should not expect any change in the modes in the short run. It is impossible in a short term to change all the tons that goes on road to the railroads. It has to be done in a long time period. It is necessary to invest in new tracks and so on.

There are some constrains if we think about rail and sea connections as alternatives to the long haul road transportation of today. Goods transports are always prioritized after public transportation. It is impossible to put more wagons in the combi trains, because when the X2000, in Sweden, has to pass, the sidetracks are not long enough to increase the number of wagons. Besides which, the rail is limited in some countries by tunnels. Sweden is a trailer country, while Germany is a swap-body country. In Sweden, swap-bodies are used more in domestic transport. It is not possible to go with Scandinavian trailers across Europe. The tunnels are not the only problem. In Italy, the stations and signals are too low and the top of the trailers would crash into them.

There is also volumes constrains. If you plan to go via ferry from Gothenburg to Belgium, you have an imbalanced flow on the way back. You have slow moving cargo from Sweden and fast moving cargo back to Sweden. This problem is being discussed in the EU.

Now, everybody wants to avoid the toll, but after some calculations, the conclusion is that the short distance combi-traffic in Germany is very expensive at both ends, being cheap only in the rail part. Moreover, you have to go back with fast moving cargo maybe during the weekend, but not in the middle of the week.

The timetable for combi and railroads is also an important factor. Everybody wants the cargo quickly delivered to the door, not to the rail station, so sometimes it is cheaper to pay the amount of the toll and do all transport via road, if you have more than one delivery. This change may cause less flexibility and quality when it comes to transports. Just in time is the reason that in many cases it is better to stay on road. Scania, for instance, does not have warehouses anymore. Part of the warehouse is on the truck and one or two days longer is a lot of money for them, and in their calculations it is cheaper to pay the toll.

Today we have the Eurovignette system in countries such as Sweden, Denmark and the Netherlands. The Eurovignette system is much cheaper because you pay for a year of use. It is simple to use and to calculate and include in the company costs. But, it is getting out of control, since the Germans started a kilometer charge system this was followed by Austria. So it is expected that the Eurovignette will disappear. The EU will now realize the impact this new toll will have on shops and products, but now it is too late.

Germany, Austria and Switzerland, who already have a toll for goods transportation, are transit traffic countries. The Netherlands has announced that they will also have something like this. This is odd, because the majority of the transport going in and out the Netherlands is done by Dutch hauliers. If they are thinking about the transit traffic, they should wait for Belgium to take action, otherwise, this traffic will simply move to Belgium. Denmark has transit traffic to and from Norway and very little to and from Sweden. Kent Lindelöf is not sure if other countries that use the Eurovignette are going to see this German strategy as an incentive of introducing a charge in the same way.

One big reason not to believe that Sweden will introduce a similar toll is that it would be a disaster for companies and people who live in the north parts of the country. Sweden is a long country, and he guesses that if the government decides to charge, it would be something addressed to the south, which is more densely populated.

DHL is also seeking new routes and consulting ferry companies to see the possibilities of connections via, for example, Belgium. The problem is that even if the connection to Belgium is feasible, you depend on the truck hauliers from there, and they are working mainly on the UK traffic. The prices for the transport to and from the harbor for the UK traffic are even more expensive than the German prices. So it might be a loose-loose situation once the toll is active.

The aim of the toll was originally to encourage a modal shift. However, when talking about the reasons of Germany to impose this new toll, even though they are increasing the costs of road transportation, it does not seem that they are trying to shift the traffic from road to other modes. It seems to be a toll for revenue. It is known that Germany needs money to pay for the infrastructure investments in the eastern part of the country. They made a calculation on how

much it costs to keep the autobahn fit per year. Just for the heavy goods traffic, they have to make € 3,5 billion. Then, they estimate how many kilometers these truckers are driving per year, and that is how they came up with the fee.

Kent Lindelöf prefers to say that the justified distance for a combined transportation is 900 km. This 500-km can be fine in lighter volumes, but it is necessary to match a little bit higher costs with more tons. The big problem is with Just-in-Time in the other direction. It is easy to increase the shipping from Sweden, but it is not simple to meet a higher number of backloads. The type of goods transported is also different. Sweden exports basically paper, steel and wood. From Europe smaller products come with a higher value per ton. The business has also changed. It used to be common to buy in bigger quantities to decrease the price per unit, but this is not done anymore.

There are some constraints for this shift due to the lack of physical facilities to an efficient transfer between modes and the incompatibility of IT among transport companies, but we cannot say that the government will be subsidizing the elimination of these obstacles to achieve the objectives. It is expected that they are going to act in the normal way, seeking for the companies' opinions, but the government will not subsidize combi terminals. In almost all countries, the railroads are losing money so the governments will probably not put more money in this. Anyway, DHL is prepared in case a modal shift occurs, since they have a terminal close to them in Malmö, which was theirs in the past, that can load train wagons on ferries.

DHL is always studying the possibility of having new routes, checking what is faster and cheaper independent of this new toll. It has been talking now about the Polish Corridor, but that is a rail system. Two prerequisites are necessary for the use of Polish and Czech road system;

- First these countries must join the Common Market, to get rid of the slow border process, because these delays cost money.
- Second, it is necessary an increase in ferry capacity from Sweden to Poland.

If these prerequisites are met it will become a very good alternative, because countries like the Czech Republic and Hungary have very good roads. DHL is already using Polish roads for the traffic to and from Poland. To the Czech Republic, they go via Germany. To Slovakia, they go via Poland.

DHL is also concerned about the environmental issues, so we can foresee an increase in ferry connections, taking in consideration that some ferry companies have new engines, cleaner than before. Ports in Germany are already jammed, so it will be necessary to sign new ways.

DHL has been preparing for this new toll and the effects on customers will be at costs, new register in the computer, educating people, invoice system. DHL is meeting its bigger customers. They have the feeling that the freight service is increasing in price, but it is not. Freight costs come from us and our hauliers, ferries, rails and government. So in this case, DHL will simply redirect 100% of the costs derived from the new toll, but will have no increase in its profit.

5.2.4 RailCombi

“RailCombi produces and develops combined transport for both domestic and international traffic. They act as subcontractors to haulage firms, forwarding agents, shipping lines and railway operators. We take care of transportation between ports and our terminals, collect and deliver to and from customers by truck, as well as provide secure depot storage for containers. On certain main routes between some of Sweden's largest and most important industrial and business areas, RailCombi has designed a number of special combined transport solutions. RailCombi has 16 terminals located at 14 sites around the country, from Trelleborg in southern Sweden, to Luleå in the north. Each terminal is equipped with modern cranes and forklift trucks, making loading and unloading a fast and efficient process. Since January 2002, RailCombi is an independent subsidiary within the Norwegian company Cargo Net AS, former the Norwegian NSB Gods. Through combining their networks they are forming a Scandinavian Network with a total of 29 terminals all over Norway and Sweden.” (RailCombi)

Hans Gutsch is the RailCombi Product Manager for International Traffic. The interview was performed on October 13th, 2003, at Gothenburg.

5.2.4.1 RailCombi's view on the German road toll

RailCombi depends on the German network. Internationally speaking, all the traffic is going through Germany to Italy, Switzerland and other countries.

The main effect of the new German road toll for RailCombi is that there is an increase in interest in combined transport between the continent and Sweden. DFDS and Schenker, for example, are looking more and more and starting to perform combined transport not only domestic, but also going to south and middle of Germany. The toll coming will force companies to find new solutions. These changes are occurring now, for example the two companies cited above are increasing the volumes in combined transport to and from the country. A lot of companies are interested in combined transport or studying ways to go around Germany. RailCombi receives a lot of questions of companies that does not know how to act due to this new change. They are working together with the KombiVerkher²⁴, the combined transport company in Germany. KombiVerkher had an enormous increase in traffic and since the beginning of last week they are putting more trains and opening more lines (06/10/2003). The major part, about 80 to 90% of the volumes transported with the help of RailCombi to Germany are going by ferry.

This change in policy and price will not cause less flexibility or quality in transports. As Hans Gutsch says, according to his customer's, rail systems are more reliable than road transportation. Frequency is not a problem since RailCombi drives trains over night all around Sweden. It seems that their customers are satisfied.

The price of the road usage will be a deciding factor in how to conduct long haul transports in the future, but it is impossible to say how much. If the combined transport took over about 5% of the cargo going on road today, it would imply a 20% increase in its cargo volume. There is an enormous volume of cargo going by road, so it is impossible to the combined transport to take it over. We will see a change in the long run, but it will not be a great cut down of the today's figures. A big problem is that we have to keep the balance of flow of cargo. Nowadays, there is more cargo coming from Germany to Sweden. In the past, it was the opposite.

²⁴ The company that provides combined transports in Germany

In the case of the Ikea dedicated trains strategy of having a train from Sweden to Germany, they are using RailCombi as a supplier for the terminal services and they are buying the traction from TGOJ²⁵ and they go via the bridge to Denmark. But the bridge is too expensive and nobody is willing to pay, although Ikea is paying. Ikea is also experiencing an enormous problem with unbalanced flows. They have a lot of cargo going down to Germany and not much in the opposite direction.

The countries that use the Eurovignette system today might see the German road toll as an opportunity of introducing road usage fees themselves. Not only them, but also every country is looking for something similar, for instance, Austria, but maybe not so much in Holland. The change in price cost added to the good reliability of combined transport will allow RailCombi to be more competitive.

There is always a possibility that other modes will increase their costs, since most companies always like to get as much revenue as possible. Companies have to increase their prices according to what is happening around them, for instance, the electricity is not getting cheaper in Sweden. So they might increase prices because of their expenses, but not because road is getting more expensive. RailCombi have been promised by their partner in Germany that they will not do it either and KombiVerkher has also promised that to the Germany market.

Rail and sea modes will be able to use this new toll to their advantage. In short distances from Sweden to Germany, the rail is not competitive, but the further south the goods have to go, more volumes would come by rail. However, it is impossible to say how much capacity rail can take over the road because it depends of space on the tracks, more rail wagons, and place in terminals. A normal increase would be of 8 to 10% per year. That is what we leave now, so it is possible to build up the system without these big steps.

It is said in every single paper from the EU that this and other road tolls that are introduced will promote the use of intermodal transportation, but we can say that this one in Germany is basically for revenue. Hans Gutsch believes that this toll is going to be used for both reasons. The autobahns are full, so

²⁵ Company fully owned by Green Cargo

Germany has to do something. One way is to put cargo on the railroads, which has its own capacity problems. For this modal shift, which he believes that they are interested in, it will first be necessary to build up an infrastructure of rail roads, but countries cannot afford it, especially Germany, who need money at the moment for the eastern part of the country.

According to Hans Gutsch, the 500 km that we are assuming as a justified distance for intermodal transportation is not correct. In Sweden, the trains are running at full capacity for much shorter distances, around 250 km. This has nothing to do with the toll systems. The fact that goods transportation is always second to passenger transport in importance is a problem, but the example given by Schenker is not applicable to RailCombi, since they run their trains at night, and X2000 runs during the day. However, it is true that the investments always go to passenger traffic.

Hans Gutsch believes that national authorities encourage transport management to work together in partnerships to establish intermodal delivery system. The control of the cargo is today not a problem anymore due to modern technology. All the IT solutions are helping to keep full control of the cargo. There is an increase in cooperation. However, road is still the most flexible transport mode. It is much easier to contact truck drivers and re-schedule the route, but the combined transport is now gaining space.

There are conversations between the authorities and the companies, but not that much cooperation when it comes to applying new strategies and rules. They should inform the transportation industry much more than they do today. The authorities talk a lot about combined transport and make their own plans but do not come to talk with the ones who are actually doing the work. They are not looking at what we have, but at solutions that look flashier. he finishes by saying that; *“People speak, cargo doesn’t”*.

RailCombi would like to have more places on the tracks between the south of Sweden and Stockholm during the day. Another problem is the lack of goods terminals in Sweden; they are not built for the combined transport of today. RailCombi does not expect any subsidy from the government. They have built some new terminals together with other partners. The local authorities might help, since they see the terminals as an advantage for them, but not the government.

Rail and sea are a feasible connection alternative to the long haul road transportation of today. However, they might have capacity and infrastructure problems. It is impossible to take all the road volumes overnight. Besides which, we cannot foresee the government increasing investments in infrastructure, especially in rail. Moreover, the infrastructure is built around road transportation. The maximum height for cargo on wagons varies from country to country. It might be 20 to 30 cm of difference, but in the end, when you go to Italy, for example, you might lose 1 meter of height, which means a lot of cargo. It is necessary to have some harmonization, but nowadays in Europe, each country has its own system, with different electricity, signals, station height and so on.

The terminals are part of the infrastructure. In Germany, the terminals are owned and built by the government. In Sweden, the government owns them but if you need to invest in them, RailCombi has to pay. The state can make some changes and take it away from the company. There is no point in investing in something that you do not know if you are allowed to keep. Today we have a situation in combined transport that RailCombi is running the terminals, has the traffic to and from the terminals, but RailCombi should be one of the companies using the terminals and they welcome the competitors. In Helsingborg, for example, DSB²⁶ uses the terminal. Of course, competitors should take their costs and equipment, but RailCombi does not hold a monopoly over the terminals.

As could be expected, RailCombi has not complained to the Ministry since they see this change as an opportunity to increase its share in the transportation market. Anyway they understand that road hauliers as well as IT companies are not happy with that. They believe also that the Swedish Ministry of Industry will probably do something, trying to keep the system harmonized in EU.

One can foresee an increase in rail and ferry connections in the future. Other routes and solutions are being created. Ferry lines are also more interested to see what we can do. This increase is not only for the natural development of the system but mainly because of the new German road toll since a lot of companies are now looking for the first time with open eyes to combined transport system. One can expect also some change in routes for the transport

²⁶ Danish State Railways

of goods in Europe. It will be some kind of corridor via Poland, especially when it joins the EU.

RailCombi has been preparing for this new toll. Its customers are more interested in combined transport as a solution. Last year, RailCombi received a lot of requests for combined-transport. However, some customers are interested in combined transport but may not have the equipment for it, and this may take some time.

5.3 Business sector

In this section the views and forecasts of Swedish companies and the business sector as a whole will be presented. This will give us the facts necessary to gain the companies/businesses perspective in the analysis part of the study. The data collection was carried out at the Confederation of Swedish Enterprises, Volvo Logistics, and Volvo Technology.

5.3.1 Confederation of Swedish Enterprises

The Confederation of Swedish Enterprises represents Swedish companies in Sweden. The overhead goal of the confederation is to return Sweden to the top position in the international prosperity league. The Confederation is supported by 57,000 small and medium sized companies. Together they present an agenda and order of business that the 48 different sectors throughout Sweden and the world will work with. (Svenskt Näringsliv)

For this study Lars Hallsten of Confederation of Swedish Enterprises was interviewed on September 23rd, 2003.

5.3.1.1 Confederation of Swedish Enterprises view on possible effects

According to Lars Hallsten transports will be more expensive as the new toll charge is introduced, and this will lead to the industry being more focused on costs and possibly alternative solutions to reduce costs, or at least keep them somewhat stable. Mr. Hallsten also believes that changes in flow pattern might come as a result of the toll. However, these changes will come over time, and this is more a general long term perspective. According to Lars Hallsten this will affect possible production and storage facility locations.

To tie in to this he believes that prices and costs will be of importance in the future, however, he feels that both rail and sea transport operators might see this new toll as a means of increasing their own price, and thus the price difference will remain as status quo, but actual prices will rise as a result of the toll. He acknowledges however, that some operators of other modes might see this as an opportunity of offering cheaper services, thus luring transporters to their specific mode. However, he thinks that this will not be very successful, since profitability within both the sea and rail sectors are quite low as it is, and this might be a way for them to increase their margins and create a higher rate of profitability.

Lars Hallsten also thinks that the reason for the toll itself is to pay for maintenance for infrastructure and to pay for future infrastructure needs, and perhaps not primarily as a means to lower congestion or for the pure reason of being environmentally friendly. The revenue aspect is the primary objective, and thus it is a means for the German government to pay for investments that it would not have been able to afford otherwise.

When it comes to changes between the modes Confederation of Swedish Enterprises does not foresee a dramatic shift between modes, but rather some minor changes. The organization also think that roads will still be the most price effective mode in general, whereas some transporters might find cost benefits from using alternative modes, however, in general the distribution will remain the same between the modes. What also ties into this is the possible harmonization of rail regulations and infrastructure in Europe, and changes like this might inflict more dramatic changes, however, when strictly looking at

price and cost only minor shifts is calculated for the upcoming change in German toll fees.

Another important aspect when discussing shift is the feasibility of changing to other modes, according to Mr. Hallsten the possibilities of moving cargo from road to sea or rail is rather small. The reason for this is, according to Hallsten, the general way transports are carried out and expected to be carried out. In some years time changes in rail and sea might cause for a bigger change, but as it looks at the moment road has far too many advantages to cause a more massive shift.

However, when talking about the changes on the actual road transports the new pricing policy will force companies to rationalize transports and transfer the cost down the supply chain, and so the flexibility or quality will not be affected. The need for fast, reliable and qualitative transports can outweigh the possible cost increase.

Mr. Hallsten also offered his views on the Eurovignette system and its difference from the new German system. The first thing he points out is the difference in how to calculate price, the Eurovignette uses a fixed rate, while the new German system uses a kilometer traveled base for calculating cost. He points out, however, that the Eurovignette system is more transparent in that costs are obvious and planning becomes simpler over time, whereas the German system is highly flexible and can sometimes be considered as less transparent and a good overview can be hard to get. He also points out that Sweden, in the future, might use the introduction of the German system to change Swedish transport policy in favor of a road toll system, and this he says, will probably occur in more countries within the EU.

According to Lars Hallsten there have also been several problems with the toll and the system has proven to be rather inaccurate, sometimes malfunctioning. The complaints have been rather loud when it comes to these aspects, but general complaints towards the tax itself have not been voiced, but rather towards smaller things that are not working properly, or are unjustly introduced, like the diesel reimbursement for buying German diesel. Further, he does not think that the system will be up and running until sometime during 2004.

When discussing the issue of modes, intermodal is an important part and the distance needed for incorporating a profitable intermodal system differs between different users, but generally speaking Lars Hallsten does not believe that the cost increase for using German roads will automatically lead to lower distances for using intermodal solutions. He thinks that other costs are more important (rail usage fees, terminal fees, etc), and he also mentions that he firmly believes that other modes will also increase their prices, so in the end the cost picture will be more or less the same.

When it comes to the implementation of policy and the hoped effects on the transports, Lars Hallsten believes that the market will adjust itself, and that a controlled system does not really work. The market will decide whether or not a cost is bearable, and make changes accordingly. Authorities however, can do much, and make changes possible, but the market is the one who will decide the modal split in the end, and this is purely based on such criteria as cost, flexibility, reliability, speed, etc. Lars Hallsten also mentions that there is some cooperation between industry and governmental authorities. However, this is not very concrete and the approach is very flexible, and differs from time to time.

The Confederation of Swedish Enterprises is generally not in favor of government subsidies, but he acknowledges that the government might have to subsidize certain areas of interest such as RailCombi terminals. As mentioned previously by Lars Hallsten problems such as this will be handled by the market.

Another important aspect is dependency of the current transport system, and Lars Hallsten explains that the current system is highly depended on the German motorway network, both when it comes to transport to, but also from Sweden. This could mean that alternative routes might come into question in the short run, but in the long run more countries will possibly have a similar road toll system, making alternative routes impossible. As before no major changes are foreseen, even though he mentions that sea transports to Belgium and the Netherlands might increase.

In conclusion Hallsten also mentions that the transition period might be hard for some companies that are used to the Eurovignette system. The cost will not be obvious and new solutions such as onboard units might have to be added to

the trucks. This is however a very short term problem area, but nonetheless it needs to be faced.

5.3.2 Volvo

Volvo is a Swedish manufacturer of cars, trucks, busses, boat engines, construction equipment, etc. It is a global corporation with production facilities on all continents, and customers in almost all countries for various products. It relies heavily on suppliers all over the world and has therefore decided to implement a corporation wide logistical company charged with the tasks of making the Volvo logistical operations as smooth and cost effective as possible. Volvo also has a pure technology department that is responsible for technological advancements within the Volvo group.

To get the opinion of Volvo, Magnus Andersson at the Volvo Logistics Business & Logistics Development department was interviewed on September 18th, 2003, and Mats Örbloom and Urban Ericsson of the Volvo Technology Transport & Telematics Services department where interviewed on October 3rd, 2003, in Gothenburg.

5.3.2.1 Volvo Logistics view on German Toll

Volvo Logistics and Magnus Andersson know that the German road toll will increase transportation costs for Swedish and Scandinavian companies, and it will bring higher costs for all areas of the economy. Volvo Logistics main concern is therefore to limit the cost impact to the Volvo Group. So Volvo Logistics are now looking into the logistics services used by the cooperation and they have begun evaluations of other modes such as rail and short sea connections together with discussions of intermodal transport solutions. Short sea shipping is already in use, but Volvo Logistics are looking into new potential train solutions and at the same time, as a first step, a new pure road system has been developed to reduce the overall cost in Volvo Logistics German inbound system. However, the effects to the traffic flow will come

over time, even though the cost increase will take effect already on the first day of the new toll.

The main area of interest for Volvo is that they are preparing for a combined transport solution involving road and rail transportation. Volvo will then arrange the inbound flow according to a combined transport solution and it will mainly transport components from European manufacturers to the Volvo plants in Sweden, and this includes all Volvo companies such as Volvo Trucks and Buses and also Cars even though it nowadays belong to the Ford Motor Company. This system will then use road transportation for collection of cargo/components, and it will be taken to a consolidation terminal and then from the terminal via rail to Sweden where it will arrive at a break bulk terminal and go via road to the various plants. A possible solution for this is by using trailers that can be carried on rail wagons, thus making it easier and faster since the cargo does not have to be repacked, etc. According to Magnus Andersson a disadvantage is that German transporters more commonly use swap bodies and not trailers, something that Volvo hope will change over a four to five year period. Volvo also believes that the cost increase is of that magnitude that changes possibly will have to take place to cut on costs, but the alternative solutions are not fully answering expectations as yet. Volvo Logistics also believe that the new technique of mega trailers that are suitable for train transports, etc. might also be available on the market.

Contrary to their own possible future changes Volvo believes that most road transports will remain on roads, but some transports and bigger companies will shift to other modes. Magnus also says that other modes except road can experience a small increase, but by and large it will increase on the roads. Volvo is using and looking into possible ferry connections via for instance Travemünde, but as of yet rail is a more feasible alternative according to Volvo. Volvo Logistics is, however, already using Travemünde to Gothenburg as a ferry connection for all its cargo from Germany to Sweden. Of all transport going from German suppliers to Swedish Volvo plants, 60% of the transport work is performed by truck and 40 % by ferry. The possibility here is that a new train concept might be used. This concept would mean that parts would be going by truck from the German supplier to a rail terminal, then by rail to Travemünde and (Swap bodies on chassis) on ferry to Gothenburg. In Sweden the Swap bodies will then be trucked to the different Volvo plants. This system would mean that transports via Denmark would stop.

Magnus Andersson also says that flexibility will not change much, but if costs go up large consignments might be needed to reach a better cost standard, this can influence all parts of transports but the cost will mainly lead to batch size increases and not the downturns or falls in either flexibility or reliability of road transports. Quality however might be reduced in the beginning due to problems with the new system. This is something that will change over time and when the system is up and running quality will probably not be an issue.

Volvo Logistics has also taking onto consideration that more countries will follow Germany's example, and Magnus Andersson believes that other countries most probably will follow within a couple of years, possibly wait to see what exactly will happen in Germany before they start taking action.

Magnus Andersson also feels that sea and rail will get an advantage towards road now when price is increasing for road haulers and companies, but he also fears that the sea and rail transportation companies might increase their prices to bring a higher and better profit, rather than increasing their market share.

When it comes to intermodal systems and combined transports generally Andersson thinks that the justified distance for intermodal transports will be lowered, thus allowing for more transports to be carried this way. The size of the shift can be big, and he believes that the toll might act as an incitement to transports to start investing in other types of transport systems. The change will trigger a change, and overtime we will see decreasing distances and more investments.

To continue on the intermodal transport systems Andersson thinks that national authorities will try to get transporters and companies to establish partnerships to form intermodal transport solutions, and he also mentions the EU program Marco Polo which is also aiming at this. He also says that the government and EU need to support the industry in this change, both when it comes to investments and also when it comes to present possible alternative solutions. He also mentions that, for instance, the rail sector is often in the hands of the governments, and so they need to take steps and actions in the right direction for a shift to be made possible.

Andersson also believes that Germany have introduced the toll in a short term perspective to gain revenue, but he hopes and thinks that there will be more

investments in other modes in the future. The gain will then be mostly in the environmental field, and he also says that EU says in its White Book that the infrastructure development must follow the economy growth to keep up with future demand. However, they will no longer invest in road infrastructure systems to meet the forecasted growth in road based transportations, instead they will try to reduce the growth and give incitements for shifting from road to other modes of transportation otherwise the situation will be unbearable. He thinks that the governments mostly are the ones creating the policy, while the market and the economy as a whole will adjust the transport systems to the correct level.

The transports that Volvo makes to and from Sweden are very dependant on the German motorway network. Volvo has more than 550 suppliers in Germany, which are used in the production in Sweden. Germany is also the second biggest market for the Volvo group after Sweden when it come to suppliers and cargo hauled on the inbound material side, and it is the largest when it comes to cost, an increase in road usage costs will impact the total cost picture. On the outbound side, Germany is not as big of a market as on the inbound side, so the impact lies mostly on the income flow in the supply chain according to Andersson. It should also be mentioned is that the finished goods flow pattern is that the products are mostly transferred via ship when going from Swedish plants to Ghent and then out into Europe via roads. If the products go to other continents than Europe they do not go via Ghent, they go straight on boats from Gothenburg, only flows to European countries goes via Ghent, but this is just the main flow, some products goes from different Swedish ports to, for instance, Travemünde, etc. The eastern European market is also served via Ghent and then passes through Germany, and this might result in a change of the flow.

Andersson also says that the new toll might change the resource and supply pattern leading to a decrease, in the long run, of German suppliers. So it will affect the transport and supply system/flow, how is not yet known but it will change. New systems and centers for distribution of finished products are considered, but nothing is decided as yet.

The main accomplishments that Volvo Logistics have worked with so far is to review the logistics system that they are using, and cost wise what this new toll with mean. On top of this possible solutions are considered, however Volvo

Logistics is also focusing on the different flow pattern of outbound and inbound flows and how they will be affected or changed, so a total review of the entire logistics system of the Volvo Group is continuing.

5.3.2.2 Volvo Technologies view on German Toll

In the technologic aspect, VTEC²⁷ is developing software for telematic systems and the new German road toll can affect it in two ways;

- VTEC can add on toll electronic functionality to their existing telematics platform
- The road toll can work via an interface to the present day telematic services

If the truck has a telematics platform or communication for just toll transactions, then it is possible to add on the framework or functionality for handling services of different kind. So there are two possibilities for Volvo Technology to do something in the telematics area. For Volvo Trucks, this toll will signify a big step towards bigger telematics platforms and it will be a requirement for Volvo Trucks. This means that Volvo Technology will have to develop it. So, the effects on Volvo Technology will come through Volvo Trucks and its customers.

It seems that Mercedes will have a big advantage, since they are the ones that developed the on-board units to the new toll. If they set a kind of standard for Germany, and they put in a vehicle platform that can enable other telematic services then this will be a rather big advantage. DaimlerChrysler will have the opportunity to implement its own telematics system in an easier way, since drivers will already have the unit for the toll.

VTEC has developed a telematic system called Dynafleet. The Dynafleet information system sends driver and vehicle data. There are two different kinds of Dynafleet systems;

²⁷ Volvo Technology

- Dynafleet online, for basic services and it is internet based
- Dynafleet Professional, for more complete group of services.

Daimler Chrysler has its own driver/vehicle data and transport management system, which is similar to Volvo Dynafleet. Now Daimler Chrysler also has a new system that focus on the toll collecting system. This system is not very different, and the necessity of having the toll system to drive in Germany can promote an interface between them and soon they will have one single system that can manage all these features. Volvo Technology should do the same, creating a system for toll services, or add on this functionality in Dynafleet. However, this is an idea for the future, but has not yet been implemented.

There are three initiatives going on now in Europe in this field;

- The toll collecting in Germany
- New EU Commission directive for trucks scheduled in 2005 and for cars in 2010
- The intelligent transport systems area that is European industrial initiative, for example the RCI (Road Charge Interoperability). In this directive, the EU require that the different technologies for toll systems in each country should be compatible, to avoid the necessity of drivers and companies to purchase a bunch of different on-board units. There is also the idea from RCI of having only one device, one contract and one invoice, which might be complicated. It is believed that it will be interoperability between the different technologies.

Actually, it is possible to solve the problem of having different vehicle platforms because they can have a software framework and software components can be downloaded for all the platforms, thus creating an interface which will give interoperability.

There will be projects on IT and telematics concerning road tolls, for example, the RCI mentioned before. But this is the tricky thing with authorities and subsidizing. They are not sure if this money earned with the tolls is going to be put into these projects, increasing the state budget, or if it is going to be the same research projects we had before, without any connection with this new toll. Anyway, it is believed that IT projects will be at least 50% subsidized by

the European Commission. The European Commission is funding three IT projects right now, not only for road taxing.

VTEC has complained about the new toll to the authorities. Their representatives in Brussels have left an official complaint related to the competition aspect that DaimlerChrysler can gain a monopoly in the market. Germany did not open competition for, or requested companies interested in developing this system, so it seems to be a protection of its own industry.

Additionally, the process, has passed in silence and most companies just took notice about this new toll one year ago. This is odd because since the whole process takes more than that to be developed. For instance, the road pricing in Stockholm, if that is going to be implemented in 2008, is already being studied and tested. Moreover, Mats Örbloom and Urban Ericsson believe that the German system will take more half a year to be launched, because of the long time necessary to preparing the process.

Not only the Eurovignette countries, but all EU member states are going to observe what happens in Germany. If it fails, with delays and problems, than the others might become reluctant to implement a similar toll systems, but in the end, it is clear that countries will start charging also by kilometer bases.

Volvo Technology has been preparing for the new toll. The company is part of the RCI initiative and during the project they will have to form their policy and how they are supposed to act in this matter. They will also make a prototype and test this from a technical side to achieve the new feature of road toll collect. The vehicle manufacturers in Europe have collaboration through the ACEA, which *“is the professional body representing the interests and combined skills of thirteen European car, truck and bus manufacturers at European level and throughout the world”*, and they are working in this field. Furthermore, Volvo has political contacts in Germany including Toll Collect, and has visited its board to deal with this issue. (ACEA)

DaimlerChrysler has kept both technology and suppliers for the on-board units, and there is nothing that other companies can do unless buying the German units. This can turn to be a great advantage in the market for them. However, Mats Örbloom and Urban Ericsson do not believe that a Volvo customer, who uses Dynafleet, would buy Mercedes trucks just because of these. However,

while Volvo does not have a system to handle road fees, they will have to install the German device in their trucks.

Analysis and Results

Analysis: Short term perspective

Analysis: Long term perspective

Analysis: Future perspective

Results

In this chapter theoretical concept will be applied to the different views on the new German road toll. The analysis will be conducted according to time line thinking. It will be divided into three parts; short term, long term and future effects of the toll.

6 Analysis and Results

In this part, we will analyze the interviews and try to find similarities and discrepancies between the views of the different interviewees. There is a lack of information and references to these possible effects on the modal split when introducing a new road toll; this means that this will be an analysis that will compare views and opinions, supported by known facts of the actual system.

Another aspect is that the German road toll is a completely new set-up and therefore a comparison cannot be made. This means that we will present the analysis based on a common feature, or factor, used by all interviewees to explain the effects on the modal split. When reading the interviews, it is possible to notice that time is a common factor. Ideas, comments and alternatives were presented and we will organize them according to a time line. The time line will be divided into three separate parts; short term, long term and future. After the timeline has been established an analysis based on the research question and theory will be presented.

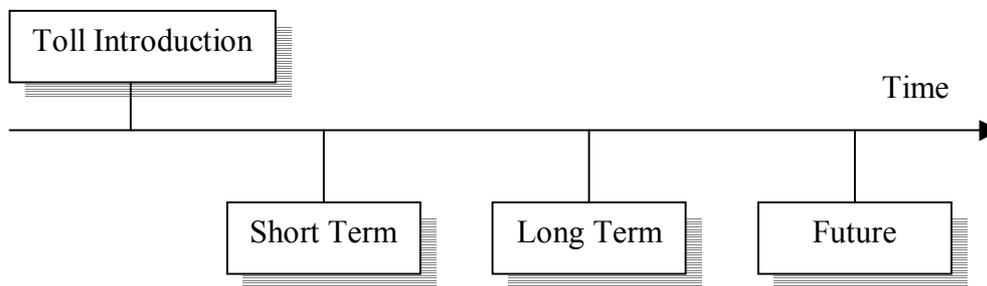


Figure 11: Time line of analysis procedure

6.1 Short term effects

All companies interviewed are aware of the new situation, studying possibilities and getting prepared for the change in the European market. As a first approach, all the interviewed companies agree that the introduction of the German toll will increase the price of the road usage, which seems a little bit obvious. The interesting part is that this increase creates a chain of consequences. First, the transport will be more expensive to the companies that

use transport company services. The logistic industry is working with low profit margins and cannot cope with absorbing the value of the toll. The toll price will be passed down in the logistics chain to the customers and manufacturers, which will pass it over. In the end of this chain, the final consumers are the ones who are going to pay for the toll. This means that we can foresee an increase in price of products available in stores.

Secondly, it is forcing companies to study new solutions. We can observe an increase in interest in combined transport, to try to avoid the road network. Combined transport providers, such as RailCombi and KombiVerkher are experiencing an increase in traffic and volumes. However, we should not expect a big change in the modal split of today, since a lot of problems have to be solved before, such as the poor rail infrastructure. It was also stated that the low capacity on combined transport with rail and ferry connections will jeopardize the expected change in modes. Sea terminals have over capacity nowadays, but a major shift from the road segment could not be handled by the sea sector. Another effect in the short term will be long queues and delay in the delivery, usually caused by the new systems due to technical problems and lack of experience from drivers and transport companies.

Price is a deciding factor in how to conduct long haul transports, although this is not the only one. Quality and frequency are also important. Some factors such as type and value of goods, customer, and time vary and dictate the level of transport quality requested. Price is important to balance the different modes of transport, to avoid overuse of some of them, so they should be priced according to marginal and social costs. However, when talking about volumes, price will not be enough to promote a modal shift. There are huge differences in volume going via different modes. Generally speaking road is the most used mode throughout Europe, its total volume outmatches all other modes, and a small shift from road to any other mode would mean a much larger increase for those modes.

Rail and sea are feasible connection alternatives to the long haul road transportation of today. However, there are some constraints. Capacity and infrastructure are some examples. There is a great problem with unbalanced flows nowadays. When talking about infrastructure, the rail sector has kept the same figures since 1960, while road has been improving constantly. Rail is not considered a reliable and flexible mode for most industries and it is basically

used for base industries, such as mining companies and forest industries. The infrastructure is built around road transportation. Moreover, cargo transport is always put in second level priority when comparing it to personal transport. In Sweden, for instance, the sidetracks are not long enough which means that it is not possible right now to put more wagons on the cargo trains, even though the trains could pull more wagons. The height of tunnels and stations, difference of currents and signaling systems throughout Europe are also constraints. Sea has a better situation, but we will not see a great change in today's figures in the next few years.

The flexibility and frequency of the alternative modes of rail and sea should also change to become more competitive. The timetable of the trains and ferries sometimes make it impossible to haul cargo via these modes. Rail and sea could use this increase to get price advantages over the road sector, but since they work with low profits, it is more likely that they will increase prices as well.

6.2 Long term effects

The long term effects can be said to be the actions taken by the companies in response to the toll. The short term is more about coming up with counter measures, while the longer term perspective looks at possible solutions to the problem.

We can see several similar occurrences in the interviews, centering on better utilization and organization of transports. This is a step that is in between short and long term effects, but it is considered a more planned occurrence and thus most interviewees consider it in a more long term perspective.

Most interviewees also believe that the kilometer based road toll will be introduced in more countries than Germany and Austria, and we will see it in Sweden, Denmark and the Netherlands, to name a few. This situation will also spark more increases in cost, which will speed on the transition to a more intermodal approach to transports. Intermodal based transports is believed to get its breakthrough in the long perspective as both sea and rail have become

more flexible and better organized, and when the cost situation on roads have become higher since more countries charge for its usage.

The system will thus become more flexible and all modes will be used according to where and how the transport should be conducted. Another important aspect is that an eastern corridor probably will be made possible as the eastern European countries enter the EU. Their infrastructure is not currently satisfactorily developed, but within time they will make a good alternative to Germany, thus increasing the traffic through Poland and the Czech Republic. This situation is however limited to the time when these countries will introduce a similar kilometer based toll.

In a long term, we can expect a major change in Europe when it comes to toll systems. The Eurovignette, which is currently time based charge, will change giving way to kilometer based toll alternative, like the one Germany is introducing. National authorities encourage companies to work together in partnership to achieve an intermodal transportation system. Although, there should be more deregulation to promote competitiveness among the sectors. There are some problems like the lack of physical facilities to an efficient transfer between modes and incompatibility of IT among transport companies. But subsidizing should not be expected. The Marco Polo, on the other hand, will help to develop the intermodal system investing funds in different projects that will help speed up the process of modal shift and intermodal transport solutions.

6.3 Future effects

The future perspective is geared to the very long term effects. These effects will be more cause and effect oriented. As the flows and means of transport are changed and as the cost increase in the system strategic changes to placing of terminals, warehouses and other physical facilities will become more important. This is done so that the actual cost of using the toll roads is reduced. A big change like this does not come over night, and the cost savings advantage must be big, but as cost increases strategic placing of various physical facilities will play a more vital role.

Another effect is that as intermodality and more environmentally friendly alternatives are put to use in the transport sector the environment and congestion situations will become better. This is more a result of change than an actual planned policy, but nonetheless, it will lead to a more sustainable system of transports.

6.4 Factors analysis

In order to clarify the different actor's standpoints on important factors this section has been created to give specific information about what each actor thinks about the following issues: the Eurovignette, kilometer toll, JIT etc., strategic/geographical placing, harmonization and changed flows. Some of the factors will be followed by a matrix where the opinions by the actors will be showed and a legend is supplied with corresponding names to the numbers (It is understood that all actors do not need to have a specific opinion about all factors).

6.4.1 Eurovignette

As mentioned before, the Eurovignette system is a time based tolling system. This means that the road user pays for the period of time (month, year, etc) that he is planning to use the roads. This was a good point in the view of SIKA DHL, and the Confederation of Swedish Enterprises²⁸, because it is an easier way for planning the companies' costs since it is, basically, a fixed cost once the time interval has been decided.

The Swedish International Freight Association²⁹ affirmed that a good point in the Eurovignette is that it is an international solution, differently from the German solution, which is a local/national solution. This is due the fact that the German solution cannot directly be used in other countries. For instance, the Ministry of Industry and SIKA stated that Sweden has a totally different road network layout, not suitable for the implementation of the German strategy.

²⁸ From now on named CSE

²⁹ From now on named SIFA

This can be understood checking figure 8, the Trans-European Network of motorways. It can be observed that the density of main roads is much higher in Germany than in Sweden. This can explain the high deviation (said by Ministry of Industry and SIKKA) from main roads by truckers in the case Sweden tries to implement a similar toll solution in the country.

The problems with the Eurovignette are that it is not a commonly used scheme in Europe, as said by SIFA, and it does not generate substantial good revenues for the government, as stated by the Ministry of Industry. In addition, the Ministry of Industry stated that this system might not be very fair for the Swedish hauliers because it is simple for foreigners to use the road network and not pay for it. However, DHL thinks that the present day Eurovignette will give way to a kilometer based system in the future.

Another aspect is that in the new Eurovignette directive kilometer charging will be made possible on all roads, as decided by the government, and thus in the future it can mean that it will be possible for Sweden as well.

6.4.2 Toll collect/Kilometer charge

The Toll Collect is the German company in charge of making the collection of the toll possible in Germany. They are owned and liable/responsible to the Government. The kilometer based system in Germany is based on the main roads, the so called motorways and Autobahns. The thoughts about the toll among the interviewees are different, and no one seems to be opposed to the idea in general, although some have problems with specifics.

The system in Germany was created by DaimlerChrysler who owns Mercedes, in this Volvo sees a problem in that Mercedes will have a competitive edge towards other competitors. This problem is not a big one, but Mercedes will be able to both have the technology earlier, and it is possible to use the on-board units for data collection about the truck itself, thus Mercedes have been given a system that can be used for both toll collect and fleet control. In Volvos case they have their own fleet control system, which is currently not connectable with the German system.

Other specific thoughts about the system are that it is revenue based only. This question is hard to answer, but as can be seen in the directive for the new road

toll the revenue is going to be forwarded to the German state treasury, which means that there is no clear path between revenue and investments in infrastructure and maintenance. This will hopefully be changed when the new Eurovignette directive from the EU will be put into force. It clearly states that all revenue collected from road tolls must be reinvested in infrastructure and maintenance. This will hopefully in the long run mean that money will be invested into new road, rail and sea infrastructure which might lead to somewhat changed flows and then in the end to lower congestion and a better and more sustainable environment. This is a view supported by most of the interviewees, as can be seen in Table 3 below.

Another aspect is the time frame in which the system will be introduced. It is known that the system has been postponed on 2 occasions, and now no final date has been presented. DHL and Volvo express their views in this by saying that the technical problems have prevailed during the entire implementation process. This may be due to few on-board units being delivered or pure system technology failures. It is believed by both organizations that the system will not be up and running until some time during the spring of 2004.

	Eurovignette	Toll Collect
International solution	Positive (3)	
Company Planning	Positive (2, DHL)	
Gov. Revenue	Negative (1)	
Country's Suitability		Negative (1, 2)
Competition		Negative (8, 9)
For revenue only		(1, 2, 5, 6, 7, 8)

Table 3: Different organizations view on the Eurovignette and TollCollect

Legend:		
1. Ministry	2. SIKA	3. SIFA.
4. Schenker	5. DHL	6. RailCombi
7. Conf. Swed. Ent.	8. Volvo Log.	9. Volvo Tech.

6.4.3 Just in Time, Reliability, Quality, Frequency and Flexibility

The concept of JIT is, as stated by the SIFA, to be in a certain place at a certain time. The time span can be longer and the time trip can be planned to last longer. For the JIT, the SIFA affirmed that reliability is the most important factor. However, for Schenker, flexibility is the key to achieve quality and reliability. We do believe that both are important. Flexibility is necessary to make intermodality possible, harmonizing the modes and timetables. Reliability is also crucial because JIT means that companies are not stocking anymore. Products, components, etc., should arrive in the correct time and place in order to keep the production chain flowing. And then, one can see that it will take a while until companies reach a change in modal split. This is due to the fact that the Ministry of Industry, SIKA, SIFA and Schenker expressed their apprehension about the lack of flexibility of the rail factor sector. The sea sector is considered not flexible by SIFA, but has satisfactory flexibility in the view of the Ministry of Industry. SIKA and Schenker also complained about the sea frequency. Poor infrastructure put at risk the quality level of, in particular, the rail sector which was remarked on by the Ministry of Industry, SIKA and the SIFA.

RailCombi on the other hand did not see any problem with any of the concepts, which might be understandable due to the fact that they may stand as a “winner” when the price for road usage goes up, and some companies might shift to intermodal rail-road solutions. The view of little or no change is also supported by the CSE due to the fact they believe in the free market forces, and to achieve flexibility, reliability and the like it is necessary to pay to get it, thus it will be no changes where it is needed.

In the table below, No Change stands for a “status quo” of today’s figures while Changes imply that the actual situation is not satisfactory.

	View
JIT	No Change (6)
Reliability	No Change (3, 6)
Flexibility	No Change (1, 2, 3, 4, 6, 7 8) Changes (2, 4)
Frequency	No Change (6) Changes (2,4)
Capacity	No Change (1, 2) Changes (4)

Table 4: Interviewees opinions on different factors

6.4.4 Strategic and Geographical Planning

Most of the interviewees stated that the toll would increase prices. This road cost increase might encourage other modes to increase their prices also, once the market will allow that, as mentioned by SIFA. The Ministry and SIKa believe that this will promote an increased load factor and better utilization of the capacity. However, there is the problem of unbalanced flows. As mentioned in chapter 3, inter-terminal or Hub and Spoke networks are the most common used nowadays by big logistic providers, a balanced material flow is very important for consolidation. Road transportation does not have this problem due to the great variety of truck sizes/loading volumes. In the rail and sea sectors however, the unbalanced flow avoids a good utilization and efficiency of the transport system. So, the introduction of this and other coming tolls are making companies to think about the positioning of their hubs, terminals, warehouses as well as production plants, as mentioned by SIKa and SIFA. The solution might be moving the production closer to the market and suppliers. SIFA stated that it is not possible to avoid Germany, since it is a country with huge number of suppliers and market.

	Strategic Planning
Price increase	Neg. (1,2,3,4)
Positioning of Terminals	2,3

Table 5: Interviewees opinions on strategic planning

6.4.5 Harmonization

Harmonization is an important aspect of the new European Union and a very important aspect to member states, logistics providers and users. As mentioned in both interviews and in chapter 3 the different member states within the EU have a very wide variety of rules and systems especially in the rail way field. This means that there is different traction, different electrical currents, different wagon profiles, different tunnel heights, etc.

Most of the organizations and persons interviewed agreed that this is a major problem that Europe faces. It is also of the outmost importance to make transports efficient and easy flowing. DHL mentions the problems that trucks and rail way wagons face in different countries, and all interviewees agree that harmonization is a very important and prioritized work within the Union. Although some expressed their view that things are moving a bit too slow.

When discussing harmonization it is easy to forget about roads. In Sweden the legal length of a truck is 24 meters, while the common length within the EU is 18 meters. This means that transshipments need to take place as soon as a Swedish truck or specifically its cargo leaves the country to go out into other parts of Europe.

6.4.6 Changed flows

The idea of changed flows can be divided into 2 different aspects, both trying to out flank Germany, and thus avoiding the toll as a whole. These two solutions is either ferry connections to either Belgium or the Netherlands, and then onwards, or via ferry to Poland and then south through the Czech Republic, etc. Both views will be discussed here.

It is however understood that some of the interviewees believe that the toll will be positive for ferries and RailCombi is one of them. DHL, on the other hand, thinks that transport flows will be changed over time, while Volvo is already looking into possible solutions.

As mentioned in 6.4.4, transports that have Germany as origin or destination will not experience changes in routes, but maybe in modes, in a distant future.

6.4.6.1 Ferry connections to Belgium and The Netherlands

Ferry connections from Gothenburg to Ghent, Rotterdam or Ijmuiden already exist, and they are used by companies presently. The Ministry of Industry, SIKA and Schenker believe in an increase in these routes. The Ministry of Industry added that the routes from Sweden to Germany will decrease somehow. DHL remarked that ferry connections to, for instance, Ghent, are possible, but it is dependant on how well the transports from the port to the actual destination works. DHL have had problems with truck transports from Belgian ports to Germany before due to a high usage of the port facilities. Therefore, an increase in capacity is probably needed in order to have a fully function system.

Volvo Logistics, on the other hand, is already using Ghent as a destination for their exports of cars from Sweden, and also from Europe to for instance the US. They also use Ghent as the shipping destination for goods going out, or in, of mainland Europe to Scandinavia.

6.4.6.2 Eastern corridor

The Ministry of Industry, SIKA, SIFA, Schenker and DHL believe in an Eastern corridor as a good alternative, although the road infrastructure in these countries should develop, a remark made by the Ministry of Industry and SIFA. Volvo is keeping an eye on developments in the eastern countries, but is not currently looking into it; they are more focused on their present system to Belgium and a possible new system via truck and rail from Germany to Sweden. Although imbalanced flows are still an issue, due to a high influx of cargo, but little or none going the other way.

	Changed Flows
Ferry Connections	Increase (1,2,4,8) Uncertain (5)
Easter Corridor	Feasible (1,2,3,4,5) Uncertain (8,9)

Table 6: Interviewees opinions on changed flows

6.5 Results

In the short term, we will see the final price of products paid by consumers going up and perhaps minor increases in ferry connections to Belgium, Netherlands and Poland. There might also be a small increase in the use of rail connections, with a growing interest in intermodality. However the majority saw all changes as small or non existent. The main idea in the short term is that companies will experience a cost increase, and that this will be passed down to the final consumer.

In the long run, when several other countries introduce a kilometer based toll of their own, we may observe a better use of intermodal transportation, with harmonized timetables between modes and harmonization of infrastructure especially in the rail sector, and new ferry connections. We will also see better organized and utilized transportations.

In the future, we can foresee some changes on a European level like the supply and production industries moving closer to the market. The toll can also change the placing of new terminals and hubs within the EU, so that locations are optimal when it comes to the tolls and its effects.

The results for the three specific time periods gives us a good picture of what lies ahead, and from these opinions and observations we are able to give an answer to the main question of the thesis; how will road pricing affect the modal split.

The answer is not as simple and easy as one might think in the beginning, there is no one clear answer in percentages, or the like. In the short term, the modal split will not change and even if some cargo move from road to another modes, it will make no difference in the figures due to the huge share of the road mode in the cargo transportation sector. However, it is safe to say, relying on the facts and collected data, that in the long run investments into the different modes, harmonization of rules, regulations and systems and the increases in road usage costs in more countries will spur a development towards intermodality.

Some behavior should change and adjust. The timetables for trains, ferries and trucks should be harmonized to promote an efficient intermodal transportation system. The cargo transport sector should receive more attention, since all companies interviewed complained about personal transportation always being prioritized.

Due to the huge volume of goods going by road, we should not expect a big change in the modal split figures. Even though a small decrease in road volumes means a great increase in maritime and rail volumes. Because of this the rail sector should work on developing, and increasing, its capacity. The sea sector is running at low capacity nowadays, but then, the problem here is the low flexibility and lack of alternative timetables. In spite of the fact that it is said that sea terminals are running with over capacity, it could not manage a great shift of volumes from the road sector. The sea and rail modes should be more deregulated to encourage more competitiveness.

The new system will be planned according to the benefits of each mode; be it price, efficiency, flexibility or reliability. This, in turn, will perhaps not mean that the road traffic figures of today will go down, but perhaps it will mean that

in the future road figures will not grow as much as before and rail and sea will gain in importance and figures, thus creating a more flexible, and used, intermodal system all across the EU. The results gathered in this study go hand in hand with the EU plan, the White Paper, of sustainable development and a change towards intermodality.

Conclusions and Recommendations

In this chapter we will present the conclusion that we have been able to draw, and also present recommendations.

7 Conclusions and recommendations

A new situation is on the rise in EU. More and more countries are joining the Community and new rules and policies are being implemented. This is also true for the transportation industry where harmonization of systems is currently a hot topic. Every time we have an increase in price/cost; a lot of complaints are made. Road tolling might be necessary to maintain the road infrastructure, as well as to reduce the over usage of this segment today. Road tolling itself is not a new occurrence within the EU, since some countries have been making use of it for some time. France and Switzerland, although the latter is not part of the EU, are two examples.

However, the tolls features in those countries are very different to the new German road toll, making this a completely new condition in Europe with unexpected consequences. The results that can be observed in Switzerland, for instance, due to their toll cannot be used as a comparison in this case. The gain in efficiency that they experienced is a response to the increase in maximum weight of trucks, making this example obsolete in the German case.

The conclusion, as such, will deal with three different aspects; possible changes and effects in Sweden, recommendations to DFDS regarding the changes in Germany and some final thoughts.

7.1 Effects in Sweden

Sweden as a part of the EU and the Eurovignette zone will experience the changes that sweep through Germany, Austria and any other EU country. It is understood by most interviewees that Sweden will also introduce a kilometer based road toll in a few years, spurring a more regional development in Sweden towards intermodality and continued investment into sea and rail, as well as road infrastructure. However, Sweden is an integral part of the EU and changes within the Union will have an impact on Sweden, and over time the harmonization requirements will change the way in which we transport on sea and rail, but eventually a common EU system will emerge, creating the common transportation market craved by many, and planned by a few.

It is important though to understand that these are not the only changes, with a move towards intermodality as the final stage. It is a three, or more steps, a process encompassing several different areas such as planning, mode changes and strategic placing a tactics. As seen in figure 11 below changes will become even more visible in the future when the full effect of increased transportation costs can be seen.

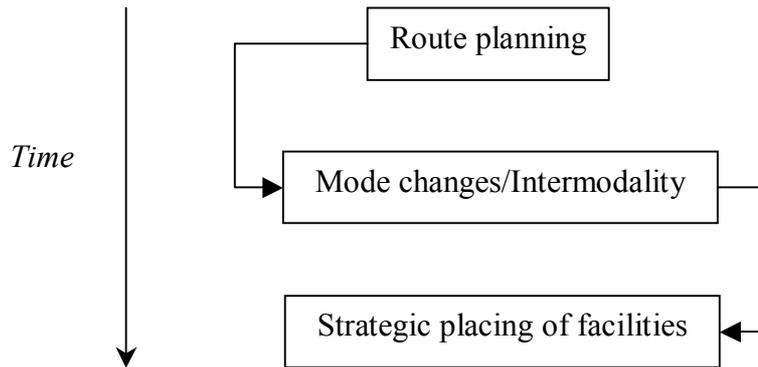


Figure 12: Effects of transport cost increases over time

The three step effects process will start when Germany increases the usage of their road system, which is very important to Sweden and the rest of the EU. It will then continue with route planning until other countries also have introduced similar tolls making road prices so high that other modes such as sea and rail can come into question for a more widespread usage. At this time the mode changes will take place, and as this continues companies might consider making strategic and tactical relocations of plants, factories, warehouses and the like to counter and lower the cost paid for using transport systems.

This development will have effects on Sweden, and not only from a change to other modes perspective, but in the long run it can mean that we may loose, or gain, industries when the cost of transporting raw materials and finished goods might become to expensive in certain regions, and more desirable in others. This means that we can draw the conclusion that the changes in road cost across Europe will not only lead to a shift towards intermodality, but in the end the effects will spread to other industries and actually possibly change the production and distribution landscape of Europe.

7.2 Recommendations to DFDS

As seen in the results and in the conclusions we believe that it is safe to say that things will change in favor of other modes than road, such as sea and rail. The time for these occurrences is still hard to pinpoint. The sea mode has an even better chance to gain with this new toll. As stated in this paper, it is said that a minimum distance necessary to make the use of intermodal transport viable is 500 km. This distance was not unanimous, varying from 200 to 900 km, depending of the interviewee and the strategies of the companies. The distances in Europe are, in general, short and this means that the existent limitations of the rail sector might put at risk any chance of increase even with the new toll. The sea sector, on the other hand, will have more chance to benefit from the new situation, since the only alternatives for the sea connections from Sweden to Europe are the Sweden-Denmark, or Öresund, bridge. Changes will come, perhaps not in the short run, but more over time.

Ferry companies, in this research represented by DFDS TorLine, should expect some route shifts. If Germany, or Denmark, is the final haul destination, nothing will change. Although less volumes of “passing-by” cargo will use these two countries as ferry destination.

Several of the interviewees said that the link to Ghent would be interesting once the toll is in full swing, and several more said that they were actively looking into an eastern corridor via Poland. In both cases the usage of ferries are compulsory, and for DFDS it is an opportunity, since connections exist both between Gothenburg – Ghent and Trelleborg – Gdansk.

Based on this, an increase in the connections to Belgium, the Netherlands and Poland can be foreseen. According to the simulations done by SIKa there will be some changes in routes. The maritime shipping from the south of Sweden to Germany and Denmark will decrease somewhat while others might increase, like Gothenburg to Ghent. Connections to and from the Netherlands will also increase and once Poland and the Baltic countries join the EU, whose ports are already used by DFDS, maybe this can become an interesting Eastern European corridor to the continent.

Most interviewees agreed that despite the fact that ferries are a good alternative; operators should focus on flexibility and efficiency. There has to be departures that fit the schedules of transporters, and cargo can not sit on the dock too long, since the crossing itself can sometimes be rather time consuming. Reliability is however not a problem, since departure and arrival time are usually correct, but harbor activities can perhaps be made more efficient, and this might become possible as more money might be invested into harbor facilities, etc.

The end result of this is that sea will experience an increase in its usage, and it should be prepared for this by increasing capacity, which some transporters said was too low today for really becoming an alternative to other modes. The change will happen over time, and will not be changed over night. The actual transition process is probably best discussed and decided in cooperation with customers, and specific bridges such as the one to Ghent and Gdansk seems to become the most demanded in the future.

So, the recommendation must be that there are possibilities within the industry, specifically towards the lower countries and the eastern European state of Poland, but the shipping companies must take care of problems relating to frequency of departures, capacity on ships, and the efficiency in harbors, etc. If these areas are smartened up, and discussions are held with customers the industry can experience a high and stable growth in the long term.

7.3 Suggestions for further studies

The big issue of the new German road toll is the reason why Germany is introducing it. It is a common opinion that the toll is basically for revenue, not being connected to a direct interest in modal shift or environmental issues. Germany is implementing the toll in a period when it is known that they need money to maintain, and develop, the transport network infrastructure. In addition, the German rail sector usage fee/cost is high, and if they were trying to create a modal shift, the rail sector should lower its prices.

The thesis subject is of interest for transport and logistics companies, as well as for national authorities, in order to have a wider overview of what changes in the European business sector this new toll might create. The study was made in a way that we tried to cover all the categories involved in the new situation such as governmental agencies, transport companies and the business sector to understand their thoughts, actions and preparations for the new toll. We conclude that some small changes will occur in the modal split, but bigger changes might happen in the way of planning and making business in Europe, especially once other member countries apply similar tolls. However, all the anxiety about what is going to happen in the near future is irrelevant and unnecessary since the study shows that no big alterations will occur in the short term. Roads will still be the most used mode and the modal split figures will not change considerably due to the great amount of volume being transported on them. The normal development of the transportation and logistics services, plus the preoccupation with congestion, environmental issues and the quality of life of the ones affected by the transportation system business will guide the business sector to a better usage of intermodal transportation.

However, there is a need for further studies in this area, specifically once the German toll is in effect. It will be interesting and possibly important to know what changes will occur, once a transport system is changed in a very fundamental way. This can be done from a calculation of increased costs perspective, or simply as an updated opinion research where organizations are asked what really happened.

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Appendix

9 Appendix

9.1 Main interview guide

1. As you see it, what effects will the new German road toll have on transports to and from Sweden?
2. Do you think that the price of road usage will be a deciding factor in how to conduct long haul transports in the future?
3. Do you think that the modal split will change dramatically due to the toll, or do you think that transports will largely remain in a status quo from today's figures?
4. In your opinion, are rail and sea connections a feasible alternative to the long haul road transportation of today?
5. Will this change in policy/price cause less flexibility and quality when it comes to transports, e.g. JIT?
6. What problems, if any, do you see with the Eurovignette system, and what advantages?
7. Do you think that other countries such as Sweden, Denmark and the Netherlands will see the new German road toll as an opportunity, or necessity, of introducing a road usage fee themselves?
8. In your opinion will other transport modes, such as sea and rail, be able to use this new toll to their advantage (i.e. being able to offer cheaper services), and will this lower the market share/transportation volume of road transportation services?
9. Have you, or do you know of any companies, that have complained to the Swedish Ministry of Industry about this new German toll?
10. Do you believe that the Swedish government will take action/discussion against this new toll?
11. Do you think that the increase in road usage fees will lower the justified distance for intermodal transportation? Today it is often said that at least a distance of 500 km is needed for a combined transportation.

12. Despite the introduction of taxation on the use, or possession, of commercial vehicles, the EU cannot persuade road hauliers to abandon the control of the shipment from origin to destination. Do you believe that the national authorities encourage transport management to work together in partnerships to establish intermodal delivery system?
13. We believe that for a change in behavior, EU and national authorities as well as transport companies should discuss alternatives for logistics transport development. Imposing new taxes might not persuade companies to change their way of making business and might increase the service costs to be paid by consumers. Do you know if the EU, or Swedish, authorities actively seek your, [name of interviewees' organization], advice when studying and discussing alternative solutions or are these decisions being made without consulting the transportation industry?
14. The aim of these policies is to encourage a modal shift. However, there are some constraints for this shift due to the lack of physical facilities to an efficient transfer between modes and the incompatibility of IT among transport companies. Do you think that the government will be subsidizing the elimination of these obstacles to achieve the objectives?
15. How dependant is [name of interviewees' organization], to and from Europe, on using the German motorway network?
16. Are you using ferry and rail connections today, and do you foresee an increase in these connections in the future?
17. Would it, for [name of interviewees' organization], be beneficial if you could 'avoid' the German roads via a ferry connection, to for instance Belgium?
18. Are you at [name of interviewees' organization] actively studying/seeking new routes for the transport of goods in Europe? Is an eastern road corridor via Poland and the Czech Republic a viable alternative for Schenker?
19. Have [name of interviewees' organization] been preparing for this new toll and what effects, if any, it will have?
20. Do you expect other modes such as rail and sea operators to increase their prices, now when there will be a road price increase?

