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BUSINESS SCHOOL

FINAL THESIS REPORT

**USING WEB APPLICATIONS FOR IMPROVED CUSTOMER SERVICE IN
LOGISTICS**

Case study: Freight Calculator for Russian Cargo Service Oy

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ABSTRACT

To further improve its customer service, Russian Cargo Service Oy created a new web application, Freight Calculator on its website. This new service allows customers to calculate freight prices from location to location, for groupage transportation from Finland and other European countries to Russia, and to place an order directly online. Freight Calculator will be used not only by customers, but also internally.

The goal of the thesis is to find out what is the perception of the customers about this new service, how useful they find it, how willing they are to use it and how well pricing can be automated for customized logistics services, how well the service is covering the needs of the customers and how accurate are the prices from the calculator. Secondly the aim is to find out how Freight Calculator affected company operation, did it bring efficiency and enhance business, and finally also how is it used for internal purposes.

Company's goals were set with this new application to speed up their service, make day to day cooperation with customers more efficient and create more value for customers.

This is a rather new software that is not yet widely used.

I was collecting data from customer contacts for a period of five months, interviewed personnel and management of the company and analysed results of an online questionnaire that was targeted to the users.

The project overall was a success. Calculator has been technically reliable, producing accurate prices and customers and employees have found it easy to use. It is shown that that pricing can to some extent be automated in customized logistics services. The adaptation of the service by customers has been slightly slower than expected, but the experiences of use have been positive. The company has achieved improved customer service, efficiency gains and positive contribution to business growth. However, as in any IT project, a number of suggestions for improvements and further development was found and are presented in this study. Customers needs have been reasonably well covered and some improvement can be done with small efforts. In internal use the calculator has been working satisfactorily.

Keywords: customer service logistics web application Russia

Preface

It was a great pleasure for me to have my work placement in this fine company and even more I enjoyed the chance to stay to work on the project that became the core of my thesis. Since the first day I felt that this is the company I would want to work for. First of all I would like to thank the CEO of the company for giving me this great chance to apply the skills and knowledge that I gained at TAMK in real working environment, and also for the constructive criticism during my first steps of working in logistics. I learned so much in practice and continue learning, gaining experience every day. Finding the subject for my thesis was to great extent thanks to the CEO. I would also want to express special thanks to the Sales manager with whom I closely work every day, for sharing his knowledge and ideas and for all the interesting discussions that very much contributed to writing this study. I want also to thank all the colleagues in the company, who were taking part in the employee interviews and patiently answering my endless questions.

Table of contents

Preface	3
Table of contents.....	4
1 Introduction of the case company, the research problem and methodology	6
1.1 Russian Cargo Service Oy	6
1.2 Research problem	7
1.3 Research methodology	8
2 Logistics.....	9
2.1 Definitions of logistics	9
2.2 Description of logistics process.....	9
2.3 Significance of logistics	11
2.4 Transportation logistics	12
3 Customer service.....	14
3.1 Customer service definitions	14
3.2 Customer service elements	14
3.3 Significance of customer service.....	15
3.4 Measuring customer service in logistics.....	15
3.5 Logistics customer service	15
4 Trade and transportation between Finland and Russia	16
4.1 Russia as trading partner to Finland	16
4.2 The role of SMEs.....	17
4.3 Problems in trade.....	17
4.4 Re-exporting to Russia	18
4.5 Transit freight	18
5 Web applications.....	20
5.1 Definition of web applications	20
5.2 Track and Trace.....	20
5.3 EDI	21
5.3.1 Definition and standards	21
5.3.2 Purpose of EDI.....	21
5.3.3 EDI's role in customer service	22
5.4 RFID	22
5.4.1 Characteristics of RFID.....	22
5.4.2 Applications for RFID.....	24
5.5 Example of a logistics company providing web based services; Wim Bosman	25

5.5.1 Transport quotation request.....	25
5.6 Online marketplace for transportation.....	26
5.7 Calculators in logistics	26
6 Freight Calculator	27
6.1 Introduction of the calculator	27
6.2 Purpose of implementation of the calculator.....	28
6.3 Functions of the Freight Calculator.....	28
6.4 Administration Console.....	30
7 Case Study Research.....	31
7.1 Questionnaire to users	31
7.2 Interviews inside the company	33
7.2.1 Interviews of Forwarders, Forwarding assistant, Office manager, Accountant... 33	
7.2.2 CEO and Sales Manager interviews.....	33
8 Conclusions and suggestions	35
List of abbreviations	37
Terminology.....	38
Bibliography	41

1 Introduction of the case company, the research problem and methodology

1.1 Russian Cargo Service Oy

Russian Cargo Service Oy is a privately owned forwarding company specialized in groupage transportation to and from Russia and CIS-countries. Company's special key competence is daily door to door groupage deliveries in both ends of transportation link. Russian Cargo Service (later RCS) provides all - round transportation services between Finland and Russia.

RCS was established in 1998. From the very start, their business idea has been to create a flexible and fast chain for parcel services between Finland and Russia. As a result, today RCS dispatches parcelled-freight trucks from Vantaa terminal every day to St. Petersburg and twice a week to Moscow. At both ends of the chain, company can also operate on a door to door basis, if the customer so wishes.

Company provides its customers all kind of logistics services like import and export clearance, terminal handling, truck documentation, warehousing, consolidation of air cargo and sea freight and customs clearance in Russia. Company offers terminal and customs services for transportation in Finland and Russia using road, air or rail transport. Company has extended its Russian coverage to more than 60 destination cities where they can deliver parcel services and groupage freight.

As an independent and flexible operator, RCS cooperates extensively with many international and local haulage companies. The company serves many international forwarding agents, Finnish forwarding agents, Russian importers and forwarding agents and direct exporters from Finland, Scandinavia and all parts of the world. RCS advertises itself as 'the key link in the supply chain of transportation of cargo from around the world to Russia by transit through Finland'.

Company employs more than 20 professionals who have extensive know-how in forwarding to Russia. At present company has two customs bonded terminals in Finland, the Helsinki and Lappeenranta terminals, which act as interchange points for transportation to Russia and other destinations.

Company's advantage is very good knowledge of special conditions of Russian transport environment. RCS has good partners in Russia with whom they have been working successfully already for many years. As a privately owned mid-size forwarding company RCS is an ideal neutral partner for any international or domestic company dealing in Russia.

1.2 Research problem

There were plenty of reasons why the company wanted to install a new software called Freight Calculator.

- Information about the rates is located in separate files, separate e-mails, causing delays.
- Freight rates are changing all the time.
- Different clients have different kind of approach. It is very often the case that a customer makes changes or additions into the order requirement after the freight price calculation has already been made and a tender has been submitted. This also causes delays and inefficiencies.
- RCS has a significant number of partner companies. The number of existing customers is quite big and new customers are gained continuously, therefore the amount of offer requests is increasing. Very often personnel of the company is not able to respond accordingly and in due time to customer requests.
- It takes time for company employees to calculate freight price at request of the customer. To calculate prices correctly they also need knowledge as calculations can be complicated. Not all employees have sufficient knowledge for making the quotations and mostly the rates are given by the sales manager of the company. When a customer has the need, very often he can not get the freight price quotation immediately, which can influence the ordering decision and also slows down the business processes.

Freight Calculator is expected to be a useful tool for the company. With the calculator customers can make their decisions about ordering the transportation faster, without the lag that is caused by manual handling of the request, which may sometimes take a long time.

Second desired advantage is availability of information. Information will be available in one place and easy to access by the customer and company employees.

Third big advantage calculator is supposed to bring is that it will save time and speed up the business processes. Company will save the cost of working time used by personnel to prepare the quotations. One more benefit should be that calculator is meant to be a useful tool also for internal use, for company's employees as everyone within the company has access to it.

The goals set for the thesis are:

1. To find out what is the perception of the customer about the new service. How useful they find it, how willing they are to use it and how well pricing can be automated for customized logistics services? How

well the service is covering the needs of the customers and how accurate are the prices from the calculator? How customers feel about the service?

2. How the price quotation process can be improved?

3. How it affects company operation. Will the company become more efficient? Will it reduce working hours used for tender calculations and processing the orders? Is the company able response more quickly for customers' requests? My task is to evaluate the changes in processes, find out whether the company achieves improvements, whether web application actually brings the expected benefits and to measure to what extent these targets are met.

4. How beneficial will the new web application be in internal use?

5. To measure how well calculator is working, how accurate and reliable it is. Does it increase or decrease the occurrence of errors?

6. Try to estimate if the calculator really contributes to increasing business. Does the company get more business from the existing customers?

7. To give suggestions for improvement and further development of the service.

1.3 Research methodology

I would classify my research methodology as action research. I was participating in a project that was aimed to change the business process of a company. I was following the progress of the project closely as I was working in the sales department. I had constant communications with the customers and I was keeping a log of all the relevant contacts I had with customers concerning the use of the calculator. The research problems in this thesis were mostly analyzed with qualitative research methods. There was an online questionnaire for the customers placed on the website with the calculator. The employees of the company were interviewed to learn about their own experiences with the software as well as about the perception they have got about customer response. With interviews of the CEO and sales manager I aimed to find out how the calculator has affected the company's business process. I then analysed these interviews and contact records separately to make conclusions about the success of the project and to make suggestions for further actions and development. I also tried to estimate how well the views of the different parties are aligned. Quantitative methods were used very limitedly. Only the online questionnaire provided data that could be measured.

2 Logistics

2.1 Definitions of logistics

Logistics is often defined as a very wide concept comprehensive of many of the functions within a company. "Business Logistics - The science of planning, design, and support of business operations of procurement, purchasing, inventory, warehousing, distribution, transportation, customer support, financial and human resources." (Cox 1997)

Other definitions emphasise the information and control aspects of logistics. "Business Logistics is defined as a business planning framework for the management of material, service, information and capital flows. It includes the increasingly complex information, communication and control systems required in today's business environment." (Logistix Partners Oy 1996)

Logistics is considered to derive its roots in the military. US Department of Defence defines logistics in its dictionary as "The science of planning and carrying out the movement and maintenance of forces. In its most comprehensive sense, those aspects of military operations that deal with: a. design and development, acquisition, storage, movement, distribution, maintenance, evacuation, and disposition of material; b. movement, evacuation, and hospitalization of personnel; c. acquisition or construction, maintenance, operation, and disposition of facilities; and d. acquisition or furnishing of services." (Department of Defence Dictionary of Military and Associated Terms 2006:317)

2.2 Description of logistics process

Logistics is a much wider concept than the physical movement of goods and information throughout the supply chain. Logistics concept implies astonishingly a variety of functions and disciplines such as: the process of planning, purchasing, demand forecasting, inventory control, warehousing and storage of goods in rest or in motion, order management and processing, planning and implementing the efficient flow of information and materials for the purpose to conforming to the customer requirements. Logistics notion also implies inbound, outbound, internal and external operations, return goods handling and also after sales services, traffic and transportation.

Logistics is flow of information, goods and money. As described in figure 1, goods are moving in the logistics chain from suppliers through manufacturers to customers and in return of the goods provided, payments of money are flowing to the opposite direction. For the process

to work, information must constantly be flowing to both directions between participants of the logistics process.

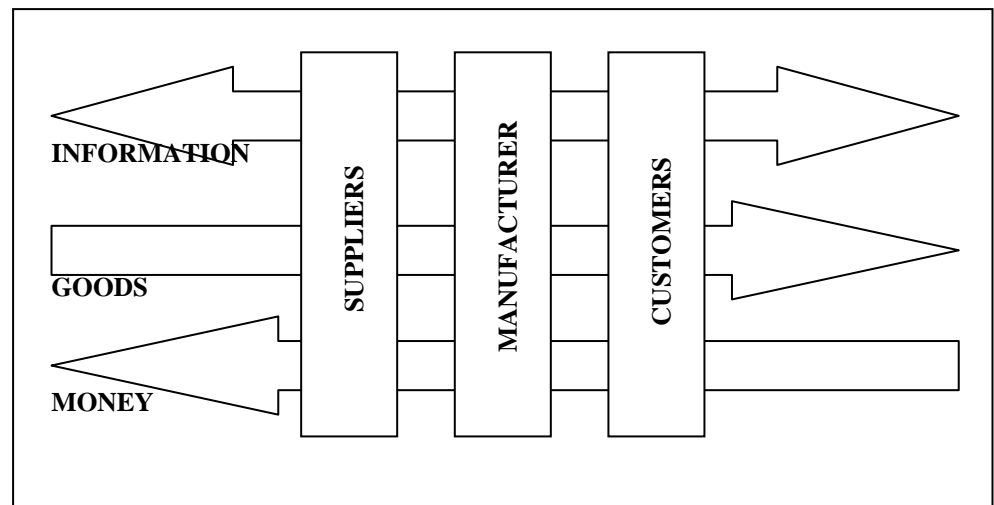


Figure 1. Logistics process. (Sakki 2001:11)

In integrated logistics, the costs of supply, manufacturing and distribution are considered to be interrelated and interdependent. Hence, costs related to logistics, such as ordering, inventory, transportation and customer service have an influence on each other. For example decreasing the transportation costs by using a slower mode of transportation increase the inventory costs, as the goods need to be held in inventories for longer time. (Copacino 1997:8-9)

Therefore for the company to achieve its goal and use logistics efficiently, it should integrate the logistics functions (order management and processing, warehousing, material handling and the facility network). Since the functions are integrated, the decision made in any of the functions effects the cost of all the other functions. (Bowersox 2002:37-39)

Illustration of the interrelationship of functions in logistics is presented in figure 2.

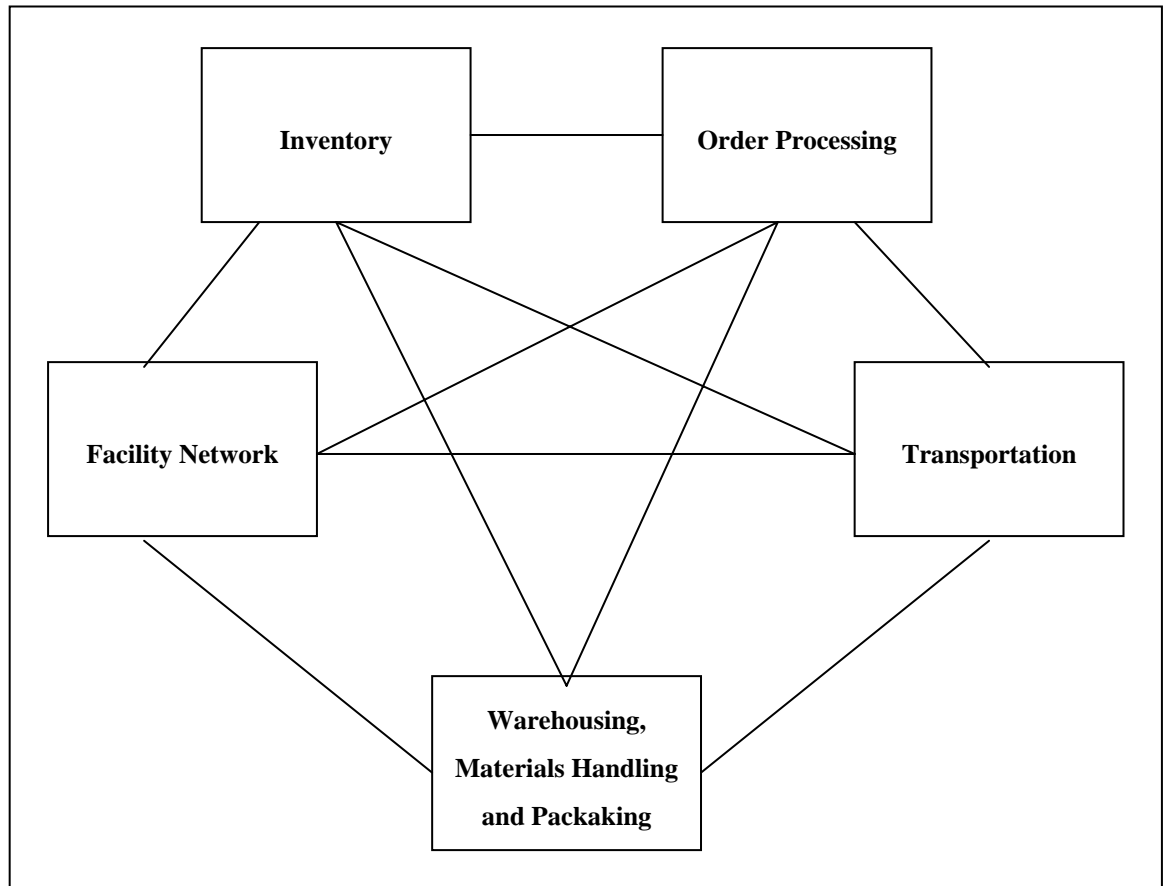


Figure 2. Integrated logistics. (Bowersox 2002:37)

2.3 Significance of logistics

Ballou considers value creation to be of essential importance in logistics. Logistics is about creating a value to all participants of the supply chain, whether to a customer, supplier or company stakeholders. (Ballou, R. H. (1999:11).

The total customer value is raised by all the activities in the value chain. The total value that the value chain is able to create equals to the amount the customer is willing to pay for the final product or service. Competitive advantage is created by the company's superior ability to optimize the total value compared to the other companies in the market. (Porter 1998:40-42)

Logistics value is expressed in the managing the transportation and information flow of goods in a way that it reaches a customer in timely

way, at the right place, in the desired condition and in the required quantities, to get the goods in a possession of a customer when he so wishes while making the greatest contribution, minimising the total costs. If the goods are not maintained at the time and place required by the customer, they do not meet the demand of customer and loose it's value. Efficient logistics management cares about adding value in each element of the supply chain. (Ballou. 1999:11)

Ballou (1999), states that logistics activities provide the bridge between production and market locations that are separated by time and distance. Therefore efficient management of these activities is of key importance to businesses today. Well developed and efficient logistics systems are a prerequisite for international trade. According to basics of market economy regions and people should specialize to goods, which they can produce most efficiently compared to other regions. Logistics enables businesses to efficiently locate production according to this principle. Logistics has a key role in trade and it contributes to a higher economic standard of living. (Ballou. 1999:4-5)

Efficient logistics contribute to the globalization phenomenon that is ongoing. As economies around the world become more open, production of goods is increasingly concentrating and the role of transportation is also gaining importance.

2.4 Transportation logistics

Transportation usually represents the most important single element in logistics costs for most firms. Freight movement has been observed to have absorbed between one-third and two-thirds of total logistics costs. Transportation is essential in creating a high level of economic activity. (Ballou 1999:135).

Evaluation of transportation services can be made in terms of characteristics that are basic to all services: price, average transit time, transit time variability and loss and damage. Pricing of the transport service in the basic form is based on the line-haul rate for transporting goods plus any accessorial or terminal charges for additional services provided. Additional services may include e.g. pickup at origin, delivery at destination, insurance or preparing of goods for shipment. (Ballou 1999:138)

There are various modes of transportation such as, rail, truck, air, maritime and pipeline. In this paper I will concentrate more on truck or road transportation as it is relevant to the case study of the thesis.

Rail is the preferred mode of transportation mainly for raw materials and low-valued manufactured products when shipment sizes of at least a full carload are used. Rail is competitive especially for heavy cargoes and bulk goods that are transported over long distances. Additional loading and unloading costs, slowness and lack of flexibility are disadvantages of rail transport.

In contrast to rail, trucking is a transportation service of semi-finished and finished products. Also, trucking moves freight with smaller average shipment sizes than rail. The inherent advantage of trucking is its door-to-door service so that no loading or unloading is required between origin and destination, which is often needed in rail and air modes; its frequency and availability of service; and its door-to-door speed and convenience. (Ballou 1999:143)

Air transportation is being considered by increasing number of shippers for regular service, even though air freight rates exceed those of trucking by more than 2 times and those of rail more than 16 times. The appeal of air transportation is its unmatched origin – destination speed, especially over long distances. But this speed is not directly comparable with that of other modes because the times for pick up and delivery and for ground handling are not included. All the time elements of separate phases of the whole delivery chain must be combined to represent door-to-door delivery time. Because surface freight handling and movement takes a considerable amount of time in air transportation, overall delivery time may in the end be so long that a well managed truck and rail operation can match the schedule of air. Of course this depends on the particular cases. (Ballou 1999:143)

About 80% of all of the World's international trade is carried on the Oceans. The growth of industrial potential, strengthening of economic ties between different continents and the increase of the volume of world trade is continuously increasing Ocean cargo transportation. (UN Atlas of the Oceans)

Modern distribution trends have led to a huge increase in part load and small consignment traffic. RCS provides international and domestic groupage, part-load and full-load transportation of the consignments through the developed network of foreign partners all over the world.

3 Customer service

3.1 Customer service definitions

Customer service, when utilized effectively, is a prime variable that can have a significant impact on creating demand and retaining customer loyalty. (Kyj and Kyj 1994:41).

Logistics customer service for many firms is the speed and dependability with which items ordered [by customers] can be made available. (Heskett 1994:4)

3.2 Customer service elements

Elements of customer service have been identified according to when the transaction between the supplier and the customer took place in a comprehensive study, sponsored by the National Council of Physical Distribution Management. These elements are grouped into categories of pretransaction, transaction and post-transaction as shown in figure 3. (Ballou 1999:81)

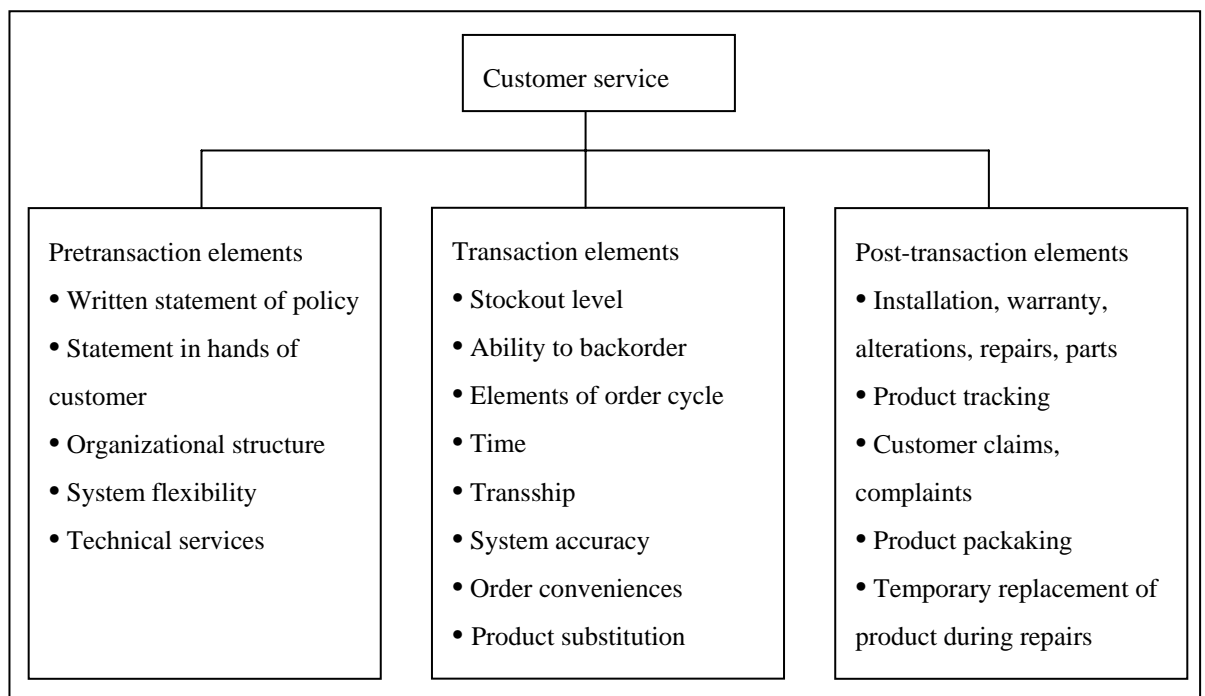


Figure 3. Elements of Customer Service. (Ballou 1999:82)

3.3 Significance of customer service

Exceptional customer service reaps the benefits of customer satisfaction, loyalty, and increased sales. Customer service is often included in companies' mission statements as it is a goal that concerns the organisation. Customer service is complex, comprised of multifaceted elements, which each have effect on satisfaction. For managers information about this effect is important, so that they can allocate the limited resources to the most critical customer service elements. Customer service is recognized as important topic by logistics researchers. (Emerson, Grimm & Curtis 1998)

3.4 Measuring customer service in logistics

Emerson, Grimm and Curtis used four logistics measures to evaluate general set of activities undertaken by a supplier to provide logistics services. Three of them, percentage of order filled, order cycle-time consistency, and accuracy of orders shipped, are associated with product flow and can be thought of as a source of competitive advantage. The fourth, order status information, gives the customer timely, accurate, information about the location of each order in the cycle. (Emerson, Grimm & Curtis 1998)

3.5 Logistics customer service

Price, quality and service are what customers of a company observe. Customer service can be thought to include numerous elements from product availability to after sale maintenance. From a logistics perspective, customer service is the outcome of all logistics activities or supply chain processes. Therefore the design of the logistics system sets the level of customer service to be offered. The profit of the company depends on revenues generated from sales and the costs associated with the system design. Decision about the level of customer service plays a key role in company's efforts towards meeting its profit targets. (Ballou 1999:80)

4 Trade and transportation between Finland and Russia

4.1 Russia as trading partner to Finland

Russia is again about to become the most important trading partner with Finland. In the year 2005 it was already close to surpass Germany with a 12% share of Finland's foreign trade. In exports Russia already held the top position with a share of 11%. In imports it had a share of 14% making it the second largest market. Exports to Russia have been growing at a very rapid pace during this decade as Russia has been benefiting of the high energy prices, which has boosted both consumption and investments. This is illustrated in figure 4. On average exports have grown by 25% annually. Finnish imports from Russia have been growing quite slowly in volume in recent years. However, value of the imports has grown on average by 20% annually this decade as bulk of the imports are energy and raw materials, which both have seen strong price increases. The structure of Finnish exports to Russia is very different from Finnish exports to other regions. Traditionally strong Finnish export products are paper and metal products, but Russia does not have much need for importing these products. Instead Russia is importing from Finland machinery, vehicles, electrical and optical equipment, chemical products and foodstuffs, although partly this reflects re-exports. The development in the structure of Finnish exports can be seen in figure 5. (Ollus and Simola 2006:25-27)

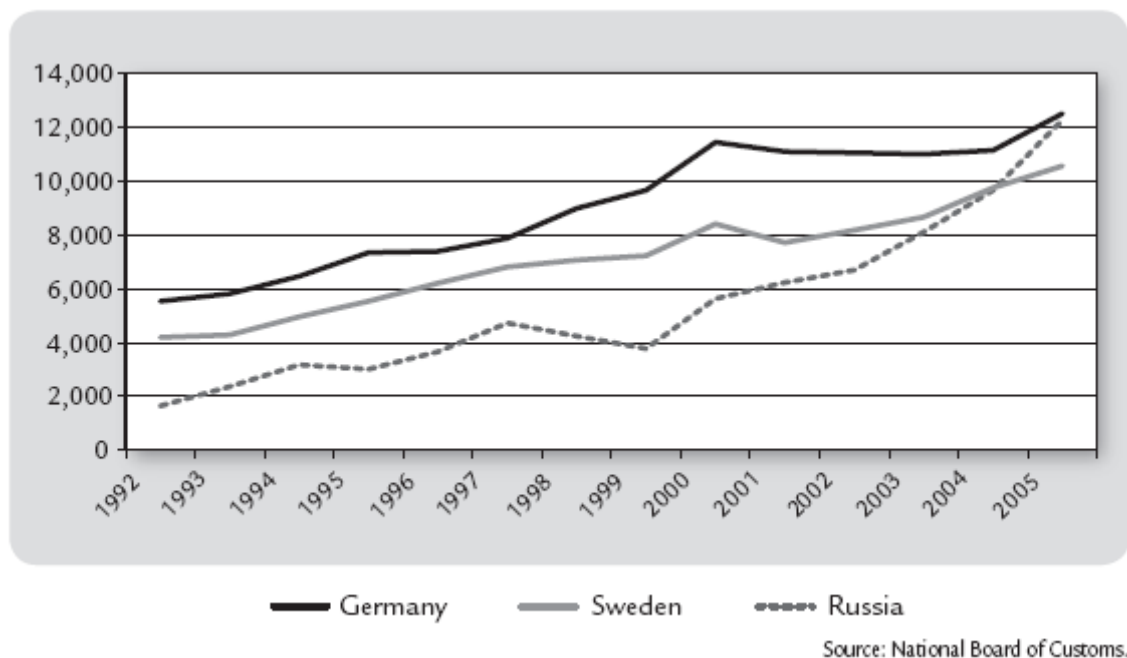


Figure 4. Finland's trade with Germany, Sweden and Russia in 1992-2005, EUR million. (Ollus and Simola 2006:26)

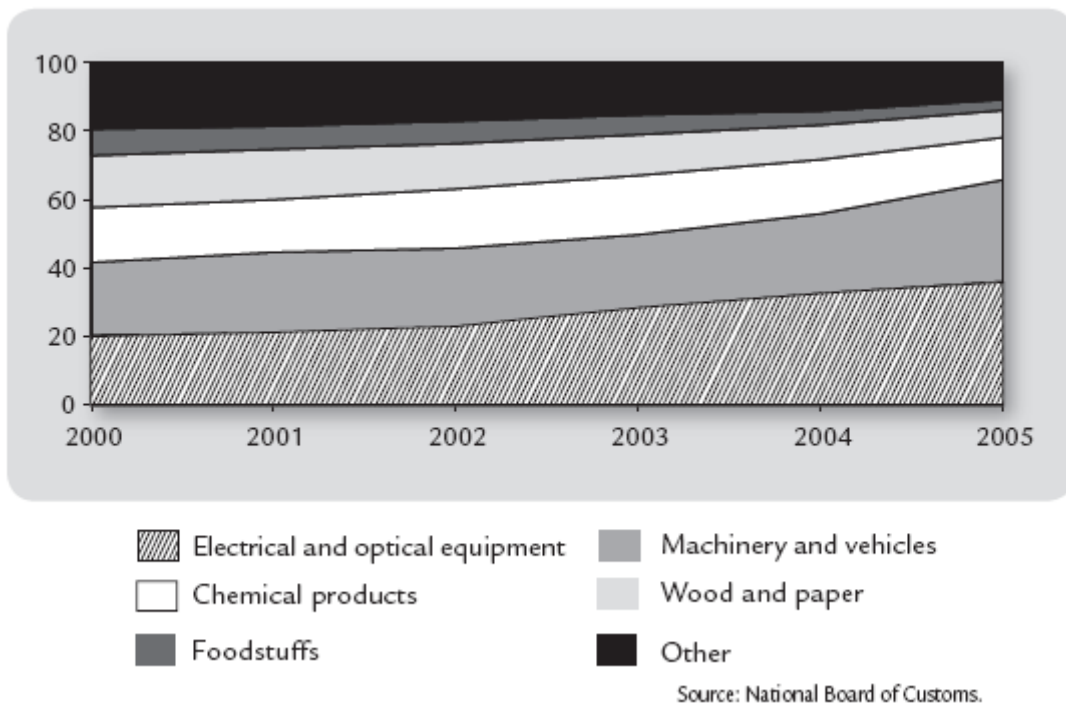


Figure 5. Structure of Finnish exports to Russia, %. (Ollus and Simola 2006:27)

4.2 The role of SMEs

The number of Finnish companies exporting to Russia is large. As much as a quarter of those small and medium sized companies that are exporters do business in Russia. In total 3700 Finnish companies were exporting to Russia in 2005 and 80% of these companies were SMEs. Their share of the value of Finnish exports to Russia was 17%. SMEs share of exports was biggest in machinery and equipment. Russia is the most important export market for SMEs operating in wholesale and retail trade, where re-exports play a key role. Many of these companies also have Russian owners. In imports from Russia SMEs play a much smaller role and therefore also the number of companies doing imports is markedly lower, standing at 1700 in 2005. (Ollus and Simola 2006:30-31)

4.3 Problems in trade

Problems that form barriers for Finnish companies to trade in Russia are to high degree related to customs procedures and tariffs. One of the biggest problems experienced by Finnish companies is the slowness, inconsistency and unpredictability of the Russian customs. In some product segments tariffs are regarded high and hindering exports. There

are also technical barriers, mainly regarding certificate requirements in Russian market. (Ollus and Simola 2006:33)

Grey trade is still a major issue in Russian foreign trade due to relatively high import and export duties. The most commonly used techniques to deceive the customs are hiding valuable goods among low value goods, double invoicing and falsification of the commodity code. Corruption of Russian customs is also an existing problem. There are efforts being taken to tackle these problems and in May 2006 the Federal Customs Service was removed from subordination of the Ministry of Economic Development and Trade and placed under direct control of the government. (Ollus and Simola 2006:40-46)

4.4 Re-exporting to Russia

Re-exporting from Finland to Russia is very common. Many of the goods can be imported from third countries to Finland duty free. Re-exporting is often favoured against transit, because warehousing is slightly cheaper in ordinary warehouses and flexibility in transporting is better, since there is no obligation to specify the final destination, transport routes and timetables beforehand. Sometimes re-export could also be preferred in relation of grey schemes that exist in Russian trade. (Ollus and Simola 2006:35)

4.5 Transit freight

Transit freight through Finland to Russia has also experienced very strong growth this decade with average increase of almost 20% annually. In 2005 total amount of freight reached about 3 million tons. Transit cargo is typically transported to Finland by sea and then further to Russia mostly by road and to lesser extent by rail. Often the goods are stored in customs warehouses in Finland for some time. The rapid growth of transit freight is illustrated in figure 6. The transit freight through Finland to Russia consists mainly of high value goods as other routes are used for bulk freight. Transit freight from Russia to Finland amounted to 3,3 million tons in 2005 growing only slightly and is down from the peak reached in 2001. Transit freight from Russia consists mainly of raw materials and low value added goods and is transported almost entirely by rail to Finnish harbours. (Ollus and Simola 2006:52-58)

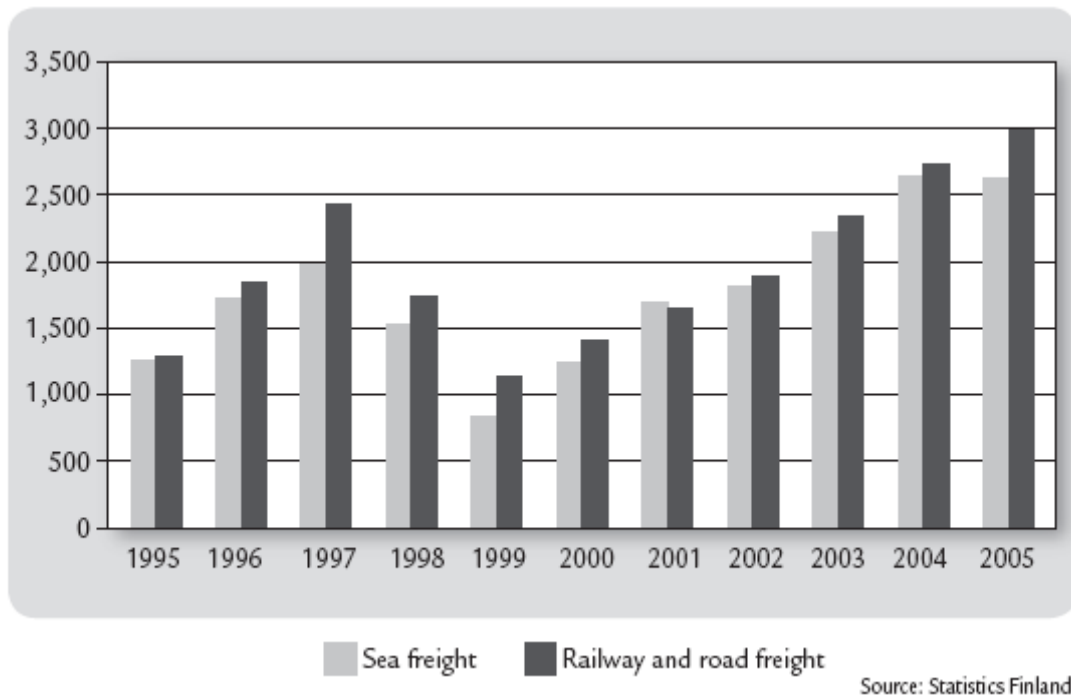


Figure 6. Transit freight through Finland to Russia 1995-2005, 1000 tons. (Ollus and Simola 2006:58)

Finland is a very important transit hub for Russian imports. In volume terms transit through Finland to Russia is a bit higher than Finnish exports to Russia and in value terms it is even 4-5 times higher and together with Finnish exports it represented as much as a quarter of the total value of Russian imports in 2005. The share has however declined from an even higher number in the earlier years as the capacity has not kept up with the rapid increase in Russian imports. Transit from Russia on the other hand is of less importance as it is less than 10% of all freight coming from Russia both in value and volume terms. The transport corridor through Finland is important because competing shorter routes through Baltic countries or Poland and Belarussia are considered to be more risky and insecure. Russia itself does not have enough harbour capacity in the Gulf of Finland as it has preferred to first develop export infrastructure. (Ollus and Simola 2006:59-60).

5 Web applications

5.1 Definition of web applications

"Web Application" - is an application that is accessed with a web browser over a network such as the internet or an intranet. Web applications are very popular today. They can be any program, any software and are used e.g. to implement online retail sales, online auctions, discussion boards and many other functions. (Wikipedia 2006)

Web applications are a numerous and diverse group of software that are used for a wide variety of purposes. In my thesis I am concentrating on web applications in logistics.

5.2 Track and Trace

With increasing global mobility and competitive dynamics, business is being increasingly carried out across the world, thus making it more important to track physical assets in real time wherever they are. "Track & Trace" web applications are aimed at fulfilling this goal. Track & Trace web applications enable customers to have control of their operations. These services are enabled by use of satellites, data centres, advanced communications systems and internet technologies. (Vxceed Technologies 2006)

Tracking can be a web based service that provides shipment tracking data and related shipping documents via internet. This is a way to provide higher level of service to customers and also improves the image of the service provider. It is a way to be seen more reliable and give faster service with less labour cost. It raises the quality of service and can be considered adding value and can hence improve the competitiveness of the service provider.

Tracking and tracing services can be integrated to logistics or transaction management systems to enhance their functionalities.

Being able to track the shipments allows the users of the services to improve their own customer service and operational efficiencies. They are able to better estimate their delivery times, take action in case of delays or insufficient supplies and notice errors in transportation earlier. Industrial customers can detect possible bottlenecks for their production etc.

5.3 EDI

5.3.1 Definition and standards

EDI is short for *Electronic Data Interchange*, the transfer of data between different companies using networks, such as private secure networks or the Internet. EDI has become increasingly important as an easy mechanism for companies to buy, sell and trade information. EDI is a standard format for exchanging business data. (Webopedia 2006)

”There are two major sets of EDI standards: the United Nations recommended UN/EDIFACT is the only international standard and is predominant outside of North America; and the US standard ANSI ASC X12 (X12) is predominant in North America.” (Wikipedia 2007)

5.3.2 Purpose of EDI

EDI can be used for exchanging several different business documents, but the two most common are purchase orders and invoices. By standardizing the information communication in business documents, EDI makes possible a "paperless" exchange. (Union Pacific Railroad Corp. 2007)

Using EDI for purchasing is a straight through process. Purchase orders are translated into a specific format and submitted to the supplier via the Internet. Security is an important issue and it is controlled throughout the process using passwords, encryption and user identification. Documents are checked and edited for accuracy by software embedded in EDI. (Crystal, Garry 2007)

With the help of EDI companies can exchange business documents electronically, which is much faster method than using traditional mail and fax. EDI is widely used today by a large number of companies, who have preferred EDI to traditional ways of business correspondence. Benefits of EDI are that it saves money, decreases chance of human error and saves time over paper processing. Using EDI the order can be processed in less than a day compared to traditional way, where processing could take from ten days to two weeks. The above mentioned quick transaction times help maintain efficient inventory levels, which leads to more effective use of warehousing and finally leads to reduction of freight costs. (Crystal, Garry; 2007)

5.3.3 EDI's role in customer service

"EDI affects the improvement of customer service. The quick transfer of business documents and marked decrease in errors allow you to do business faster and more efficient. Thus with improved customer service, you can ultimately expand your customer base" (Huggins-Chan 1995)

Customer service can be enhanced in many aspects with the use of EDI. It can improve the speed, accuracy and reliability of customer service. It can be also a tool for closer partnership with the customer and a way to achieve together efficiency gains which both parties can benefit from.

5.4 RFID

RFID is not a web application by itself, but rather an enabling technology for many different applications and services. The potential it brings to developing web applications is so large that it should be presented here as a basis of what the near future could bring.

5.4.1 Characteristics of RFID

RFID consists of a computer chip and an antenna that communicates via the radio frequency with readers that relay the information to a central computer. Movements of the cargo can be tracked by scanning the RFID tag. Compared to the popular barcode system, RFID has the advantage of being able to carry much more information. (Googlevideo)

"RFID (radio frequency identification) is one of the most promising technologies in logistics. Using wireless data collection and electronic tags for storing data, it enables a keener tracking and tracing of cargoes. In most cases it is also more reliable than a bar code and can handle much more information." (Nordicum 2006:34)

"Harsh environment resistance: unlike barcodes, RFID tags need no visual contact so they can be dirty or embedded while functional. This is especially important in industrial asset tracking." (Vilant Systems Oy:273)

"Read many at a time: unlike barcodes, RFID tags can be read very quickly in large quantities, eg. as boxes on a pallet – also when the tags are hidden in the stack. 200 tags can be read in the matter of seconds. This is especially important in supply chain processes. Tracking points can be established in places where it was not feasible before without raising personnel cost. In current tracking points work times can be reduced up to 80%." (Vilant Systems Oy:273)

“Read distance of automatic read points: unlike barcodes, tags can be read automatically from moving objects from up to 5 meters distance. This enables even vehicles to be tracked in dock doors or gates with RFID.” (Vilant Systems Oy:273)

“All in all, RFID tags will be instrumental in achieving real-time visibility of raw materials and product inventory, leading to fewer production delays and faster response times to customer requests. A disadvantage of RFID is the rather high price compared to bar codes. Prices are, however, coming down.” (Nordicum 2006:34)

Pictures 1 to 3 illustrate the way RFID technology works.



Picture 1. An RFID reader is able to read/write data from/on an RFID tag by using radio signals. (Vilant Systems Oy:272)



Picture 2. The information is stored on the RFID chip of the RFID tag. (Vilant Systems Oy:272)



Picture 3. Passive RFID tags contain no battery, and are often in the form of a shipping label. The read distance of passive tags is less than 10 meters. (Vilant Systems Oy:272)

5.4.2 Applications for RFID

A new application of technology called RFID is about to solve the problem of keeping track of shipments of consumer goods, which has been a trouble for businesses since the start of commerce. RFID enables easier and more efficient tracking of the movement of goods, it offers opportunities for implementation of web based services for tracking and tracing. More reliable and detailed real-time information about the movement of shipments can be relayed to the participants of the logistics process. The providers of transportation and forwarding services can send information via internet to customers about the location of the shipments at all times. Shipping and receiving of goods can be more automated and more accurate information can be generated for the ERP systems. Tracking and tracing services can be integrated to the companies' internal systems like ERP using EDI. (Googlevideo)

“Many companies are looking for new ways to automate their fields of operations with RFID technology, for instance, in asset management, maintenance, repair, manufacturing, item tracking, delivery scheduling, customer billing data collection, and work order management. However, transportation, warehousing and value-added logistics are businesses that benefit most from RFID.” (Nordicum 2006:34)

The purpose of the RFID tag is to help track shipments from warehouse to the store. It enables retailers to know they are receiving the ordered merchandise as well as reassures manufacturers that they have delivered the products. RFID is in a way a further development of the barcode,

which has been extensively used for long time. RFID is considered a smart label. (Googlevideo)

With the help of RFID retailers and manufacturing companies are able to keep goods on the store shelves more reliably, which means that consumers can more often find what they are looking for. Ultimately it will also enable faster and more accurate checkouts at cashier. Retailers as well as other organisations using RFID are able to manage their supply chains more effectively and efficiently. RFID tags will be used in common consumer goods like shoes, DVDs or pharmaceutical products. (Googlevideo)

5.5 Example of a logistics company providing web based services; Wim Bosman

As an example of a logistics company offering online services I introduce Wim Bosman, whose French office I also visited during a field trip of logistics module in 2006. Wim Bosman is a Dutch logistics company operating with a network of 25 locations in 8 European countries. They offer multiple online services on www.wimbosman.com:

- EDI (Web-EDI, EDI via e-mail and Integrated EDI)
- E-Shipment (online shipment management system)
- Tracking & Tracing
- Warehouse Management System (using RFID)

5.5.1 Transport quotation request

Wim Bosman has a service that has some similar features as RCS's Freight Calculator, where you can request for quotation for transport. Customer needs to fill in his data to receive a quotation for transport of his cargo. He has to fill such required fields as: company information, data about the sender and recipient; shipment parameters such as whether the cargo is dangerous/hazardous, required delivery service - normal/express. Then there is a field named "number of packages", which has a wide range of choice of cargo packaging, such as whether the cargo is in a box, container, Europallet, barrels or other; goods description, value of the shipment, length, width and height of the shipment, total weight, and finally a column for remarks where customer can add some more important information about the shipment. After filling in all the required fields customer should press button "send request" to receive a price quotation.

This service has similar features as the Freight Calculator of RCS, which is introduced in the following chapter. There are many similar fields like data about sender, receiver, shipment parameters. This system however does not produce an immediate price quotation, so this is in a way just an electronic form for the quotation request without the functionality to

actually calculate an offer. This is possibly a nice way to improve request processing, but does not really much improve customer service.

5.6 Online marketplace for transportation

There is a relatively new marketplace opened over internet in www.translot.com which has gained popularity among companies involved in transportation. In this marketplace you can offer or search for cargo to be transported, offer or search for transport service and offer or search for containers. All modes of transport are present (road, rail, sea and air).

5.7 Calculators in logistics

Different types of calculators are offered over the Internet to be used in logistics. Here is a short list of some of them. Mostly their are very simple in nature, others for very specific applications.

- Ocean shipping calculator and air calculator

http://www.canadiannorth.com/rateCal/rateCalculator_start.asp

- Postage rate calculator of US Postal Services

<http://postcalc.usps.gov/>

- Logistics Cost Savings Calculator.

http://www.todbulk.com/services/savings_calculator.htm

- Freight Management Calculator for hospital beds

<http://stratcenter.com/StratCenter/docs/fdsi.aspx?articleid=209&zoneid=17>

- Chargeable weight Calculator

<http://www.bas-hk.com/bas/logistics/charge.htm>

- Online volume calculator

<http://www.transcargo.com/content/view/90/334/>

6 Freight Calculator

6.1 Introduction of the calculator

The freight calculator is designed for those who are users of trade and transportation services. It is an easy to use tool for estimating the cost of shipping goods from location to location for groupage transportation. Freight calculator is used only for road transportation. Since RCS is mostly dealing in forwarding services by road transportation, this Freight Calculator is a very useful tool for the company.

Application provides accurate freight price, which is calculated by entering the point of origin, destination, weight of the cargo, handling costs, postcode and other information into the Freight Calculator. Screenshot of the calculator can be seen in figure7.

Calculator

User: admin (logout)

Leaving from Region

Going to Region

Instructions

1. Press "Terms" button to read terms and conditions
2. Select "Leaving from" and "Region"/"Postcode"
3. Select "Going to" and "Region"/"Postcode"
4. Enter shipments parameters
5. Press "Calculate" button
6. To place an order, press "Order" button

Shipments

#	Cbm	Ldm	Kg	Plt	Weight kg	Price €
1	<input type="text" value="4"/>	<input type="text" value="0"/>	<input type="text" value="0"/>	<input type="text" value="0"/>	1332	693
2	<input type="text" value="0"/>	<input type="text" value="1.5"/>	<input type="text" value="0"/>	<input type="text" value="0"/>	3000	810
Total:					4332	1503

Price including: TIR Carnet and issuing CMR
Volume/Weight conditions: 1 cmb = 333 kg, 1 LDM = 2000 kg
Prices are in EUR and without VAT

Figure 7. Freight Calculator customer interface on RCS web page.

6.2 Purpose of implementation of the calculator

This new application is targeted to speed up customer service and create more value for the customers and also assist company employees in their tasks. This is a quite new web application, only a few logistics companies in Finland have been using it. Calculators purpose is to save time, reduce errors and make the process easier for the company and the customer.

There were plenty of reasons why the company wanted to install this new system. Turnover of the company has grown from 1,5 to 3 million euros in the last year and the number of employees has grown from 11 to 20 people. Russian cargo has a significant number of partner companies. The number of existing customers is quite big and new customers are gained continuously, therefore the amount of offer requests is increasing. Every day company receives a lot of phone calls from customers requesting for the information about freight prices for different kind of shipments to numerous destinations of the world and very often personnel of the company is not able to respond accordingly and in due time to customer request.

This software is not very widely used as of yet. Among big companies, it is used only by UPS, TNT and Kaukokiito. It is interesting to note that it is not used by such big companies as DHL and Schenker, and it is not used at all by the small forwarding companies.

6.3 Functions of the Freight Calculator

Freight Calculator is designed only for groupage transportation and its use is limited for calculating cargo weight till 6.000 kg from Europe to Finland or Europe to Russia. From Finland to Russia calculator works up to 15.000 kg. In case a customer wants to make an order for bigger weights or a nominated truck, he has to contact the sales department of RCS.

In the calculator freight charge of individual cargo items can be calculated based on volume and destination variables and then added to the total price of the order. The administrator of the software can modify the freight charges and add or remove freight destinations.

Button *Terms* gives the information about transportation terms and conditions.

To choose point of origin, drop down menu in the row *Leaving from* and *Region / Postcode* should be used.

To select the country of destination, the drop down menu in the row *Going to* and *Region / Postcode* should be used.

In the row *Shipment* the shipment parameters should be entered (Cbm, ldm, kg, pll).

To add another shipment button *ADD* should be pressed. Button *ADD* is used for calculating the price for one destination. It can not be used for two or more destinations.

There is a possibility for a customer to make an order directly from the calculator. Order button provides the possibility for the customer to proceed to another page, which is illustrated in figure 8, where is displayed the list of required fields that needs to be filled by the customer to place an order, like transportation information and shipment parameters:

Shipment: The volume of each cargo item must be specified by the appropriate parameter [Cubic Meter | Gross Weight | Loading Meter | Pallet]. Shipment may include cargo items specified by different volume parameters. Each cargo item is represented by a row in the order. The different volume parameters have defined corresponding weight equivalent values in the following proportion:

<u>Unit</u>	<u>Freight weight equivalent</u>	<u>Description</u>
1 cbm	333 kg	cubic meter
1 ldm	2.000 kg	loading meter
1 pll	0,4 ldm = 800 kg	pallet

All order requests are to be automatically sent to a separate customer mailing list and processed by forwarders. Later a customer log will be created where information about the users of calculator will be stored. With the help of customer log company will get the information about how frequently customers are using calculator and how often they make orders. Additionally the history of customer's orders can be viewed.

Leaving from **Finland** Region **Helsinki Region**
 Going to **Russia** Region **Moscow**

Shipments

#	Cbm	Ldm	Kg	Plt	Weight kg	Price €
1	-	-	2500	-	2500	776
2	-	2	-	-	4000	880
Total:						1656

Order information

Sending options

Pickup date ...

Contact person

Address

Description of goods

Receiving options

Consignee

Contact person

Custom terminal

Figure 8. Screenshot of the order form of the calculator.

6.4 Administration Console

Freight Calculator is supported by the Administration Console, which is designed in a form of SQL Database. Console connects to the server via secured channel (SSL).

All the required information parameters (countries, postcodes, freight weights, freight prices, routes etc.) are input into system by entering them in the Administration Console. Each customer is given a login name and password. Passwords are given by the administrator. A freight charge reduction or discount is offered if a customer is using the services of RCS frequently. The system can recognise the customer by login name and password and give a discount based on discount rate defined for each customer.

The pricelists can be constantly modified according to the changes in the cost structure and the competitive environment. For example if gasoline prices go up, there should be appropriate changes made in the Console; customers should be also informed about those changes. For example, when the customer logs in into the calculator, he should see an automatic message about the occurred changes.

7 Case Study Research

This is the public version of the thesis. This chapter is for the most part not available for public viewing for period of 5 years. Feedback from customers, interpretations of results of the questionnaire and answers of the employees and management in the interviews are not available in this version.

7.1 Questionnaire to users

The following questionnaire was placed on the website to be answered by the customers taking part in the pilot project. There was a link to it on the same page with the calculator and all customers were requested to fill it when they were given user IDs and passwords. This questionnaire was planned to be more extensive for the purpose of this study, but the company management wanted to keep it short to make it easy to fill to maximise the degree of participation of the users. The number of answers to each choice is marked here below

1. Has the calculator been accessible to You at all times?

Onko laskin ollut käytettävissä aina halutessanne?

Всегда ли калькулятор был доступен для Вас?

Yes 24

No 1

2. Do You find the calculator user friendly/easy to use?

Onko laskin mielestänne käyttäjäystävällinen/helppokäyttöinen?

Удобен ли калькулятор в использовании?

Yes 27

No 1

3. *Would You need more help functions or assistance for use of the calculator?*

*Tarvitsisitteko enemmän käyttöohjeita tai ohjausta laskimen käytössä?
Есть ли необходимость в дополнительных вспомогательных функциях или помощи в использовании калькулятора?*

Yes 6

No 20

4. *How frequently are You not able to find the desired destinations/points of origin?*

*Kuinka usein ette löydä haluamaan lähtöpaikka tai määränpöytä ?
Как часто Вы не можете найти пункт отправления\ назначения перевозки?*

Frequently 4

Not Frequently 8

Never 11

5. *How often are You not able to find the applicable price quote with the calculator?*

*Kuinka usein ette saa haluamaanne hintatarjousta laskimesta?
Как часто Вы не можете получить желаемую стоимость используя калькулятор?*

Often 6

Not often 10

6. *Have You received any faulty quotes from the calculator?*

*Oletteko saaneet laskimelta virheellisiä tarjouksia?
Получали ли вы неправильную стоимость при использовании калькулятора?*

Yes 3

No 15

7. *Your suggestions for improvement of the calculator?*

If you need any assistance, please contact us.

.....
Parannusehdotuksia laskimelle?

Jos tarvitsette opastusta ohjeita, ottakaa yhteyttä meihin.

.....
*Ваши предложения для усовершенствования калькулятора?
Если Вы нуждаетесь в помощи пользование калькулятором,
пожалуйста свяжитесь с нами.*

.....

7.2 Interviews inside the company

Interviews inside the company were made in April 2007. All the people who are involved in the project or using the calculator were interviewed.

7.2.1 Interviews of Forwarders, Forwarding assistant, Office manager, Accountant

The employees were all interviewed individually

Questions

- *Do you find the calculator user friendly/easy to use?*
- *How frequently are you not able to find the desired destinations/points of origin?*
- *How often are you not able to find the applicable price quote with the calculator?*
- *Have you received any faulty quotes from the calculator*
- *Your suggestions for improvement of the calculator?*
- *How frequently are customers asking prices from you? How often does the calculator help you in these situations?*
- *What is your feeling about the effect the calculator has had in the business process and your own work flow in particular?*
- *How often are customers asking questions about the use of the calculator from you? How often do you get complaints about the calculator? What are the most common problems?*
- *What other feedback have you received from customers regarding the calculator?*

7.2.2 CEO and Sales Manager interviews

The best persons to view the progress of the project and the success of it are the CEO and the sales manager of the company. They were interviewed separately to gain their personal opinions and evaluations.

Questions the CEO

- *How well do you think that the targets set for the project have been reached in general – do you consider the project as a success?*
- *How well has the personnel been able to implement this new business process? Is it working the way that you had in mind?*
- *Have you been able to reduce the number of missed orders since implementing the system? How about number of errors in your processes?*
- *How much faster is the process now?*

- *What kind of response have you received from the customers? Have they adapted the new service to the extent that you hoped? Is there a need to try to push them to increase the use?*
- *Have you seen an increase in business from existing customers? (Has the number of orders per customer increased?)*
- *Has the calculator helped in gaining new customers?*
- *Do you think that the project has been profitable? How much cost savings do you think you have achieved?*

Questions to the sales manager

- *Have you been able to reduce the number of missed orders since implementing the system? How about number of errors in your processes?*
- *Do you think that customers have been better able to reach you since the implementation of the system? Has the number of calls decreased?*
- *How much faster is the process now?*
- *What kind of response have you received from the customers? Have they adapted the new service to the extent that you hoped? Is there a need to try to push them to increase the use?*
- *How much do you need to assist customers in the use of the calculator? How good are the customers in using the system? Are the customers able to input parameters for cargo correctly? How often do you need to correct the pricing afterwards?*
- *How often do you get complaints about the calculator? What are the most common problems?*
- *Have you seen an increase in business from existing customers? (Has the number of orders per customer increased?)*
- *Has the calculator helped in gaining new customers?*
- *How has your work flow changed after the implementation of the system?*
- *Have you noticed an improvement in the internal information flow within the company?*

8 Conclusions and suggestions

This is the public version of the thesis. This chapter is for the most part not available for public viewing for period of 5 years. The suggestions for improvements and some of the conclusions are not available in this version.

The general feeling is that so far the project has been a success. Besides the somewhat slow progress in adaptation no major problems have appeared. Some adjustments need to be made, but all in all complaints have been few. CEO is mostly satisfied with the level of meeting targets even if some of them have been reached slower than anticipated. According to him the personnel has been able to implement the system well after difficulties in the early stages.

For the profitability of the project at this point CEO does not want to take a very strong stance. He sees many positive developments as of now, but sees this project more as a start of long term transformation of the business towards tomorrow's modern logistics services. He not only believes that these efforts will bear fruit in the long run, but sees that it would be detrimental not to take part in this quest for better and more efficient customer service.

The feedback from customers has been to large extent encouraging. The goal of having a user friendly system seems to be met very well. Both customers and employees are almost without exception regarding the service easy to use. There have been very few technical problems. The challenges seem to be related firstly to get the customers to try out the system and secondly to gain their trust that the calculator is actually working properly.

The internal use of the calculator has so far been more or less as expected. According to CEO people in the organisation have adapted well to the use of the system.

Based on interviews it can be concluded that part of the customers are already using the calculator actively and regularly. However, there are still a number of customers that need to be convinced to start using the system. At this point could be a good time to make some improvements to the system in the first place and then with an improved service try to activate those customers that thus far have not been eager to start using the software.

The influence of the calculator on the growth of the business is difficult to measure, but the perception of the management is that there has been a positive effect. At least it can be said that as it has been actively used in marketing, there has been a real contribution. CEO of the company is

firmly in the opinion that the project has been successful, should be further enhanced and is an integral part of the core process of the company that is essential in the future success. This is a strong indication of the importance of the project for the business process and growth of the company.

List of abbreviations

Cbm - Cubic Meter

CMR - Convention on the contract for the International Carriage of Goods by Road. CMR provides a basic insurance for cargo, approximately 10 Eur per kg.

EDI - EDI is a standard format for exchanging business data between different companies using networks. EDI makes possible a "paperless" exchange of business documents, the two most common are purchase orders and invoices.

ERP - Enterprise Resource Planning. Complex applications used by large enterprises to manage inventory and integrate business processes across multiple divisions and organizational boundaries, frequently the application backbone in many large enterprises.

ETA - Estimated Time of Arrival. The expected date and time of arrival in a certain port or terminal.

EX-1 - Export Declaration is a formal statement declaring full details about goods being exported, that is made to customs at a port of exit, EX-1 is required in Finland for the cargo that has a European status.

Ldm - Loading Meter

Pll - Pallette. Cargo can be placed on a pallet

RCS - Russian Cargo Service Oy

RFID - Radio Frequency Identification is one of the most promising technologies in logistics. Using wireless data collection and electronic tags for storing data, it enables a keener tracking and tracing of cargoes. In most cases it is also more reliable than a bar code and can handle much more information.

SMEs - small and mid-sized companies

T1 – customs document which is required for the transportation of transit freight for the cargo that has a transit status.

Terminology

Chargeable weight - Is the amount of weight that is paid for. Most often it is the actual weight; the chargeable weight will be the volume weight if this volume weight is higher than the actual/gross weight.

Customs bonded warehouse- A warehouse authorized by Customs authorities for storage of goods on which payment of duties is deferred until the goods are removed.

Door to door deliveries – Transportation of cargo with pickup from the address of the consignor to the address of the consignee

E-Shipment - An online shipment management system for customers, with which they can book their shipment using the Internet. In E-Shipment you can use your own addresses, print barcode labels and read the actual status of your shipments.

Europallet - Standard size pallets. Size of a Europallet is 800 kg.

Export - The process of carrying or sending goods to another country or countries, especially for purposes of use or sale in the country of destination. The sale of products to clients abroad.

Finpallet – Size of a Finnpallet is 1.000 kg

Forwarder - The party arranging the carriage of goods including connected services and/or associated formalities on behalf of a shipper or consignee.

Synonym: Freight Forwarder.

Forwarding company – An independent business that handles export shipments for compensation.

Company that arranges transportation of cargoes from the point of loading to the point of destination, using any mode of transport within the agreed deadlines, whereby providing freight forwarding services.

Freight forwarding services – Includes organization of transportation, documentary support, freight insurance and all the necessary activities required for the transportation of cargoes by a haulage company.

Gross weight - The full weight of a shipment, including goods and packaging.

Groupage freight – Service, where the service provider groups the cargoes of multiple consignors into one shipment, which is then transported to common destination of all the cargoes included.

Import and export clearance - Any person wishing to import or export goods must declare them to the Customs and obtain a permit after fulfilling customs formalities like paying all required duties and taxes and also necessary examination of the goods concerned.

Invoice - An invoice provided by a supplier prior to the shipment of merchandise, informing the buyer of the kinds and quantities of goods to be sent, their value, and important specifications (weight, size, etc.).

Nominated truck – Truck for use of carrying only a shipment of one customer.

Pallet - A small wooden platform on which cargo is stored for ease of loading and unloading. Cargo shipped on pallets is referred to as palletized cargo.

Quotation - An offer to sell goods at a stated price and under specified conditions.

Re-exports - Re-exports are foreign goods exported from the same state as previously imported

Shipment parameter – Could be size of shipment, dimensions e.g. height, width and length, number of boxes or Pallets, volume, weight gross/net.

Terminal handling - Loading, unloading, packing or unpacking of cargo, includes cargo handling services provided for freight in special containers or for non-containerised freight, services provided for any freight terminal, for all modes of transport.

Track and Trace – Service that enables customers to have control of their operations, to track physical assets in real time wherever they are. These services are enabled by use of satellites, data centres, advanced communications systems and internet technologies

Transit freight – When the goods are exported one country to another and transported through a third country without customs clearance in the third country. While the goods are in third (transit) country they are called transit freight. Goods can stay long time in a transit country, but they can not be sold or purchased in the transit country.

Transit time - A time period it takes for cargo to move between two points (i.e., from shipper to consignee)

Volume - The space occupied by a cargo expressed in weight unit (kg) obtained by dividing the volume by the volume ratio, needed to establish the chargeable weight.

Web Application - An application that is accessed with a web browser over a network such as the internet or an intranet. Web applications are very popular today. They can be any program, any software and are used e.g. to implement online retail sales, online auctions, discussion boards and many other functions.

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