Master's Thesis in Informatics

# A qualitative study about the effects of Transport Information Systems on the insurance premiums for haulage companies

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Gothenburg, Sweden 2004

IT University of Göteborg
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TIS – a future factor for reduced insurance premiums?

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Gothenburg, June 4th 2004

David Granhage

Johan Persson

# Abstract

The last decades the information technology has invaded our society and affected the way we live our lives. In recent years it has also reached the vehicle industry. A tougher competition in the automotive business is driving on the development of IT. The Automotive companies are looking for new ways of differentiate against their customers. IT is a powerful tool to improve the car.

The haulage companies have generally low margins, and the need of a more effective transport is getting more obvious. The need of lower fuel consumption, lower communication costs and a more effective rout planning is needed. Transport Information System has been more common in the commercial traffic. The system is used for dynamic navigation – to find the fastest way, to get continuous serviced, to control security systems like brakes, to get detailed information about fuel consumptions and optimize driving behaviour, all of this gives more effective transports.

New technology such as GPS and telematics allows for new value propositions in the insurance industry context. In particular the new way of information gathering on risk relevant parameters, through the use of active and passive tags, GPS and telematic leads to these changes, with more accurate information available to insurance companies. They can use this additional information for risk evaluation, dynamic pricing and insurance product customization.

This study focus on haulage companies and Transport Information Systems, we will investigate if haulage companies that have a TIS system can get a lower insurance premium. The purpose is to investigate how both insurance companies and haulage companies can benefit from this technique. Such work has not yet been thoroughly examined; therefore we saw a good opportunity to investigate it.



**Keywords: Transport Information Systems, Fleet Management, Telematics, Enterprise Resource Planning, Insurance Companies and Haulage Companies.**

# Table of content

# 1 Introduction

In this chapter we give a short background of the topic. The chapter will also describe the purpose, the main question and sub questions linked to illustrate the main question. We will also outline how the thesis is disposed.

Achieving profitability is a challenge in all industries, not least in the transport industry.

The haulage industry is a very competitive industry. Due to the nature of the services provided, the profit margins are very low. The number of companies providing the same services are many, thus the prices for the services are very similar. The way to increase profits are made by a boost of business and/or lowering the costs. A way to attract new customers could be by providing value added services. The information technology today is able to provide such features. Due to these problems haulage companies have started to implement different types of IT-solutions in order to optimizing their fleet. A Transport Information System reduces costs and increases income by rationalizing, simplifying and improving the efficiency of many cost centres within the haulage industry, but there are also problems. Today, many haulage companies are reluctant to invest in a Transport Information System believing that the system are expensive, difficult to implement and fear of the organizational restructuring. There are many similarities between TIS and ERP (Enterprise Resource Planning) systems both in the way they are integrated into the organization and the physical system structure being module based. An ERP system is according to M Al-Mashari (2002) beneficial in a way that it can speed up decision-making, reduce costs and give managers control over a widespread business operation.

The insurance industry has during the last three years raised their insurance premiums against haulage companies with approximately 25-40%, and in some cases up to 100% according to T Heierson, CEO at ABC Åkarna,. This has given the haulers further complications.

Therefore the approach of this thesis is first to investigate haulage companies that have a Transport Information System. We will investigate the benefits from TIS, and discuss implementation problems and the procedure when implementing TIS. The

second goal of this study is to find out if insurance companies are willing to lower their insurance premiums to haulage companies that have a Transport Information System.

## 1.1 Purpose and Question at Issue

The thesis main focus is on the relationship between haulage companies and the insurance industry. We will examine if haulage companies can get a reduced insurance premium when having a Transport Information System. This thesis has also focused on the business value and problems haulage companies' faces when buying and implementing a Transport Information System in the organization.

The main objective with this thesis was to investigate if haulage companies can, with the use of a Transport Information System, get in a better position when negotiating with insurance companies. Consequently, the thesis focuses on the aspects of Transport Information Systems. However, what are the advantages with a Transport Information System, and what factors need to be taken into consideration when integrating this technology?

Based on the purpose above, the following main question has been outlined:

**Is there any added business value towards haulage companies when implementing a Transport Information System in the organization concerning insurance premiums?**

We will look at the modules in TIS to see if they can affect the premiums. To clarify this we have performed interviews with haulage companies that have implemented a TIS as well as insurance companies who decide the insurance premiums for haulers. In addition to this we have had discussions with Volvo Trucks in order to gather background information regarding the purpose with their Transport Information System, Dynafleet.

## 1.2 Delimitation

We have delimited this thesis by focusing on three different actors: Haulage companies, Insurance companies and Volvo Trucks. Volvo trucks are the manufactures of a Transport Information System called Dynafleet. Haulage companies are the customers of the product, and Insurance companies are setting the

premiums for Haulage Companies depending on numerous factors. We have also looked at other Transport Information Systems on the market, but our main focus is on Volvo Trucks system Dynafleet.

Regarding the theoretical framework of this thesis, we have chosen to look at theories about Enterprise Resource Planning Systems (ERP). There are no theories about Transport Information Systems; we have therefore focused on ERP system which has many similarities with TIS, due to its module based architecture.

### 1.2.1 Target Audience

This thesis is intended the employees within Volvo Trucks and other truck companies, people within the haulage industry, the insurance industry and suppliers and developers of Transport Information Systems. Since we have these four groups as our target, we feel free to use some common industry terms without further explanation.

## *1.3 Disposition*

- **Chapter 1; Introduction.** Explains the background, purpose and question at issue. Also explains the thesis delimitation.
- **Chapter 2; Research Context.** Describes why the topic was chosen and background information about the haulage industry and insurance industry.
- **Chapter 3; Method.** Describes our way of procedure throughout the thesis.
- **Chapter 4; Definitions and general technical information.** Describes telematics, Transport Information System and Dynafleet.
- **Chapter 5; Theoretical framework.** The theoretical framework involves business value and implementation issues with Enterprise Resource Planning systems.
- **Chapter 6; Empirical study.** Shows the results from the interviews made and statistical summaries.
- **Chapter 7; Discussion.**
- **Chapter 8; Summary.**

# 2 Research Context

Why is this an interesting topic? Since we both have “Business Technology” as our major at the IT-University in Gothenburg, and also are interested between the linkage of business and telematic applications, this is an area that suits us well. The IT-university is located in the Telematics Valley region; therefore the interest in telematics, and especially automotive telematics, has grown during our master studies here. Over the last 5-10 years, the use of telematic applications has increased and is applicable in many different kinds of industries. Telematic applications are designed to help companies to add business value to its various services, either by improving existing services or by adding new services.

With the evolution of telematics, information technology has an ever-increasing impact on personal travel and transport. The combination of telecommunications and informatics has traditionally defined the concept telematics. Lately, the term has become the predominant definition for wireless communication in or to motor vehicles. A narrower and more recent meaning of the term is the integral system of wireless communication and Global Positioning System (GPS) satellite tracking (*Tech Encyclopaedi*a).

In the automotive industry large resources are spent on telematic solutions. In the haulage industry, more trucks are now equipped with different kinds of communication system. This effects to a great extent the transport industry, and commercial transports have become an important part in the telematics area.

The haulage industry is characterized by a great number of small haulage companies with 1-2 trucks. There are approximately 56000 Lorries in Sweden with a loading capacity of 3.5 tonnes or more. There are a total number of 12000 haulage companies in Sweden performing the transports (SCB, 2003). Despite an increased volume of transports, the haulage companies are in a business that struggles with many problems.

Most haulage companies have very low margins. When having low profit margins, there is always a need to lower the costs. The variable costs are hard to control due to the fact that they change proportionally to how much it is consumed. The fact that external fluctuations in costs are probably the same for all haulage companies makes it harder to try and compete on variable costs. Therefore, there is a need to always try to lower the fixed costs. Salary is the largest fixed cost for a haulage company which stands for approximately 36-50 percent. Depreciation, Administration and fuel are three other large costs which stand for approximately 12-20 percent. The insurance costs are approximately 5-6 percent according to (SCB, 2003).

The fact is that insurance premiums generally have become much more expensive over the last two three years. Especially for the haulage industry the insurance companies have made radical premium increases. Research has show that the average increase for a haulage company to insure their trucks has been between 25 percent and 45 percent during that period and in some cases even a 100 percent increase. One big reason for this is the last couple of year's downfall of the world's stock exchanges. Depending on the economic situation, insurance companies are setting the premiums after the overall return of investments. During the 90's, insurance companies offered low insurance premiums because they were feeding of its profits from their stocks making it easier for them to compete with low premiums.

The emergence of the Digital Economy has a major impact on the insurance industry. In academia as well as in industry currently the impact of wireless technologies is being discussed very intensive. The more information an insurance company have on a certain risk and the better these information are, the easier it would be to change risk structure for example to manage risk proactively to avoid damage and to perform better risk diversification. Insurance companies in other countries such as Norwich Union in Great Britain and Progressive Insurance in the US have already done pilot projects involving telematics for a new way of calculating car insurance premiums. This indicates that insurance companies are starting to include new technology such as telematics for the calculations on insurance premiums.

How are premiums calculated? There are many different ways of calculating insurance premiums for haulage companies. There are a lot of factors that insurance

companies use to calculate premiums, and it differs depending on which insurance company the haulage company chooses. The most important factors that insurance companies use in the underwriting process are:

- Brand and make of the truck
- Truck size
- Truck value
- Truck weight
- Additional equipment on the truck
- Geographic location
- Miles driven per year
- Previous accident history

A haulage company can in most cases negotiate about the premium with insurance companies. Insurance companies are often looking at a standard price list to see what premiums a haulage company should have, the fewer vehicles the haulage company has, the closer to the price list they get. Previous accident history is one important factor. If haulage companies have a large fleet and good statistical accident records, they clearly improve their position when negotiating with insurance companies.

# 3 Method

In this chapter we will review the methodology we have used during our work, and discuss questions such as how and way we chose to go in a certain direction. This makes it possible for the reader to judge the quality and credibility of the thesis.

## *3.1 Method of Investigation*

### 3.1.1 Literary Studies

Our main focus during the first weeks was on studies of literature. Most of the research was done in advance, since the topic has interested us for a long time. We gained a deeper understanding of the topic that helped us to understand and define what we wanted to do and what theories could be applicable.

We performed an intense search for articles treating the subject of ERP systems. We found that the most relevant literature was in terms of articles and research-studies that we found through electronic article databases. Since the topic we are investigating is relatively new, the theoretical study refers to ERP systems which we, after having consulted with our academic coach agreed to be the most accurate theory applicable to the topic. Implementing an ERP-system has many similarities with implementing a Transport Information System into an organization.

### 3.1.2 Choice of Method

The choice of qualitative and quantitative methods is important to have figured out before choosing a method. In our case we were looking for a deeper comprehensive answer, to be able to build up a vision of what the future might look like. Hence, an emphasis on qualitative methods was chosen.
The most common methods in the qualitative perspective are interviews, various kinds of involvement and/or naturalistic/ethological studies and documents. In these methods the researcher(-s) him- themselves are included and are representing the instrument (Backman, 1998).

#### 3.1.2.1 Qualitative Method

The purpose of a qualitative method is to get a picture of how other people view the world, to understand their point of view in a certain matter. The data collected consists of detailed descriptions of situations, events, people, interactions and observed behaviours (Patton, 1980). Instead of multiple choice questions, questions in qualitative studies are open ended questions. To be able to fully understand what is happening the observer must get close enough to the people and situation being observed, capture what is said and done, and describe these activities. This is done by analyzing documents and events, and by performing interviews. Direct quotations are also often used (Backman, 1998). The main points here are:

- Emphasis on interpretation and understanding
- Explorative orientation
- Process oriented
- Holistic approach

#### 3.1.2.2 Quantitative Method

The quantitative methods are based upon quantity. This means that one tries to gather as much fact as possible by asking as often as possible. Also one tries to gather data, process it or present the findings in the shape of numeric values. This type of direction is strongly influenced by statistics with its usability towards relationship analysis (Nordgren. M, 1999). The strength with a quantitative method is that, as opposed to a qualitative method, the data collected are more easily measured and comparable. Also, different observations can be described automatically, which facilitates the analysis of the data. These data can be concluded with numeric values, and are often collected through multiple-choice questionnaires, experiments etc (Patton. M.Q, 1980). The use of quantitative data is common within the positivistic method of doing research, as the observer must be objective and not influence the observed person, event and such (Backman, 1998). Quantitative methods measure how much, how many, how often and so on, the main points here are thus:

- Emphasis on test and verification
- Logical approach
- Analytical
- Result oriented

There are of course some negative sides too. It can be difficult to make questionnaires that are easy to understand by all respondents, especially in our case when we interviewed haulage companies about new IT-systems.

### 3.1.3 Interviews

The majority of our gathered material comes from comprehensive interviews with people within the insurance and haulage industries. Interviews are known to be the "best" methods for the collection of information. But it is also a complex and very time consuming method. The majority of our interviews were telephone interviews due to lack of time and distance. The remaining interviews were face-to-face interviews.

One way of doing interviews are to have a series of questions prepared in advance and to have a framework to work from. Before the interviews we designed an interview guide to make sure that we asked questions which were relevant and interesting for our thesis. Before the interview we sent out a document to the respondents to explain or main points and in some cases also the actual questionnaire. This was made so the respondents could prepare themselves and maybe investigate issues which they may not be so up to date with. We did two different kinds of interviews. One was more of a deep interview with many open questions where we tried to get as much information as we could from the respondents. If there was something that was unclear we asked additional questions. This was used with the insurance companies since there was only three companies to interview. The other kind was more of a faster interview with shorter questions. We started to interview haulage companies that we knew had some sort of a Transport Information System.

## *3.2 Choice of Interview Participants*

### 3.2.1 Main Participants

After carefully surveying the topic, we identified four different groups of participants which are involved with the development and have an opinion about TIS and its

possible effects towards the insurance industry. The four groups are: Halauge companies, Insurance companies, Truck Companies and Haulage Interest groups.

### 3.2.2 Selection of Company/Organizations interviewed

**Haulage Companies**

| Company Name | Position | #Trucks |
|---|---|---|
| Allfrakt | Managing Director | 30 |
| Bäckebol | President | 100 |
| Börje Jönsson Åkeri AB | Market Director + IT Director | 120 |
| Curt Sillström Åkeri AB | Owner | 35 |
| Ericsson Åkeri KB | Owner | 14 |
| GDL Transport AB | IT Director | 350 |
| Gunndals Åkeri | Owner | 10 |
| Göteborgs Lastbilscentral | IT Director | 350 |
| Hyllinge Åkeri AB | Owner | 15 |
| Jannessons Åkeri AB | Office Director | 5 |
| Kallebäcks Åkeri AB | Owner | 24 |
| Klas Hansson | IT Director + Driver | 11 |
| Lastbilscentralen Eslöv Hörby | IT Director | 130 |
| Nils Hanssons Åkeri AB | Vice President + Driver | 115 |
| Nils Olof Nilsson Åkeri AB | Owner | 14 |
| Skandinavisk Lastbilscentral | IT Consultant | <1000 |
| W H Bowker Transport | Managing Director | 180 |

Table 3.1

**Insurance Companies**

| Company Name | Position |
|---|---|
| IF | Underwriting Director + Business Manager |
| Trygg-Hansa | Underwriting Director |
| Länsförsäkringar | Underwriting Director |

Table 3.2

**Interest Group**

| Company Name | Position |
|---|---|
| Svenska Åkeriförbundet | Information Manager |
| ABC Åkarna | Managing Director |

Table 3.3

## *3.3 Analysis of Material*

Analyze of the material was done continuously during the data gathering. The data we collected were registered manually and technologically. The interviews were recorded and stored on computers, so that we easily could go back and analyze the material

several times during the writing session. The collected data material was then organized into subcategories and analyzed separately.

By gathering a lot of material and seeing similar patterns, we have tried to create a picture of the development within Transport Information System, and how both the insurance business and haulage companies can gain benefits from these systems.

(Easterby-Smith et al, 1991) presents a method for analyze of non-standardized data. The method is based on the work during deep interviews. The method consists of seven steps:

- **Familiarize with the subject**

  We started to record the interviews, after that we listened to it and observed the respondents attitude and tried to analyze how trustworthy the information given was. In this stage we found similarities and connections between the respondents.

- **Reflect**

  In this phase we started to categorize data. We started to evaluate the information. The goal was to see if collected data supports existing knowledge and if answers former unanswered questions.

- **Conception of concepts**

  During this phase we went back and tried to find concepts that had arisen from the collected material.

- **Adaptation of concept**

  We went through the concepts that we found from literary studies and interviews. Concepts that often arose were Telematics, GPS, Wireless and Integration.

- **Retrospect**

  When we had all the facts we did a retrospect. We wanted to make sure that all concepts were put in the right context and explained the right observable fact.

- **Linkage**

  Here we put together our patterns and related this to our theory and interviews.

- **Evaluation**

  To improve our evaluation we gave a draft to our academic coach. After his comments and further ideas we updated the draft.

## *3.4 Validity and Reliability*

Validity and reliability are two central components when evaluating works of research. According to Easterby-Smith, Lowe, Thorpe (1991), it is important to review the chosen methods in order to determine how reliable and valid the information that is brought forward. This should be done to able to verify and secure the quality of the work done. We have to be sure that we measure the right thing, validity and that this is measured on a reliable way, reliability.

### 3.4.1 Validity

Traditionally it is said that validity verifies weather or not the research measures what it is supposed to measure. According to Easterby-Smith, Lowe, Thorpe (1991) this positivist viewpoint must be extended within phenomenological research; to measure weather or not one has gained full access to knowledge and meanings of the informants in the case being studied. The dependent factors here are which and how many persons are being interviewed and what data is being investigated, in what context and so on. One important aspect is to what degree the interviewees can be said to be representatives for the organization or not. We have only interviewed haulage companies where there has been someone who had knowledge about the companies operations and knew what type of technology they used.

### 3.4.2 Reliability

When it comes to reliability, the challenge lies in how trustworthy the result is. According to Bell (2000) a reliable study should give the same results regardless of who performs the study. Reliability is achieved when the same results can be achieved twice (i.e. conducting another study with different respondents). Since one of us has had previous experience with marketing research, the interview material is structured in a way a qualitative interview should be.

# 4 TIS

Many of the features of a TIS come from telematic applications; therefore, this chapter will start of with describing telematics in more detail. Part one will include the various areas of application for telematics and discuss the different technologies which makes telematics work. Part two will describe TIS as a system and how it relates to telematics in terms of applicable areas. The main features and their main advantages will be described. Part three is a presentation of Volvo's DynaFleet Transport Information System and will describe the main features which their system provides.

## *4.1 Telematics*

There is no real definition of *telematics* today. However, the word is more and more used as a concept description for communication and positioning technologies for vehicles. A good description could be this summary:

> *The application of communication and positioning technology to promote convenience, mobility, productivity and safety for vehicles such as trucks and cars (Lindgren et al, 2003).*

Vehicle telematics can be divided into five different application areas:

- Vehicle maintenance
- Security and safety
- Productivity
- Navigation and accessibility
- Entertainment and information

The focus in the following chapters will be on the first four areas. Entertainment and information is not something that relates to the main goal of the thesis and is also an area that does not bring any direct business value for haulage companies.

### 4.1.1 Vehicle Maintenance

There are today many projects that try to utilize telematics to make vehicle maintenance and diagnostics easier. A truck today has an advanced internal communication system which has resulted in possibilities to manage a lot of valuable information about the trucks for various needs. One can see how much the brakes have been torn, oil and water levels and light bulbs. With the help of wireless communication, this information can be sent back to an office or a service centre in real-time. With the help of various applications, these data can be analyzed and from that it is possible to see driving habits, frequency of maintenance and service. It is also possible to have systems looking for changes in fluids, filters etc. The program then might inform the driver beforehand if something has to be fixed. There is also a possibility for the system to give instructions if something has to be replaced and there might be some electronic wiring involved. The trucks software is something that can be upgraded today and there is a lot of effort put in to his especially for doing the upgrades remotely (remote vehicle upgrade). To be able to “download” some extra horse power when entering the Alps for example is a feature that really takes advantage of the telematic platform (Lindgren et al, 2003).

### 4.1.2 Security and Safety

One of the major features of telematic services deal with safety and security, especially accidents and vehicle problems. For instance, if there is a vehicle breakdown, the driver can push an emergency button which sends out an SMS or an e-mail with GPS position and damage information to a repair shop or something similar. It is also common to have a panic button which is useful for robbery, assault or high jacking. It discreetly sends out a status message and reports that something is wrong. There is also something called “emergency assistance”. This feature notifies an SOS alarm centre in case of an accident and deploys rescue and medical personnel (Lindgren et al, 2003).

### 4.1.3 Productivity

In companies where vehicles are a part of the core business, evaluation and statistics of the vehicles are very important. Factors such as run-time, rest-time, work hours and

wait-time are very valuable for a company which can be extracted from a TIS and help make an overview of an employees work schedule. Some systems have features that can monitor the driver's way of driving the vehicle. It monitors the fuel usage, how often the brakes have been applied, how much the driver uses the gas pedal and so forth. This can then be used to see how efficient the driver has been driving. These features can also show if there is something wrong with the vehicle. If the driver has been driving in a correct way maybe tire pressure or some thing else is the reason for high fuel usage (Lindgren et al, 2003).

### 4.1.4 Navigation and accessibility

Telematics can really help drivers with navigation and route assistance. With technologies such as GPS for positioning and CD/DVD media for holding map information, onboard guidance systems are today the cornerstone for optimising route planning. Roadwork and accidents can be avoided with the help of real-time information for the guidance system. These feature can save both time and money for the companies (Lindgren et al, 2003).

### 4.1.5 Entertainment and information

Yet another aspect where telematics can be useful is within entertainment and information. This are can basically be divided into two different usage areas where the first one includes services such as stock trading, basic banking tasks, e-mail, news feeds, reservation of tickets and current weather. Some of these features are already available from mobile phone companies and could easily be modified to be available for vehicles. Games and music is the other area that could really make the passengers have a more pleasant ride. Streaming music and video is something the content providers are looking at. However, bandwidth is still a bottle neck for these features (Lindgren et al, 2003).

## *4.2 TIS – applicable areas*

A TIS consists of different modules that come from former or existing IT solutions for haulage companies. One module consists of features found in Fleet Management

Systems. A Fleet Management System (FMS) could be described as a system for fleet optimization as a whole with features such as GPS-positioning, route planning, and in some cases some form of communication between the driver and the office. Where FMS normally is limited to the features described above, today the additional features in the modules within a TIS could consist of:

- *Driving Management*
  Helps the driver to drive in a more efficient way to reduce fuel consumption and become more environmental friendly.

- *Enhanced Communication*
  Two way text communication between the office and the vehicle, such as Short Message Service (SMS). Real-time information sharing.

- *Vehicle Management*
  Logging and statistical data of vehicles and employees.

- *Security and Safety Management*
  Tracking of goods with GPS and/or other tracking techniques such as radio based solutions. Quality insurance of goods with the help of senores such as temperature gauges. Emergency and/or alarm buttons.

## *4.3 Volvo Trucks – Dynafleet*

### 4.3.1 History and Introduction

The first Dynafleet product was launched in 1996. The combination of steadily increasing freight volumes and tougher competition has focused attention on the efficiency of the hauling industry, in which fuel consumption and maximum utilization of every vehicle is vital. In practice, this means that haulers must have constant access to information on freight operations and on the vehicles used to undertake them. Constant access to information requires new types of systems for fleet operators and drivers, the users must be equipped with systems that enable them to communicate efficient and safely.

The Volvo group strategy is to provide competitive products and transport solution for goods and people, focusing on efficient fleet operation the truck division is supporting their customer with Transport Information Systems services.

Dynafleet is built up around three basic working areas:

- Vehicle Management,
- Transport Management
- Driver Management.

### 4.3.2 Vehicle Management

Dynafleet Vehicle Management consists of four subsystems:

**1. Logger Tool:** The Logger Tool unit is fitted in the truck. The vehicle unit has a display, control buttons and a card reader in the front panel. The unit shows and saves information from the engine control unit and the tachograph. The vehicle unit contains details about how the vehicle has been driven and by whom. The information is either transferred via a mobile phone to the internet-based service Dynafleet Online or to the computer program Logger Management, which is installed on a computer at the office. The information is either wireless or by cable transmitted back to the office.

Logger Tool in the vehicle gives:

- Wireless downloads of data from the vehicle to the office.
- Register drivers' working hours – prepared for future EU requirements.
- Fuel consumption.
- Driven distance.
- Information about the freight space momentary temperature.

**2. Logger Manager:** The computer program Logger Manager processes driver and vehicle information from Logger Tool in the truck. The information is transferred to the office computer via a cable or mobile phone. Logger manager gives detailed information about how the vehicle has been driven over a certain distance, including everything from empty mileage to which gears have been used and when. Logger Manager allows haulage companies to enter their own settings and develop their own

information analysis. Drivers' working hours can also be registered. The drivers are equipped with a smartcard and register the driver hours according to current EU requirements. The card is then scanned at the office and the times are registered in the computer system, to be used for simpler and more accurate wage calculation.

.Logger Manager at the office gives analysis of and basis for proceedings concerning:

- Working hours; driving, work, waiting and rest.
- Fuel consumption.
- Driving condition.
- Driver training.

**3. Trip Manager:** Trip Manager gives statistics from the latest download from the vehicle. The statistics from the measure period can be used for:

- Find deviations in working expenses.
- Evaluate driving behaviour.
- Calculate profitability on recurrent routes.

**4. Dynafleet Online:** Dynafleet Online is a web based service. The service is an alternative to Logger Manager and is suitable for smaller haulage companies or companies with a mixed fleet. Via Dynafleets website, the haulage companies get information about their fleet.

Dynafleet Online gives:

- Fuel report, per vehicle or fleet.
- Distance reports.
- Service calendar, detailed information about the vehicle.
- Environmental report.

### 4.3.3 Transport Management

Within Transport Management, Dynafleet is used by the traffic planner to make decisions by ensuring that he or she has constant access to the vehicle's geographical position and load status. The Transport Manager program is installed at the office. It is the Transport Manager that gathers all the vehicle and driver data downloaded from the vehicle.

The Transport Manager gives:

- Possibility to send and receive messages.
- Possibility to send order form.

- Locate position for each vehicle.
- Possibility to integrate the system into the office other administrative programs.

Dynafleet Transport Management consists of three sub systems.

**1. Web Manager:** Web Manager is a program that gives the haulage companies the possibility to show their customers the status of the goods. The customer could log on to the website and get access to any information that the haulage companies decide.

**2. Communication Tool:** This unit sends collected vehicle and driver data from the vehicle to the office. It sends and receives text messages and shows the geographical position for the vehicle.

Communication Tool gives:

- Register drivers' working hours – prepared for future EU requirements.
- Wireless downloads of driver and vehicle data.
- Fuel consumption.
- Driven distance.
- Information about the freight space momentary temperature.
- Possibility to send and receive messages.
- Possibility to send order forms.
- Possibility to se the vehicles geographical position.
- Communication that works in all truck brands.

**3. Information Tool:** This unit contains all the functions that *Communication Tool* has. However, it also has an extra colour screen with a map that shows the vehicles geographical position. The additional functions for the Information Tool compared to Communication Tool are:

- Access to maps all over Europe.
- Vehicle position on maps.
- Colour display.
- Traffic information via RDS/TMC.
- Assistant button.

### 4.3.4 Driver Management

The driver time module, which is an option in the Transport Manager program, helps drivers and traffic planners to comply with EU rules for driver times. A warning signal, both at the office and for the driver, indicates when the time is about to be

exceeded. Should the driver time be exceeded, an alarm is activated. The driver can be alerted by Dynafleet when he is about to pass the maximum time limits for driving or has not had the break that is required.

The driver time module gives:

- Warn the driver if he is about to break the work-time rules.
- Help the dispatcher not to unintentionally force the drivers to break the work-time rules.
- Help in distributing orders between drivers.
- Give an overview of a drivers working/resting time pattern.
- Help the dispatcher to instruct a driver to take a break.

# 5 ERP

In the theory part, we firstly talk about Enterprise Resource Planning (ERP) systems, and how these systems affect an organization, both before and after the implementation phase, the added business value and obstacles when obtaining an ERP system.

ERP systems are in many ways similar to a Transport Information System (TIS). A TIS implementation is likely to encounter the same problems, but also achieve the same benefits as an ERP implementation. Both ERP and TIS consists of various modules, normally ERP is a companywide information system that generally integrates all aspects of a business, while a Transport Information System consists of different modules concerning logistics and traffic planning.

## *5.1 Introduction and Definition*

Enterprise Resource Planning (ERP) has been defined by various authors, however with few differences.

(Markus et al, 2000) defines ERP systems as: integrating inventory data with financial, sales and human resources data, allowing organisations to price their products, produce financial statements, and manage effectively their resources of people, materials, and money.

ERP is also defined by (Nah et al, 2001) as:" a package business software system that enables a company to manage the efficient and effective use of resources (materials, human resources, finance, etc.) by providing a total, integrated solution for the organization's information-processing needs".

According to (Davenport, 1998) an ERP-system is designed to solve the problems in organisations with scattered information. Without an ERP-system, information is often spread across many separate computer systems which lead to direct and indirect costs. Storing and rationalizing redundant data, maintenance and communication

between the systems are examples of direct costs, while indirect costs due to different systems within a company arise when for example storage and sales are not updated in real time. An ERP system is at its core a single comprehensive database. The database collects from and feeds data into applications supporting virtually all of the company's business activities. This makes the information available to all employees within the company in real time.

Fig 1.1 Overview of an ERP system (I. Cheng, 2001)

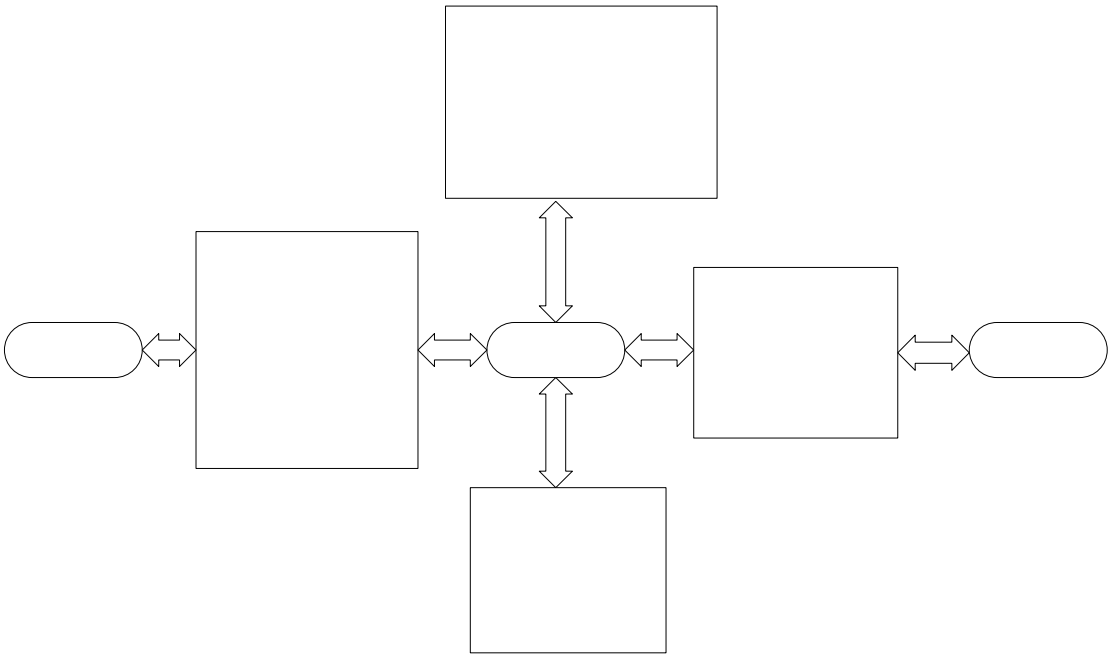

Fig 1.1 At the heart of an enterprise system is a central database that draws data from, and feeds data into a series of applications supporting diverse company functions. (Davenport 1998)

The 4th definition is by (B, Prasad et al, 1999). They mean that an ERP system can be thought of as a companywide information system that integrates all aspects of a business. This integration benefits companies in many ways such as quick reaction to competitive pressures and market opportunities, more flexible product configuration, reduced inventory, and tightened supply chain links.

What have motivated organizations to implement ERP systems are their integration and standardization capabilities, flexible client/server architecture, and their abilities to drive effective business reengineering and management of core and support processes (Computerworld, 1998). However, implementing enterprise resource planning systems are mostly costly and complex. While some companies have achieved significant efficiencies through ERP, others have complained of failed implementations, budget overruns, and disappointing performance (M. Bradford, J. Florin, 2003)

## *5.2 Business value of ERP-systems*

One of the major sources of competitive advantage has been the ability to speed up the supply-chain process. This demand led to a significant development in information systems (IS) also known as enterprise resource planning (ERP) systems (M Al-Mashari et al, 2002). ERP systems have been qualified as "the most important development in the corporate use of information technology in the 1990s" (Davenport, 1998, p. 122). The Enterprise Resource Planning software market has been since the mid-1990s, and continues to be one of the fastest growing segments of the Information Technology industry with growth rates averaging from 30% to 40% per year (Eckhouse, 1999)

The basic architecture of an ERP system builds upon one database, one application, and a unified interface across the entire enterprise. An organisation is therefore able to operate under one application standard where all applications serving human resources, accounting, sales, manufacturing, distribution, and supply-chain management aspects are firmly integrated. An ERP system is also beneficial in that it can speed up decision-making, reduce costs and give managers control over a globally distributed business operations (M Al-Mashari et al, 2002). An ERP system streamlines a company's data flows and provides management with direct access to real-time operating information. With an ERP system, management base their decisions on information from one source instead of collecting information from different system which can be very time consuming, and the information may not be accurate and/or outdated (Davenport,1998).

(S. Lonzinsky, 1998) contends that there are seven general objectives that companies seek to accomplish by installing new enterprise software packages:

1. Drastically reduce the size and cost of the company's IT sector.
2. Decentralize information processing by making data available in real time.
3. Provide technology tools that permit simplification of accounting, finance, and administrative functions, as well as the generation of management reports to maintain processes of control and business management.
4. Create a base to support growth with reduced proportional internal support costs.
5. Achieve a better balance between decentralization and control among functions to avoid duplication, ensure synergy, and manage performance indicators.
6. Electronically exchange information and orders with clients to decrease costs.
7. Employ new technology to keep pace with or outdo competitors.

Cooke and Peterson (1998) conducted an empirical study of 162 adopters of SAP's enterprise software. They found out that the top seven reasons why companies implemented ERP systems where as follows: standardize company processes, integrate operations or data, reengineer business processes, optimize supply chain or inventory, increase business flexibility, increase productivity/reduce number of employees and support globalization strategy.

## *5.3 Organizational preparedness for embarking on ERP*

The adoption of ERP system in an organization requires intense efforts, focusing on both technological and business themes of implementation. Critical to the success of these efforts is the adequate organisational preparedness for embarking on ERP (M Al-Masahari, 2003). Planning for ERP adoption generally occurs when an organization recognizes that current business processes and procedures are inadequate for their current and/or future strategic needs (I. Chen, 2001). The following list developed by Rao (2000) describes the major factors that have to be considered in the preparation stage on an ERP implementation.

**Taxonomy for critical success factors**

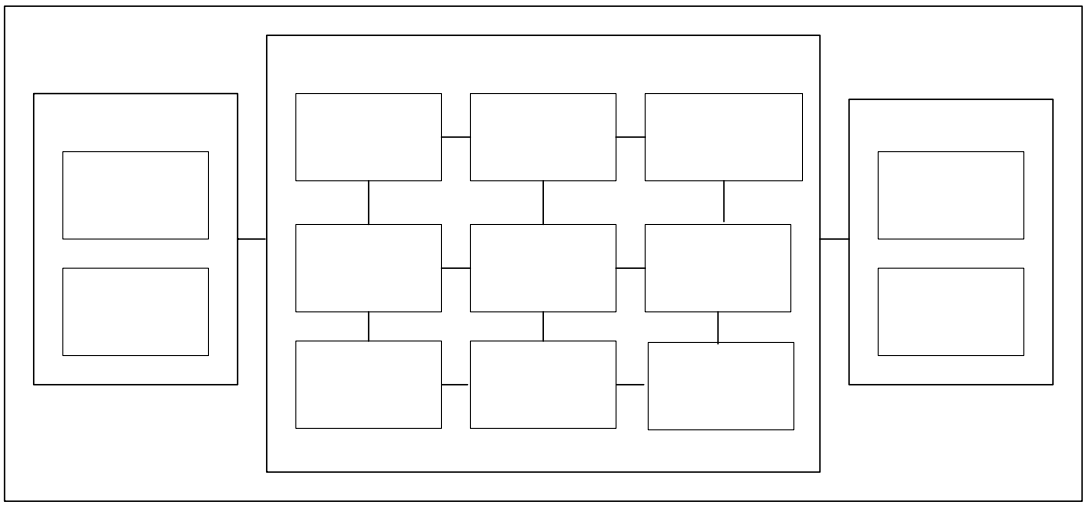

Fig 3.2 Modified from (M. Al-Mashari, 2003).

1 *Infrastructure resources planning*: The objective is to ensure that adequate infrastructure is planned for well in time (both for the pre-implementation and the post-implementation stages).

2 *Local area networks:* Ensuring network support for any ERP or other applications.

3 *Servers:* Deploying adequate server/network, even during the training/modelling phase.

PREPARENESS

4 *PCs*: Introducing new PCs with latest configuration.

5 *Human resource planning:* Focusing on building a teamwork environment where team size spans across the entire organisation.

Management & Leadership

6 *Education about ERP:* People in the organisation must understand what ERP is and also what it is not. ERP education should be carried out across the organisation about ERP success and failure practices.

Visioning & Planning

7 *Commitment to release the right people:* ERP is recognized as a difficult but necessary project, and the best people should work full-time on the project. Adequate advance planning is often necessary to be able to release the best people.

8 *Top management's commitment:* Making ERP as one of the top projects for the company for that year. The top management must also have the willingness to allow for a mindset of change by accepting that a lot of learning has to be done at all levels.

9 *Commitment to implement "vanilla version":* Ensuring minimal customization at the start implementation of ERP. There should be a clear policy to implement the ERP system in the "vanilla" form (without customization) and run the system like that for at least six months after the implementation and then make a review for further possible customizations.

10 *Reasonably well working manual systems:* Carrying out audit exercise to find the current status and corresponding corrective actions

11 *Strategic decision on centralized versus decentralized implementation:* The broad decision a company needs to take when implementing an ERP system is whether each location (manufacturing, branch office) would have servers or would they only be centrally located. It would be worthwhile to go for centralization of IT resources.

### 5.3.1 ERP Implementation

Enterprise systems appear to be a dream comes true. The commercially available software packages promise seamless integration of all information flows in the company, financial and accounting information, human resource information, supply chain information, and customer information. For managers who have struggled, at great expense and with great frustration, with incompatible information systems and inconsistent operating practices, the promise of a quasi ''off-the-shelf'' solution to the problem of business integration is enticing. It is no surprise that business organizations have been beating paths to the doors of enterprise system developers. A successful ERP project can reduce operating costs, generate more accurate demand

forecasts, speed production cycles, and greatly enhance customer service, all of which can save a company millions of dollars over the long run. ERP systems reportedly lead to improved cash management, reduction in personnel requirements, and a reduction in overall information technology costs by eliminating redundant information and computer systems. Surprisingly, given the level of investment and length of time needed to implement ERP systems, many companies have proceeded to implement ERP without making any return on investment (ROI) calculations. But, most companies seem to have had good reasons for doing so, some wanted to integrate diverse business units, others wanted to consolidate redundant proprietary information systems, and many implemented ERP systems to solve their year 2000 problems. But the price of securing the benefits of ERP may be high. Not only do ERP systems take a lot of time and money to implement, they can disrupt a company's culture, create extensive training requirements, and even lead to productivity dips and mishandled customer orders that, at least in the short term, can damage the bottom line. Moreover, according to Standish Group research, 90% of ERP implementations end up late or over budget. (E.J. Umble et al, 2003)

## 5.4 Critical Success Factors

Implementing an ERP causes massive change that needs to be carefully managed to reap the benefits of an ERP solution. Critical issues that must be carefully considered to ensure successful implementation include commitment from top management, reengineering of the existing processes, integration of the ERP with other business information systems, selection and management of consultants and employees, and training of employees on the new system (Bingi et. Al 1999).

An ERP system represents a considerable investment for a company. According to (I. Chen, 2001) an ERP system can range anywhere from $2 to $4 million for a small firm. The huge investment required to implement an ERP system needs to be weighed carefully against the eventual savings and benefits the system will produce.

According to (K. Hong, Y. Kim, 2002), most IT-managers responsible for managing their organization's ERP implementation, view their ERP systems as the most

important computing platform in the organization. However, despite such strategic importance, ERP projects have an unusually high failure rate which can jeopardize the core business.

(Davenport, 1998) means that it is not the technical challenges that are the main reason why enterprise systems fail. The biggest problems according to Davenport (1998) are the business problems. Companies fail to reconcile the technological imperatives of the enterprise system with the business needs of the enterprise itself. With ERP systems, the business process must often be modified to fit the system.

Implementing an ERP system is not an inexpensive or risk-free venture. In fact, 65% of executives believe that ERP systems have at least a moderate chance of hurting their businesses because of the potential for implementation problems. It is therefore worthwhile to examine the factors that, to a great extent, determine whether the implementation will be successful. Numerous authors have identified a variety of factors that can be considered to be critical to the success of an ERP implementation. The most prominent of these are described below. (E.J. Umble et al, 2003)

### 5.4.1 Clear understanding of strategic goals

ERP implementations require that key people throughout the organization create a clear, compelling vision of how the company should operate in order to satisfy customers, empower employees, and facilitate suppliers for the next three to five years. There must also be clear definitions of goals, expectations, and deliverables. Finally, the organization must carefully define why the ERP system is being implemented and what critical business needs the system will address (E.J. Umble et al, 2003)

### 5.4.2 Commitment by top management and communication

Successful implementations require strong leadership, commitment, and participation by top management. Since executive level input is critical when analyzing and rethinking existing business processes, the implementation project should have an

executive management planning committee that is committed to enterprise integration, understands ERP, fully supports the costs, demands payback, and champions the project. Top management commitment is much more than a CEO giving his or her blessings to the ERP system. This commitment must not be limited to the conception of the project but should continue through its conception. As in many major change efforts, objections and disagreements arising in the process of reengineering and ERP implementation can only be solved through personal intervention by top management (S. Sarker, A.S. Lee 2003).

Management commitment should look beyond the technical aspects of the project to the organizational requirements for a successful implementation. In addition to providing the necessary funding, top management must recognize that ERP implementations require the use of some of the best and brightest people in the organization for a notable period of time. Top management must identify these people, free them from present responsibilities, organize them into an interdisciplinary team, and empower them for the responsibility of the project. Commitment also implies that they are willing to spend significant amounts of time serving on the steering or executive committee overseeing the implementation team (Chen 1999).

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### 5.4.3 Project management

ERP implementation teams should be composed of top-notch people who are chosen for their skills, past accomplishments, reputation, and flexibility. These people should be entrusted with critical decision making responsibility. Management should constantly communicate with the team, but should also enable empowered, rapid decision making. The implementation team is important because it is responsible for creating the initial, detailed project plan or overall schedule for the entire project, assigning responsibilities for various activities and determining due dates. The team also makes sure that all necessary resources will be available as needed (E.J. Umble et al, 2003).

With new technology, it is often critical to acquire external expertise, including vendor support, to facilitate successful implementation. Hundreds of companies

provide ERP services, which may include all or some combination of ERP selection, business process planning or reengineering, ERP implementation, End-user training and ERP maintenance and support. With the growth of the ERP market being fast and huge, there has been a lack of competent consultants. One of the challenges with ERP implementation is that it demands multiple skills covering functional, technical, and inter-personal areas (M. Al-Mashari 2003).

### 5.4.4 ERP system customization

A clear definition of project objectives and a clear plan will help the organization avoid the all-too-common ‘‘scope creep’’ which can strain the ERP budget, jeopardize project progress, and complicate the implementation. The project scope must be clearly defined at the outset of the project and should identify the modules selected for implementation as well as the affected business processes. If management decides to implement a standardized ERP package without major modifications, this will minimize the need to customize the basic ERP code. This, in turn, will reduce project complexity and help keep the implementation on schedule (E.J. Umble et al, 2003).

The companies also face a question as to whether to implement the ERP software "as is" and adopt the ERP system's built-in procedure or customize the product to the specific needs of the company. Research shows that even a best application package can meet only 70 percent of the organizational needs. What happens to the rest? An organization has to change its processes to conform to the ERP package, customize the software to suit its needs, or not be concerned about meeting the balance 30 percent. If the package cannot adapt to the organization, then organization has to adapt to the package and change its procedures. When an organization customizes the software to suit its needs, the total cost of implementation rises, the more the customization, the greater the implementation costs. Companies should keep their systems "as is" as much as possible to reduce the costs of customization and future maintenance and upgrade expenses (Bingi et al, 1999).

### 5.4.5 System testing

As the implementation of any application system cannot be realized in a single step, the new functionalities are better tested both alone and in conjunction with the existing functionalities. In ERP implementation, going live on the system without adequate and planned testing is a recipe for an organizational disaster. The testing and validation of an ERP system is important to ensure that the software works technically and that the business process configurations are practical. When business processes are up and running, an important test is of whether the processes described and represented in the application system actually match with the processes taking place in the organization (M Al-Mashari et al 2003).

### 5.4.6 Process management

The existing organizational structure and processes found in most companies are not compatible with the structure, tools, and types of information provided by ERP systems. Even the most flexible ERP system imposes its own logic on a company's strategy, organization, and culture. Thus, implementing an ERP system may force the reengineering of key business processes and/or developing new business processes to support the organizations goals. Redesigned processes require corresponding realignment in organizational control to sustain the effectiveness of the reengineering efforts. This realignment typically impacts most functional areas and many social systems within the organization. The resulting changes may significantly affect organizational structures, policies, processes, and employees. Unfortunately, many chief executives view ERP as simply a software system and the implementation of ERP as primarily a technological challenge. They do not understand that ERP may fundamentally change the way in which the organization operates. This is one of the problematic issues facing current ERP systems. The ultimate goal should be to improve the business, not to implement software. The implementation should be business driven and directed by business requirements and not the IT department. Clearly, ERP implementations may trigger profound changes in corporate culture. If people are not properly prepared for the imminent changes, then denial, resistance, and chaos will be predictable consequences of the changes created by the implementation. However, if proper change management techniques are utilized, the

company should be prepared to embrace the opportunities provided by the new ERP system, and ERP will make available more information and make attainable more improvements than at first seemed possible. The organization must be flexible enough to take full advantage of these opportunities (E.J. Umble et al, 2003).

### 5.4.7 Data accuracy

Data accuracy is absolutely required for an ERP system to function properly. Because of the integrated nature of ERP, if someone enters the wrong data, the mistake can have a negative domino effect throughout the entire enterprise. Therefore, educating users on the importance of data accuracy and correct data entry procedures should be a top priority in an ERP implementation. ERP systems also require that everyone in the organization must work within the system, not around it. Employees must be convinced that the company is committed to using the new system, will totally changeover to the new system, and will not allow continued use of the old system. To reinforce this commitment, all old and informal systems must be eliminated. If the organization continues to run parallel systems, some employees will continue using the old systems (E.J. Umble et al, 2003).

### 5.4.8 Legacy system management

In ERP implementation, existing legacy systems have to be carefully defined and evaluated to determine the nature and scale of problems that an organization may encounter during implementation. It is suggested that if organizational legacy systems are very complex (with multiple platforms and a variety of procedures to manage processes), then the amount of technical and organizational changes required is likely to be high, and vice versa. Indeed, the problem of legacy systems focuses on the fact that in most companies, data are not kept in a single repository, but rather spread across dozens or even hundreds of separate computer systems, each housed in an individual function, business unit, region, factory, or office. Each of these legacy systems may provide valuable support for a particular business task. However, when they are considered in combination, they represent one of the heaviest hindrances on business productivity and performance. It is important, therefore, that an organization

approaches the transition of legacy system carefully and with a comprehensive plan (M Al-Mashari et al 2003).

### 5.4.9 Training and education

Inadequate training has been one of the significant reasons of many ERP systems failure. In ERP implementation projects, despite millions of dollars and hundreds of deployment hours, many projects fail because of the lack of adequate training. A particular challenge in ERP implementation is to select an appropriate plan for end-user training and education. It is however important to stress that the main goal of ERP training should be the effective understanding of the various business processes behind the ERP applications. ERP training should address all aspects of the system, be continuous and based on knowledge transfer principles wherever consultants are involved (M Al-Mashari et al 2003).

Education/training is probably the most widely recognized critical success factor, because user understanding and buy-in is essential. ERP implementation requires a critical mass of knowledge to enable people to solve problems within the framework of the system. If the employees do not understand how a system works, they will invent their own processes using those parts of the system they are able to manipulate. The full benefits of ERP cannot be realized until end users are using the new system properly. To make end user training successful, the training should start early, preferably well before the implementation begins. Executives often dramatically underestimate the level of education and training necessary to implement an ERP system as well as the associated costs. (E.J. Umble et al, 2003).

### 5.4.10 Focused performance measures and ERP Evaluation

Performance measures that assess the impact of the new system must be carefully constructed. Of course, the measures should indicate how the system is performing. But the measures must also be designed so as to encourage the desired behaviours by all functions and individuals. Such measures might include on-time deliveries, gross profit margin, customer order-to-ship time, inventory turns, vendor performance, etc.

Project evaluation measures must be included from the beginning. If system implementation is not tied to compensation, it will not be successful. Management, vendors, the implementation team and the users must share a clear understanding of the goal. If someone is unable to achieve agreed-upon objectives, they should either receive the needed assistance or be replaced. When teams reach their assigned goals, rewards should be presented in a very visible way. The project must be closely monitored until the implementation is completed. The system must be forever monitored and measured (E.J. Umble et al, 2003).

# 6 Empirical study

## *6.1 Results – Haulage Companies*

We have interviewed 20 haulage companies mainly located in Sweden and some in Great Britain. We interviewed owners, people in charge of IT and truck drivers.

### 6.1.1 Haulage companies knowledge about Transport Information Systems

| Question | Answers | | |
|---|---|---|---|
| Do you know what a TIS system is? | YES **93%** | NO **7%** | Not Sure **0%** |
| Do you have a TIS system | YES **85.5%** | NO **14.5%** | |
| Do you use its full potential? | YES **25%** | NO **75%** | Not Sure **0%** |
| Was the TIS a good investment? | YES **100%** | NO **0%** | Not Sure **0%** |
| How long have you had the system? | less than 1 year **8%** | 1 to 5 years **54%** | more than 5 years **38%** |

Table 6.1

As shown in table 6.1 a vast majority of the haulage companies knew what a transport information system was. However, when asked what their definition of a TIS was, we more or less got the same answers with a few exceptions. Some gave more detailed and technical information, while others had a more general knowledge about TIS. Most of the companies knew that it had something to do with communication between the office and the trucks. A tool for fleet management was also a very common answer.

Approximate 86% of the haulage companies interviewed had some sort of TIS installed. The majority had both office and vehicle module, while a few only hade one or the other. Also seen in table 6.1 three quarters of the companies did not use their system to its full potential. One owner said *"we can probably do more with our system, but it's more laziness from our side that we do not use it the way it could be used"*. One head of IT said *"we started off only buying a few modules to help us with our basic needs. But the possibility of upgrading and expanding the system are there"*.

### 6.1.2 Insurance related information and statistics

| Question | Answers | | |
|---|---|---|---|
| Your current insurance company | TRYGG-HANSA **46%** | IF **15%** | LÄNSFÖRSÄKRINGAR **39%** |
| Are the premiums too high? | YES **100%** | NO **0%** | NOT SURE **0%** |
| Tendencies too fewer claims? | YES **0%** | NO **77%** | NOT SURE **33%** |
| Should TIS lead to lower insurance premiums? | YES **15%** | NO **70%** | NOT SURE **15%** |

Table 6.2

All respondents thought the current insurance premiums were too high. Also all were very aware that the premiums had become much more expensive over the last three years.

Most of the respondents believed that the TIS did not have any affect on the insurance claims frequency. The others were not sure. They did not see the connection between having TIS and the possible effects on premiums. However, after explaining our main points why a TIS could help reduce the premiums the majority agreed with us and also thought that a TIS could help them reduce the premiums. (This was only done so we could have a discussion about the subject in matter. It did not affect the statistical result at all since the discussion was done after the main interview questions.) As one owner said *"I think that GPS tracking should lead to a lower premium because of the possibility to track and recover stolen vehicles or goods"*. Another owner said *"especially in certain areas in Europe the GPS tracking comes in handy. Assault and robbery is far more common in the southern and eastern parts of Europe, so having an emergency button or something like that really helps improve the drivers' security"*. Another security issue is road safety. *"Not speaking on the phone anymore while driving makes me concentrate more on the driving itself. Today the communication is made through text messaging. Since it is almost impossible to write and drive at the same time, I have to stop the truck when writing messages"* said one truck driver. *"Many accidents occur when the work load on a specific driver and truck is too high, so a warning that notifies when there is an overload of work would be a preventive way to reduce accidents"* stated one owner.

## 6.1.3 Implementation Issues

### *6.1.3.1 Training and education*

Training on new Transport Information Systems differs much depending on what system haulage companies invest in. Depending in what department the employees are working, the level of training and education differs.

The people who generally provide the haulage companies with training and education are the systems providers and consultant companies. The quality on training the employees varied a lot from company to company. One owner *said "Our supplier had a list of companies who they were implementing systems for, since we are a small haulage company, we were not given the attention needed".*

Training and education on the new system were *"given to all personnel continuous, but all personnel where not involved all at once." states several owners. Another owner says that "the system was so easy; it is only a couple of commands that needs to be learned. We had a brief overlook of the system, and then we just handed out a manual to our employees."*

One haulage company was more sceptical about having too much training on the system in the implementation phase. *"Learning by doing is our way of training the employees; it is not until you make an error you realize you made a mistake"* said a head of IT. Other haulage companies were more careful. *"We were putting all other work a side so that the employees could concentrate more on the new system."* says one owner.

After the system is installed, generally one person is selected in the chosen department to be responsible for further education and training for the rest of the employees. *"We picked one driver to be in charge of educating and informing all the drivers about the system continuously"* said one head of IT.

Some systems require more training for the personnel working at the office and some systems does not affect the driver's in a larger extent. One owner said that *"all personnel got training about the system except the drivers. The drivers just write simple messages with our system, so training for them was not necessary."*

#### *6.1.3.2 Installation difficulties*

Generally the implementation of a Transport Information varies a lot depending on the size of the haulage company, number of customers, back up from suppliers and legacy systems.

When buying a newly design system which haven't been on the market before, "child deceases" are very common. "It took several upgrades before the system worked it was supposed to" said one head of IT who bought a newly designed system from a supplier.

#### *6.1.3.3 Performance evaluation and ROI*

It was shown that performance evaluation is not common in the haulage industry.
*"We bought the system and thought it would be a good investment, but we have not evaluate the system at all"* said one owner.

However there are a few companies that are looking more closely at the costs related to the system. *"We evaluate our systems continuously. We look at our costs"* said one owner.

Several owners are saying that their communication costs are drastically reduced. *"We just see from the accounts that the costs from mobile phone has gone down considerable"*
However, all haulage companies were satisfied with the TIS implementation.

#### *6.1.3.4 Process management*

The work processes in the office and for the drivers are the ones that will change the most. In most cases the change is more in the fashion of making the process easier

than becoming a whole new way of conducting the process. *"It makes life a little bit easier for the operators. 75-80% is calls from drivers with problems. With messaging the office is much quieter, more time to think and organize. A lot of time saving due to messaging"*, says one of the owners. *"There were no changes in the task made by the employees, the point is that it should make it easier and not alter or modify the actual task. Our employees are doing the same tasks as before, but the Transport Information System makes the work tasks an easier tool to work with"*, stated by another owner.

#### 6.1.3.5 Communication

One common problem is the way supplier describe the system and the way haulage companies interpret the main functions of the system. *"The functions that we wanted the system to perform turned out not to be exactly the ones we wanted after the system was implemented. It is safe to say that we had a serious communication problem"*, said one owner.

#### 6.1.3.6 Customization

*"The first few months, we ran the system with a simple configuration, when we felt comfortable we started to modify the system towards our business needs"* said one head of IT.

#### 6.1.3.7 Legacy systems

One problem that many haulage companies had were the transfer of information from the old system into the new system. *"There were problems transferring data from the old system to the new system. The old system had hierarchical database structure which it not supported with modern systems"* said one head of IT. There is often a lot of data that needs to be transferred to the new system. *"It is a major work transferring customer, price and article records. We have 2-3000 customers so it takes a lot of time. "* said another head of IT.

If the haulage company had an old system, there is often a need of having both systems running side by side until the new system is performing desirably. *"We had*

*to run both systems simultaneously because the new system needed new fresh data in order to operate correctly."* said one owner.

### 6.1.4 Reasons for investing in Transport Information Systems

There were several different reasons why haulage companies chose to invest in a Transport Information Systems.

As shown in table 6.3 reducing communication cost was a strong reason for investing in a TIS. *"The foremost reason for buying a Transport Information System was to lower our phone bills"* said one owner.

To reduce administration costs and make the work easier for employees and drivers were another big factor. *"We wanted to transfer written bookings and not oral. This is much easier for the traffic planner because he can send messages whenever he wants and does not have to wait for any response from the drivers. It is the same with the drivers, they don't have to write down the booking, and they can look at the message whenever they want"* states one owner.

Another reason for haulage companies were the price for the system and how well the system fitted into the organisation. Some haulage companies drive locally, while others drive internationally. One owner said *"we only drive locally so we don't need functions such as GPS and Rout planning. For us is cutting down communication costs the most important feature"*.

A lot of haulers drive for larger shipping agents which usually consist of several haulage companies. One hauler who was driving for a shipping agent was forced to get the Transport Information System due to demands from the shipping agent.

One owner had a very clear idée what he wanted out of the system. *"We wanted to see where the drivers were with the help of GPS, also looking at fuel consumption and downloading data hours, text messaging for reducing communication costs, maintenance purposes. We also wanted to use the system as a management tool mainly for accounting purposes. Produce invoices in the end."*

One factor was also looking at the company providing the system. Long experience in the field, and a strong brand were some factors that haulers took into account.

There were also haulers who had an old system and wanted to upgrade to a more modern system.

#### *6.1.4.1 Advantages from having a Transport Information System*

Many of the great advantages with a TIS system are described above. However, after using the system, some haulers found other advantages not thought of when buying the system.

*"The biggest advantage is the reduction of high cell phone communication costs. It is also safer to transfer the information to drivers in text messages, there are many addresses and customers that have similar names, and it is easy to hear wrong names over a cell phone in stressful situations. In text messaging, the driver can look at the message many times and he can respond whenever he has the time"* says one traffic planner.

*"The communication with customers has been heavily improved. We can tell our customers directly where the truck is with the help of GPS positioning."*

### 6.1.5 Driver Integrity

A lot of drivers were sceptic in the beginning about having a system that enables the office to see the exact location of the truck or to see if the drivers were on a break or not. *"In the beginning there were complaints from drivers, they did not wanted to be watched. But today the drivers' only see advantages"* said one owner. Also several drivers agreed to this statement.

Some haulers did not use features that can watch the drivers. “We don’t use the system to look at the drivers driving and rest times. We leave that responsibility to the drivers” said one owner.

Some haulers, especially those from Great Britain use this feature frequently. *“The salary stands for 40 % of our costs, so most companies in this business have problem with drivers who steals time. I would say that 50 % of the drivers are handling the time cards flawless while the rest are handling the timecards incorrect in various degrees”* said one traffic planner.

*“We can not observe all our drivers, I am against supervision, but there are other purposes, for example if I can’t get in touch with a driver. Then I can look in the system and see if they are on a break or not”* said one owner.

### 6.1.6 Summary - gradable questions for respondents

Below are the summarized results from the questions the respondents had to rank from one to seven, where seven was very important for the purchasing decision and where one was not important or not considered when buying the Transport Information System.

| Transport Information System Benefit | Average Score | Rank |
|---|---|---|
| Reduction of communication costs | 5,71 | 1 |
| Overview of the fleet due to GPS | 5,46 | 2 |
| Reduction of administration costs | 5,07 | 3 |
| Optimized route planning | 4,57 | 4 |
| Reduction of fuel consumption | 4,07 | 5 |
| Access to real-time driver statistics | 3,86 | 6 |
| Reduction of insurance premiums | 2,77 | 7 |

Table 6.3

## *6.2 Results - Insurance Companies*

### 6.2.1 Interview response material

We asked insurance companies to rate some features from a Transport Information System, and tell us what they think would be interesting from their point of view for a possible future decision making factor for calculating insurance rates. The features we

have listed are mainly from Volvo Trucks "Dynafleet" system. These questions were answered by personnel from the three major insurance companies in Sweden that insures haulage companies.

**Computerized driver logs according to EU requirements:** Driver's working hours can be registered. The driver can be alerted by a warning signal, both at the office and in the truck, when he is about to pass the maximum time limits for driving or has not had the break that is required. Driver speed can also be logged.

One manager said that *"if this system results in less accidents for that reason, meaning that drivers drive safer because they don't fall asleep or that they are alert, then there will probably be less accidents, but there is nothing that says its going to turn out that way. This could be interesting when we see the effect of it. We would need statistical data before we take this into account in our premium calculations, but if we see such effect, then it would be a good argument to take this into account when calculating premiums"*

One underwriter said that *"if this would have an affect on truck accidents, then it will affect the rates indirect." But there are also problems with a feature like this, there will probably be an easy way to disconnect the system to make extra money. Therefore it is difficult to see the business value for insurance companies with a feature like that. Another problem is morals and ethics. Should we really give discounts to haulage companies for driving legally?"*

Another underwriter was also sceptic about in what extent haulage companies can manipulate these systems. *"One scenario is that already serious haulage companies buy these systems while the other ones don't want to have a logging system like that"* was the underwriters comment.

**Complete the claim cycle more efficiently:** *With the GPS technology the call centre knows exactly where and when the accident occurred, which helps the insurers take control of the vehicle faster, carry out possible repairs with their own vendors, and*

*complete the claim cycle more efficiently. Costs could be cut by reducing the time and resources spent on each claim.*

One insurance manager stated that *"it depends on what information we can get from the truck, but today the claim cycle time isn't any problem for us. A "black box" like they have in airplanes would be interesting to have in the truck, the more information we get, the better it is."*

Another underwriter agreed that the claim cycle for trucks already is effective. *"Trucks are prioritized because they are a category of customer that needs their vehicle in their work."*

One head of underwriting said that it depends on what information insurance companies can get. *"Something that could help us would be if the truck driver could write a notification of damage after an accident and electronically mail it to us."*

**Ambulance and rescue personnel getting faster to the accident scene:** *With an assistance button in the truck, the truck driver can alert a call centre whose task is to forward information directly to either an ambulance or assistance vehicle. Rescue personnel can get the exact location of the vehicle from the GPS unit.*

All of the insurance companies we have interviewed say that a feature like this would be positive, but that it would probably be more positive for the drivers then for the insurance industry in general, mostly because the driver gets help faster. One head of underwriting where sceptic if insurance companies can see a lower accident cost because of this, but he adds *"If the driver gets help faster, then the insurance cost could decrease."*

More than one insurer pointed out that the insurance cost could be cheaper if the driver actually died instead of for example being seriously injured. Paying for disability is more costly over time then paying for death coverage.

All of the insurers agreed that this is a feature that would help haulage companies and would be good for traffic in general.

**Haulage companies can see where every truck is with the help of the Global Positioning System:** *The purpose of this feature is mainly for the traffic planner to be able to make the right decision quickly by ensuring he or she has constant access to the vehicle's geographical position and load status. It could also be seen as a tracking feature that could track stolen vehicles.*

This was a feature that all the insurance companies we interviewed found very interesting. Two insurance companies stated: *"If we can see that a feature like this can reduce stolen vehicles and that the cargo is safer, then this is a very interesting argument for a reduced insurance rate. The faster we can see that a vehicle is stolen, and the easier it is to recover, the better it is."*

One manager did say that *"a GPS is not a bullet proof system when it comes to tracking stolen vehicles. It is easy to shield the GPS antenna, if the truck goes into a tunnel or is driven on to a boat, the signal breaks. There are other systems that can track stolen vehicles better, systems that are transmitting with radio waves."*

Another aspect of this is the personal integrity for truck drivers. The Big Brother syndrome has been and still is a highly discussed question. Not just in an insurance company perspective, but also generally in the society. Legislation could affect the issue of a total surveillance of trucks, states one insurer.

**Crime prevention due to that a Transport Information System is installed in the truck:** *Trucks with a GPS installed can be tracked, which could prevent crimes from happening.*

Generally, the insurance companies are positive towards this. However, they state that it is important that the tracking device is well hidden and cannot be disconnected. One underwriter said *"if criminals know that there is a tracking device in the truck, which makes it possible to track the vehicle, then thieves probably will avoid those trucks in general"*.

Also as with cars one rather brakes in to a car without any security system. As a comparison with cars, the more alarm systems installed, the actual number of stolen vehicles decrease. One manager points out, *"as in the beginning of car security systems people wanted lower rates as well but the problem actually did not disappear, hence they just choose another car and the costs are still there for the company. Only when a greater majority has security systems installed, the actual number of crimes will decrease".*

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**Drivers can get feedback on their driving:** *information that could be an active source of support for the driver in achieving an economical driving style. This reduces fuel consumption and the driver may drive in a safer way due to feedback on driving behaviour.*

Two insurance companies agreed that this feature is built on that haulage companies educate drivers to become a better driver. This would probably reduce the damage frequency on personal injuries, vehicle damages and road accidents.

*"It will probably work well in a couple of months, but haulage companies must have follow-ups and continuously evaluate the routines for these issues"* Said one insurance manager.

They all agree that this could lead to fewer accidents; *"however it is very hard to measure and show that feedback to the drivers actually results in fewer accidents" states one underwriter."* Another underwriter said *"everything that results in decreasing damages is interesting for us."*

**Service diagnostics:** *Haulage companies can get information on how a vehicle is driven, with this information haulers can analyse the driving conditions and service requirements. With the aid of a service plan, haulers can ensure that each vehicle receives the right maintenance at the right time. In the near future there could also be indicators on parts in the truck that automatically sends information to the office if there is something that needs to be changed.*

Swedish Motor-Vehicle Inspection Company (SMVIC) are responsible for doing yearly check-ups on all vehicles, however most insurance companies believe that the number of inspections are to far apart time wise. Also the statistics they get from SMVIC is poor and hard to evaluate.

*"If these systems in the future can keep track of for example brakes and engine components, then it is interesting. Trucks that are driving heavy cargo like timber transports have very high wear and tear on brakes and shafts, and probably need more frequent service than other trucks"* stated one insurance manager.

*"Both trucks and drivers will have fewer damages if the trucks are maintained more regularly. That would lead to safer trucks and fewer accidents caused by faulty or worn parts"* said more than one underwriter.

#### *6.2.1.1 Claim frequencies*

All of the insurance companies stated that the most expensive categories for insurers were: Traffic insurance, damages to the vehicle and personal injuries.

*"Normal traffic accident could be very expensive to us"* said one underwriter and continues. *"One big problem is that drivers fall asleep and drive off the road, but how many that fall asleep are hard to see in the statistics or in the claim report. Truck drivers in this case say that they were trying to avoid hitting a dear or something like that. This affects the statistical data and does not reflect the actual accident scenario."*

One insurance manager said that *"a truck is very expensive, it could cost 3-3.5 MSkr and that does not include any goods. So if the truck is involved in an accident where the truck gets damaged and the driver gets injured, the insurance cost for such an accident is extremely expensive for us."*

Another underwriter added that *"trucks with various kinds of special equipment are a big cost, mainly because parts are hard to get by, and are expensive. The rates are very different if you insure a normal pick-up or a truck with lots of special equipment"*

**Valuable TIS information for reduced insurance rates**

Several insurance managers stated "What will happen is that if the number of claims is starting to reduce, which leads to fewer actual cases, then the rates will become lower. But you can not predict that it will be in a certain way just because the haulers have a TIS system."

All of the insurance companies mean that when the systems in the future will become more common, then the possibility to compare will be there. But they don't think that the profits for the haulers will come from insurance rates. Diesel and other things are features that haulers will save more money from, if they have a TIS system. Several managers stated that *"Haulage companies have very small profit margins. However, it is pretty safe to say that if the trucks are driven in a way to reduce diesel and other costs, then there will be fewer accidents. Driving will become safer. If you drive more recklessly, then diesel, tires and maintenance will become very expensive and more accidents will happen. If there was a way to make sure that there is a difference between haulage companies who have a TIS system and those who don't, then I don't see why that could not be a factor in the underwriting process."*

One insurance manager said *"A problem is that haulage companies are under a lot of pressure. They are supposed to be at a certain place at a certain time. We had a week when everything except trucks was standing still. Airlines, trains had cancelled all their business; however the trucks were still on the roads. That week we had a lot of accident claims, mostly damages to the vehicles."*

Another insurance manager would like haulage companies to take more responsibility; he continues *"when haulage companies negotiate business contracts the main focus is always on the lowest price, which leads to stress. A quality focus all the way from the offer, the deal and lastly the final product is something that haulage companies should be more focused on. With GPS tracking and weather reports it could be positive with a TIS system. A well known problem is over-load of the trucks, for instance like timber. Then roads, trucks and people can get very broken or injured. There is should be much more focus in quality, even from the people who buy the*

*services from the haulage companies, who not only ought to just see the lowest price of the service."*

**Could TIS have an effect on insurance premiums in the near future?**

One underwriter makes a comparison to ABS brakes. *"This was a factor in the underwriting process when they first came out. Now everybody has ABS brakes. ABS brakes were an argument back in the early 90´s to get lower rates because that was when ABS first started to be an option in more expensive cars."*

### 6.2.2 Interview analysis and highlights

| **Question** | Respondents main points |
|---|---|
| Computerized driver logs | Need for statistical data – system manipulation – alert drivers – law abiding drivers |
| Claim cycle time | Prioritized customer segment – one-side information – insufficient information |
| Emergency vehicle response time | Disability costs – level of injuries – benefits for society |
| Tracking device GPS | Level of security – rate of truck theft – truck recovery – alternate systems |
| Crime prevention | Rate of truck theft – choice of truck stolen – deterrent – propagation of systems installed |
| Feedback to drivers | Driving habits – accident rate – continuous education |
| Service diagnostics | Government controlled inspection – part maintenance – system indicators |

Table 6.4

# 7 Discussion

## *7.1 Discussion – Haulage Companies*

### 7.1.1 Business value for haulage companies when buying TIS

As shown in table 6.1 every haulage company that we spoke with are satisfied with their Transport Information System investment. Bingi et al (1999) speaks about the organisational change that an ERP implementation causes. The same reasoning could be applicable to investing in a TIS. Bingi points out that implementing an ERP causes massive change that needs to be carefully managed to reap the benefits of an ERP solution. Critical issues that must be carefully considered to ensure successful implementation include commitment from top management, reengineering of the existing processes, integration of the ERP with other business information systems, selection and management of consultants and employees, and training of employees on the new system. A successful TIS project can reduce operating costs, generate more accurate demand forecasts, speed production cycles, and enhance customer service, all of which can give a haulage company a lot of savings and a better position on the market.

After analyzing five different Transport Information Systems, with most focus on Volvo Trucks “Dynafleet”, we saw various benefits that the systems could give a haulage company. Having the insurance companies in mind and what they might need to have a closer relationship with the haulage companies, we choose the features and benefits listed below.

- **Reduced communication costs**

  Instead of speaking to the driver most systems have now a text based communication between the office and the trucks. In the literature Lonzinsky (1998) points at the importance of employing new technology to keep pace with or outdo competitors, he means that the exchange of information should be done electronically in order to decrease costs. Almost all of the haulers saw a big reduction in phone costs after buying a TIS. The costs for sending text messages are much lower than cellular phone calls, hence lower communications costs are

shown rather fast. This feature was the most important feature according to the interviewed haulage companies.

- **Information accuracy improvements**

Davenport (1998) stresses the importance of focusing on having access to real time operating information. With an ERP system, management base their decisions on information from one source instead of collecting information from different system which can be very time consuming, and the information may not be accurate and/or outdated. A TIS uses text-based communication which reduces the risk of misunderstanding. With text messages the driver can go back and look at previous messages until he/she deletes the message. The driver does not have to call back and ask for previous information since the data is stored in the truck. Confusing and similar names of cities and addresses are eliminated when sending messages in plain text. The possibility to send a confirmation to a received message with the system helps improve the companies overall quality of information flow. Knowing that the message was received is crucial for traffic-planners to effectively do his/her job.

- **Tracking and tracing**
  - Roadside assistance

    Trucks that are equipped with an assistance button can get help faster. When pressing down the assistance button an assistance request and details of the vehicle's position is send directly to the haulage company and in some cases to the systems providers call centre. From this information service vehicles and rescue personnel can be send out to the location immediately. This feature was not often used, but the haulers that had this feature felt that it was an extra security feature which made them feel safer.

  - CRM - customers and suppliers get location information.

    Investing in TIS could strengthen haulage companies' relations with customers. M Al-Masahari (2003) speaks about enhance customer satisfaction. Customers can get access to real-time information about the status of their loads. The customer gets a better level of service and they do

not have to call the traffic planner for information about their goods. Many haulage companies said that the communication with customers had been heavily improved, mostly because the customer could get information exactly were the truck where with the help of GPS positioning.

- Own routing improvements- maps

With maps the traffic planner can keep track of the company's trucks from a computer screen at the office. This makes it easier to plan and coordinate transports.

- **Overview of drivers work schedule in real-time**

Drivers working hours can be registered according to EU requirements. This would help the office with a more accurate wage calculation, and can also warn both the driver and the office if the driver has exceeded the driver time. This helps drivers and traffic planners to comply with EU rules for driving times which could lead to reduction in fines for haulage companies.

- **Reduced administration costs - more time for other tasks**

Reports on working hours are important for haulage companies. Automatic reports on working hours can save money through reduced administration costs. Also, due to fewer phone calls made to the trucks the environment improves both at the office and in the truck. The noise level at the office is reduced and work at the office is being done more effectively due to the planning of dispatching orders to drivers whenever the traffic planner has the time.

- **Reduced fuel consumptions**

By looking at reports on fuel consumptions, average speed and distance driven. Haulage companies can reduce fuel consumptions. Some of the systems make it also possible to set limits how the personnel should drive the trucks. The system shows how often or how long a certain vehicle was driven above the set maximum speed or if it was driven too hard.

### 7.1.2 Implementation

After analyzing the implementation issues with TIS, one can find many similarities with ERP implementation. Customisation, training, system testing and legacy system management are issues where the interviews showed that TIS is very alike ERP and the various issues one must look into when implementing a new module based system such as a TIS.

As M Al-Mashari et al states it is important that training should address all aspects of the system. The interviews show that this varies a lot. There could be several reasons for this. Some systems are easier than others to learn. The consultant companies who install the systems may have different approaches to how much time they will give the personnel in training and education. Since haulage companies are a bit of an old fashioned type of organization and IT solution are not that common, it is really important that the personnel are given the proper training and education to really make sure that the new installed system can be utilized in a way that it is supposed to.

### 7.1.3 Insurance related issues

After the survey was done it was clear that all the haulage companies wanted to lower their insurance premiums. Over the past few years the premiums have increased between 30 percent and 100 percent. When looking at the total cost for operations for a haulage company, insurance premiums “only” are between 2 percent and 4 percent. However, margins are very low for the remaining factors of operating costs, which make insurance premiums one factor to try and influence. All participants thought that the premiums are too high and that these large increases during the last years have hit them hard. With 86 percent of the participant having a TIS, but only 15 percent of those thinking the systems should lead to a lowered insurance premium, it is clear that they have not yet realised what their investment might add to the company in the future.

## 7.2 Discussion – Insurance Companies

### 7.2.1 Survey question analysis

**Computerized driver logs according to EU requirements:** *Driver's working hours can be registered. The driver can be alerted by a warning signal, both at the office and in the truck, when he is about to pass the maximum time limits for driving or has not had the break that is required. Driver speed can also be logged.*

Insurers need to see statistical data before they can take driver loggings into account when calculating premiums. They must see an effect that driver loggings really increase traffic safety. Even if insurers get the statistical data they need, today they are uncertain if it would affect the accident outcome.

One big issue was if drivers and haulage companies could manipulate these systems. Since the profit margins for haulage companies are very low, insurance companies fear that manipulations of systems like this could be, or are very common. The issue of morals and ethics also plays a big role. As one insurer pointed out "Should we really give discounts to haulage companies for driving legally?"

If they see a positive effect, then driver loggings would be a good argument for lowering insurance premiums for haulage companies.

**Complete the claim cycle more efficiently:** *With the GPS technology the call centre knows exactly where and when the accident occurred, which helps the insurers take control of the vehicle faster, carry out possible repairs with their own vendors, and complete the claim cycle more efficiently. Costs could be cut by reducing the time and resources spent on each claim.*

Insurers mean that haulage companies already are a prioritized customer group. Because, trucks are needed in the daily work of haulage companies, they get assistance quicker then other customer segments. The claim cycles for trucks are according to insurance companies already effective.

One problem facing the damage investigation is that the information they might get from an accident scene is not as comprehensive as they would like. Even though the truck might have GPS and can give valuable information the seconds before the accident, the other vehicle or vehicles might not. A “black box” would be of interest for insurance companies so that they can evaluate the entire accident scene. The problem still is that all vehicles, both trucks and cars, need a “black box”. This information would give insurers comprehensive data of what actually happened during an accident.

An option wanted from one insurer was an electronic transfer of damage notification send directly after an accident from the truck to the insurance company. This would reduce the claim cycle time for insurance companies.

**Ambulance and rescue personnel getting faster to the accident scene:** *With an assistance button in the truck, the truck driver can alert a call centre whose task is to forward information directly to either an ambulance or an assistance vehicle. Rescue personnel can get the exact location of the vehicle from the GPS unit.*

*An additional feature is an automatic message which is sent to a call centre triggered by an airbag being deployed. If no response is given, rescue personnel are sent out to the location.*

Insurers mainly saw this feature as a benefit for society as a whole. The financial outcome for insurance companies could be both positive and negative. Faster treatment and earlier rescue could lead to less severe injuries which lead to less cost. Due to the fact that insurance companies are doing business the way the do, and how the insurance coverage is setup, there is a possibility that they would have to pay more money for disability rather than an accident with a fatal outcome.

**Haulage companies can see where every truck is with the help of the Global Positioning System:** *The purpose of this feature is mainly for the traffic planner to be able to make the right decision quickly by ensuring he or she has constant access to*

*the vehicle's geographical position and load status. It could also be seen as a tracking feature that could track stolen vehicles.*

One issue pointed out was that a GPS system is relatively easy to make non functional. The satellite signal of a GPS becomes vulnerable when for example driving into tunnels, garages or on to a boat. Covering the antenna with aluminium foil could be enough to block out the signal. If the system would be 100 percent fool-proof then it would be an argument for most insurance companies.

Two of the underwriters mentioned other tracking systems that are more reliable. These tracking systems use radio wave technology either in a passive or active way.

The underwriters believe that the number of stoles trucks will become less with tracking systems installed. The insurance companies are generally very positive towards tracking systems and believe that this could be a good argument for reducing premiums in the future. However, the underwriters believe that haulage companies might be reluctant to install tracking systems due to the truck driver's personal integrity.

**Crime prevention due to that a Transport Information System is installed in the truck:** *Trucks with a GPS installed can be tracked, which could prevent crimes from happening.*
Insurers believe that criminals generally avoid trucks with tracking and alarm systems installed, because of the extra risk it generates. They also mention that a system which automatically sends a signal to a call centre when a lock or window is broken could be a crime preventing feature.

The underwriters pointed out that compared to cars with alarm systems installed, an actual reduction of stolen vehicles was first evident after a greater majority had systems installed. They believe that this will also be true for trucks. They think that crime preventing features will have a positive effect on stolen vehicles, which eventually will either eliminate or reduce damages caused by theft.

**Drivers can get feedback on their driving:** *information that could be an active source of support for the driver in achieving an economical driving style. This reduces fuel consumption and the driver may drive in a safer way due to feedback on driving behaviour.*

Insurers mean that if haulage companies educate the drivers to drive more efficiently, then this would probably reduce the damage frequency on vehicle damages, road accidents and personal injuries. Insurers say that haulage companies constantly must give feedback to drivers to maintain safe driving habits.

**Service diagnostics:** *Haulage companies can get information on how a vehicle is driven, with this information haulers can analyse the driving conditions and service requirements. With the aid of a service plan, haulers can ensure that each vehicle receives the right maintenance at the right time. In the near future there could also be indicators on parts in the truck that automatically sends information to the office if there is something that needs to be changed.*

Insurers would like to see more regular inspections from Swedish Motor-Vehicle Inspection Company (SMVIC) to ensure truck safety. Today, insurers get inadequate information and statistics from SMVIC.

Insurers mean that it is positive with advanced systems that indicate when parts are starting to wear out. They mean that indicators like this would lead to safer trucks and fewer accidents caused by worn out parts. Both trucks and drivers would be safer if the trucks are maintained more frequently. It is also said that driving distance and driving habits are important factors that affects the wearing of parts.

### 7.2.2 Calculations on insurance rates

It is shown that haulage companies can in most cases negotiate with insurance companies. Only one insurance company clearly states that they do not negotiate with haulage companies. Insurance companies also have a standard price list when they calculate premiums for haulers. Insurers say that the fewer vehicles a haulage company has the closer to the price list they get.

It is shown that there are many different types of factors that insurance companies include when calculating premiums for haulers. Both the number and kind of factors are different for each insurance company. Some of the premium factors that all insurance companies use are: Brand and make of the truck, Miles driven per year, Truck size and Truck value.

Historical data is also an important part of the underwriting process. This data gives the underwriters a solid base for establishing an accurate premium for the haulage company. The more data they have about a company the more fair the premium will reflect the imposed risk.

# 8 Conclusion

Our study has shown that all haulage companies interviewed where satisfied with their Transport information system. All modules that we have listed were not used in every Transport information system used by the various haulage companies. The haulers usually picked out the modules that would be useful for the organization. We believe that haulage companies bigger than five trucks and not only driving locally will benefit from investing in a Transport information system. We think that a haulage company should implement a TIS gradually, meaning that the company should choose the modules that are necessary for the moment and then, after running the system for a couple of month, upgrade the system if necessary. However, if the company already has a high IT maturity and that management has a well defined plan of what they want the system to do, we see no reason not to invest in a full scale TIS solution initially. We are also of the opinion that investing in a TIS should be thoroughly well thought-out.

According to the haulers interviewed, the module that were the most beneficial for the company were the reduction in communication costs. Instead of phone calls the communication between the truck and the transport coordinator is sent by SMS. This was also beneficial in the matter that misunderstandings were reduced.

When discussing the insurance aspect of this thesis, most insurance companies where not willing to lower the premiums for haulers who had a transport information system at this moment. The main reason for insurance companies was that they needed to see statistical data that showed a decrease in insurance claims for haulers that could be associated with TIS. We think that a closer relationship between insurance companies, haulage companies and TIS suppliers would be needed for premiums reductions, and that also generates increased traffic safety and more effective systems. We believe that a positive development between the involved parties can lead to a successful cooperation. The suppliers can develop modules that would help the insurance companies to calculate fair premiums for the haulage companies, and the suppliers get another selling argument why haulage companies should invest in their system.

We think that a Transport information system will give haulers a lower premium within a few years. All three major Swedish insurance companies stated that they are likely to lower the premiums with information from TIS. As an historical comparison where a technological invention has affected insurance premiums is the ABS brake system. ABS brakes did not give a decrease in insurance premiums when it first was introduced. A couple of years later, insurance companies saw statistical data that ABS brakes had an effect on insurance claims. Now it is standard for all insurance companies to give a reduction in insurance premiums if having ABS brakes on the vehicle. Another argument for that transport information systems will have an effect on premiums in the future are that big insurance companies in UK and US are now using telematics for calculating premiums. UK's largest insurance company, Norwich Union are now testing a pilot project that will use telematics to determine when, where and how often vehicles are driven and calculate premiums accordingly.

We also believe that the modules discussed in the thesis could decrease the insurance premiums. For this to happen, we believe that haulage companies and insurance companies must gather statistical data that shows possible fewer insurance claims related to the Transport Information System.

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