

**Logistics and Transport Management
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VALUE-ADDING SERVICES IN RORO-SHIPPING

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PRESENT DEMAND AND FUTURE POSSIBILITIES

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Abstract

Increasing demands in logistics and transportation is a driving force behind the demand for value-adding transport services. However, concerning roro-transportation it is not always clear what kind of extra services the customers desire in connection to the sea-voyage. In this study, nine roro-customers have expressed their views upon what kind of services the roro-providers should offer their customers. The interviews were analysed from a service-level perspective, showing how the service level increases as extra services are added to the roro-transport. A basic approach to the interviews was to find out if the roro-providers should widen their services, to include broader transport- and logistical services.

The study shows that there is a demand for additional services that improves the roro-operations. Concerning broader services there is an interest, but no real demand could be identified. Based on the results, it is concluded that roro-providers should focus on developing their basic service to perfectly match customers demands. Broader services may be offered on a tailor-made basis, but the design of such individual solutions depends on which customer to focus on. Furthermore, the possibilities of each roro-provider according to for example financial risks and available space should be regarded.

Foreword

The following thesis consists of a study carried out at the request of the Swedish Shipowners' Association. Initially, the basic guideline was to enlighten a logistics problem within the shipping industry. Since the roro-business is highly affected by logistics demands, it felt most relevant to focus on this specific kind of shipping. According to my background, it also turned out to be the perfect mix of theory and reality. I am a master mariner with operative experiences in all ranks between deckboy and chief officer, mainly from roro-shipping,

Many are the persons who have contributed to carrying through this thesis. First of all, I would like to express my thanks to all the persons I interviewed, who represented the roro-customers. They were all very helpful and engaged, giving me all the time I needed to carry out the interviews properly. Then I also would like to thank my tutor professor Kenth Lumsden, for giving me alternative approaches and feedback. Last, but not least, I would like to thank Lennart Dahlbäck at DFDS Tor Line and Kenneth Johansson at Stena Line Freight, for their outstanding support of the project.

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1. Introduction

1.1. Background

Transport-customer's demands on logistics and transportation are getting greater and greater. Nowadays, time windows for deliveries are often very small and the margins for delays are minimal. Manufacturers seek cost-reductions by developing efficient production techniques, cutting the lead-times and minimising the stock levels. This development calls for fast and reliable transportation, but today such service is rather regarded as a basic service than as an extra service. Therefore, many transport-providers try to find ways of offering extra services, in order to make the transport more valuable to customers. The ability of offering a unique service involves an option to strengthen the market position and to become more competitive.

Having this in mind, many traditional forwarders have developed towards third-part logistics providers, offering a number of value-adding services. In this context, roro-transportation is carried out in a quite traditional way, with a lack of innovative logistics solutions. According to Evert Wijkander, logistics manager at Avesta Polarit, actors on the shipping market still focus on taking the vessel from quay to quay, instead of looking upon the transport as a wholeness. However, similar to the forwarders, ship-owners and charterers have a number of possibilities of adding value to the transport, but a reconstruction of their traditional roles may be necessary.

1.2. Purpose and problem definition

The purpose with this thesis is to investigate if there is a demand for value-adding services in roro-shipping. In this context, value-adding services refers to extra services a roro-customer could draw benefit from, not offered by the roro-providers today. Several questions may be raised:

- How do the roro-customers look upon current roro-services?
- What kind of services could be regarded as value-adding when transporting goods on roro-vessels, and which services do the customers demand?

- Are the roro-customers willing to pay for value-adding services?
- Are the roro-providers willing to offer extra services according to customers' demands?
- Do the roro-providers have to make significant changes in their business, in order to meet the customers demands in the future.

When putting these questions together, it ends up with questions of a more strategic kind, touching how a roro-provider should position in the future and what strategic decisions he will face. In this matter, the thesis aims to work as an input for future decisions rather than to state what is the right or wrong in decision-making.

1.3. Method

This thesis describes an exploratory study, using a qualitative technique. It consists of site-visits and interviews at DFDS Tor Line, Stena Line Freight and a sample of their most important customers. In the following, Stena Line Freight is referred to as Stena Line.

First, two site-visits were carried out, one at Stena Line and one at DFDS Tor Line. The main purpose was to get a picture of how the freight business in roro works today and which services are being offered. The next step was to make a sample of transport customers to interview. In order to cope with the qualitative approach of the thesis, it was assumed that the number of customers included should be kept low. However, the final number of customers was decided first after putting up some basic criteria:

- The customer should handle significant freight volumes in respective market areas, either shipped by Stena Line or DFDS Tor Line.
- The customer should have a characteristic of special interest, representing for example a specific market area or a controversial opinion.
- The sample should involve both intermediaries (trailer operators and 3PL actors) and the original transport buyers (the industry).

After having discussed the sample with DFDS Tor Line and Stena Line and compared it with the criteria, it ended up with nine customers. Since the sample was limited, it was regarded as important to include customers representing as large freight volumes as possible. The idea of mixing cargo volumes with a specific characteristic was to enlighten a certain topic in each interview. However, the same questions were used during the interviews, but the interviews were carried out as discussions rather than as questionings. The questions were mainly designed according to two principles:

- Questions based on actual topics
- Questions based on hypotheses

The purpose of using actual topics was to find out customers' opinions concerning value-adding services and quality improvements already being brought up. The use of hypotheses aimed at introducing theoretical ideas to the customers and discussing them, in order to find possible solutions. The persons interviewed all had decision-making positions in respective companies, or were designated by a person having a decision-making position.

The interviews with the roro-customers were followed up by two additional interviews, one at Stena Line and one at DFDS Tor Line. The purpose was to give the analyses an extra dimension by adding charterers reactions to what was discussed with the customers.

1.4. Reliability and validity

In short, validity describes to what extent the right thing is measured and reliability describes how well it actually is measured. As a qualitative research method, interviewing has some certain characteristics one should be aware of when discussing reliability and validity (Bell, 1993, p. 90):

- **It is flexible.** The possibility of following up ideas and discussing motives involves an opportunity to reach deep and complete answers.
- **It is subjective.** An interview deals with human beings and not machines. Therefore, the answers may be affected by personal valuations by the person

who put performs the interview, or by other circumstances surrounding the interview.

Since the interviews assumed discussions rather than straight answers, the flexibility was the main reason for using interviews as the researching technique. The interviews had a high degree of structure, and basically the same questions were used in all the interviews. However, depending on how the answers turned out, the order they were put in varied from case to case. Furthermore, for natural reasons the discussions with the industrial customers differed from the discussions with trailer-operators and 3PL-actors. During the interviews, all the respondents had their telephones turned off and also had sufficient time to spend. They were supplied in advance with written information concerning the issues that were supposed to be discussed, giving them a possibility to prepare themselves. One interview was cancelled, since the respondent seem to be stressed and didn't had enough time. The interviews were followed up by telephone-calls, in order to give the respondents a chance to correct the answers. It also involved an opportunity to complete the interviews with additional questions, if necessary. To conclude: the reliability could be regarded as high.

However, the level of validity is more uncertain. The answers are extremely dependent on who the respondent is, or more precisely his or her position in the company. Therefore, it could not be taken fore granted that another person within the company would have given the same answers, and the following should be considered:

- If the respondent has a too high position in the company, he doesn't have the accurate contact with the daily work.
- If the respondent has a too low position in the company, the knowledge concerning strategic decisions is insufficient.

However, since the main issues concerned strategic questions, it was assumed that the respondents at least should have a decision-making position.

1.5. Scope and limitations

In the thesis, the following scope and limitations have been made:

- It only deals with roro-cargo. However, the situation is similar concerning other goods as well, especially container-goods.
- It focuses on operations of conventional roro-vessels, and roro-cargo on ferries is not considered.
- Only two roro-providers and nine of their customers are part of the investigation.
- It only covers four roro-routes in the northern part of Europe and systems used in other parts of the world are not regarded. Thus, the thesis focus on short sea shipping (24 to 36 hours sea-voyages), and special conditions valid for ocean-crossing voyages are not included.
- The main focus is put on the relationship between transport provider and transport customer. However, there are other actors playing important roles when discussing value-adding services, but this aspect is only discussed briefly.
- Environmental issues are not considered as a factor affecting transport quality and transport services.

1.6. The outline of the thesis

The theoretical part gives a broad introduction to the driving forces behind freight transportation. It aims at giving an understanding of why it is important to support transport customers with extra services. First it describes the function of the supply chain and the reasons why customer demands upon freight transportation are rising. Then it is given a customer perspective, involving theories behind transport quality and customer demand. Finally it ends up with describing customer service in general and value-adding service more specifically. The logical connection between those different issues is illustrated by using frameworks based on the network-model.

After the theoretical description, an introduction to the present roro-business at DFDS Tor Line and Stena Line is given. This introduction shows what services

the charterers offers today, and it is essential for the understanding of the topics discussed in the interviews. The results of the interviews are presented in the next chapter, followed by the analysis, conclusions and recommendations. Finally, some suggestions for further research are given.

2. Frames of reference

2.1. Building frameworks

In order to understand the importance of value-adding services, it is important to show the role of transportation and customer service in a larger perspective. What seems to be small corrections in cargo-handling and transportation could in fact be essential parts of a complex chain of activities. Even small improvements in one single link may affect operations and actors all over the chain. There is a close relationship between value-adding service, customer service, transport quality, logistics, supply chain management and the transport network. By using frameworks, this connection will be further explained in the following chapter.

2.2. Transport theory

2.2.1. General assumptions

The basic presumption for freight transportation is that a demand for transportation exists. The mechanisms behind transport demand shows a great complexity, but basically the driving factor is the demand for consuming a specific product in a given location (Coyle, Bardi & Novack, 1999, p. 41). However, this general approach should be valid only under the conditions that the expression “consumption” is given a broader meaning. Söderstam, L, suggests that consumption “is the final use of products and services” (Nationalencyclopedia, band 11, p. 285). Since a significant part of

transportation volumes consists of raw-materials and semi-finished goods¹, those products are assumed to be consumed when used in production. Therefore, it should be correct to state that the need for transportation is directly depending on the need for consumption. The need could be derived either from a company or a private person, but in the end the private consumption rules. However, in the further discussion the private consumption is not regarded and thus, transportation is considered mainly as business-to-business activity².

2.2.2. The main utilities of transportation

A transport is by Lumsden (1999, p. 31) defined as a service rather than a product, and as such it has no value itself. Instead, the purpose of offering transport services is to create a value to the customer by adding certain utilities for him. The main utilities in transportation are the place utility and the time utility (Lumsden, 1999, p. 32).

- **Place-utility** assumes that goods are given a higher value by being moved from their origin to their destination. Of course, the cost of transportation should also be covered by giving the product a higher price at the destination. (Coyle, Bardi & Novack, 1999, p. 23).
- **Time utility** assumes that a demand for a particular product only exists during certain time-periods. By moving the goods to the right market at the right time and performing the service when it actually is needed, time-utility is created. (Coyle, Bardi & Novack, 1999, p. 24).

Those utilities bring value to the transport customer, and from his point of view it doesn't matter how or by whom the transport service is produced. It makes no difference which kind of transport-mode is used, as long as the goods are delivered on time. (Lumsden, 1999, p. 32).

¹ Goods not complete finished for sales

² Also called B2B, which regards to business activities between companies

2.2.3. The transport network

A common model when describing transportation is the network structure (figure 2.1). The network represents the physical flow of goods and resources and it consists of nodes and links (Lumsden, 1999, p. 27).

- **A node** is a place where the flow of goods is or may be stopped, and could be a terminal, a warehouse or a production facility.
- **A link** consists of the movements connecting the nodes, and could be a truck transport, sea-voyage or an in-house fork-truck transport.

The network is also given a time-dimension through the cycle-time (figure 2.1). The cycle-time represents the time required for a specific transport in the network. It consists of the link-time and the node-time (Lumsden, 1999, p. 28).

- **The link-time** is the time afforded for the actual movement (transport-time).
- **The node-time** is the time spent in the node. It is regarded as active when the goods are handled internally in the node, and as passive when the goods stay in the node without being handled. Obviously, no value at all is added to the goods and therefore, the passive node-time should be as short as possible (Lumsden, 1999, p. 28).

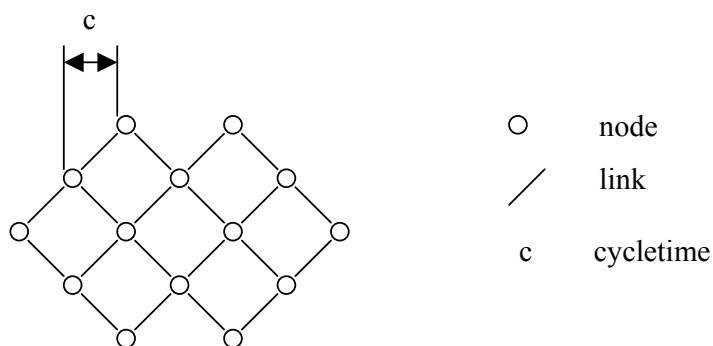


Figure 2.1: The transport network (Lumsden, 1999, p. 28)

Different combinations of nodes and links in the network may be used when transporting a specific shipment. However, when a such combination gets

permanent, a channel through the network has been created. (figure 2.2) (Lumsden, 1999, p. 29). After the network has been structured into channels, the time perspective in every part of the network has become a critical factor. Schedules have to be kept in each channel, in order to create final time-utility as planned. (Lumsden, 1999, p. 30).

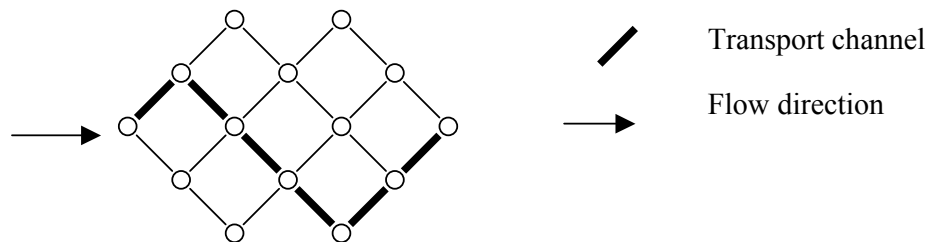


Figure 2.2: The transport channel through the network (Lumsden, 1999, p. 30)

The network-model illustrates how time-utility and place-utility interacts in transportation, and it also explains graphically where in the network the majority of the time-losses are created. When trying to add value to the transport-customer through improving the time-utility, the model puts even small improvements or changes in a larger perspective. Therefore, it may work as a basic model when discussing value-adding in transportation.

2.2.4. Flows in the network

Lumsden (1999, p. 59) means that the flow of goods in turn generates three other kind of flows: the monetary flow, the flow of resources and the information flow (figure 2.3):

- **The monetary flow** involves financial transactions between buyer (transport customer) and seller (transport provider).
- **The flow of resources** represents the flow of cargo-units necessary for carrying the goods (trailers, containers etc.). The flow of resources is not consumed when used and therefore, there is a flow of resources in the reversed direction as well.

- **The information flow** could be divided into two different kinds: horizontal and vertical. Horizontal information is a two-way communication between buyer and seller regarding for example different kind of requirements connected to the product (or service). Vertical information is also a two way communication between buyer and seller, but concerns for example the status of goods and resources.

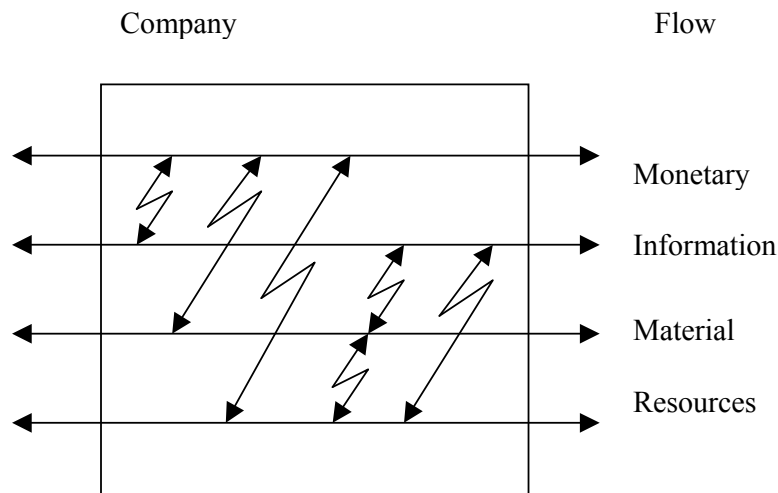


Figure 2.3: Vertical and horizontal flows (Lumsden, 1999, p. 59)

As we can see from the model above, the information flow is the vertical link between the monetary flow, the goods flow and the flow of resources. It is also the horizontal link between the actors in the transport sector, since it provides them with all relevant information. In this perspective, it is easy to see why the development of information technology involves such great opportunities in the future.

2.2.5. Imbalances

According to Coyle, Bardi & Novack (1999, p. 419), the economy in most industrial countries is attributable to the benefit derived from mass production and the division of labour. This kind of specialisation results in an oversupply of goods in one locations, and an under-supply (demand) of these products in another location. Coyle, et al (1999, p. 419) mean that transportation should bridge the supply-and-demand gap inherent in mass-production, but this also

involves problems for the transport provider. As the goods-flow between two locations is different depending on direction, it causes imbalances in the goods-flow. Five kinds of imbalances exist (Lumsden, 1999, p. 624-625):

- **Structural imbalances:** general transport demand is different depending on direction.
- **Operational imbalances:** the flow of goods and the flow of resources don't fit.
- **Technical imbalances:** cargo-units in one direction don't cope with the goods-flow in the reversed direction.
- **Chain imbalances:** when transporting in a sling, the filling-grade and the utility of resources goes down as the goods are delivered.
- **Safety imbalances:** variations in demand lead to an over-capacity in resources, since the producer wants to make sure that the goods will be delivered.

Because of the imbalances mentioned above, the overall demand for transportation between two locations may show a certain variation depending on which direction to consider. In many cases, the problem with imbalances could most likely be reduced, if more information concerning the goods was available.

2.3. The role of transportation

2.3.1. The Supply Chain

Most customers in freight transportation have a connection to production, as a producer or a consumer. They are members in a distribution channel, involving a number of interactions between the channel-members. Coughlan, et al (2001, p. 513), defines the supply chain as “the set of entities that collectively manufacture a product and sell it to an endpoint”. In this sense it is a value-adding chain, but it only considers value-adding activities in production and distribution (Coughlan, A, et al, 2001, p. 513). Christopher (1992, p. 12) has a similar definition. He suggests that “the supply chain is the network of organisations that are involved, through upstream linkages, in the different

processes and activities that produce value in the form of products and services in the hand of the ultimate consumer”. The supply chain goes back not only to the factory floor, but also to the suppliers of the suppliers of the suppliers (Coughlan, A, et al, 2001, p. 504). This means that a supply chain in its most extreme form starts with the raw-material and ends up with the ultimate buyer. According to Christopher, (1992, p. 13) it covers the flow of goods from supplier through manufacturing and distribution chains to the end user.

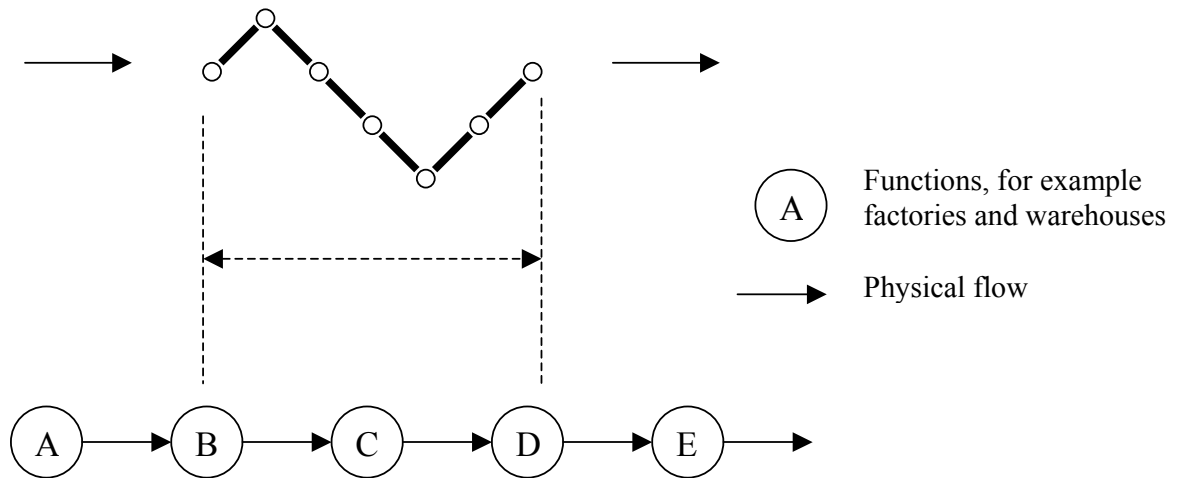


Figure 2.4: The transport channel in a supply chain perspective. (Garberg, 2001)

As a crucial requirement, Christopher also mentions that the logic of integration outside the boundaries of the firm should include suppliers and customers. Achieving cost-reductions or profit improvements at the expense of the supply chain partners only transfers costs upstream or downstream in the channel, and in this way no one gets more competitive. Leading edge-companies recognises the fallacy of this conventional approach and therefore, a more competitive approach is to make the supply chain as a whole more competitive. According to Christopher (1992, p. 14), competition should be supply chain against supply chain rather than company against company. He describes this process with four different stages of integration, where stage 1 stands for the complete functional independence and stage 4 for the optimal external integration. At stage 4, the company is a part of a pipeline that achieves optimal value added in terms of each customers requirements, whilst maximising total supply chain profit (Christopher, 1992, p. 15).

2.3.2. Transportation as a logistical tool

From the reasoning above, it is easy to see how and why the demand on transport services has increased. Transport companies work either as an integrated part of the supply chain or as a subcontractor to a logistics provider, integrated in the supply chain. As the transport performance may affect the whole chain, transport customers require a high service level in order to satisfy the channel members.

Christopher (1992, p. 14), suggests that logistics management primarily is concerned with optimising flows within a specific organisation. Thus, logistics doesn't focus on the whole supply chain, but rather on physical-, information-, and capital-flows inbound, inside and outbound from a production facility. In this context, transportation is one of the most visible elements of logistics operations, concerning physical flows (Bowersox and Closs, 1996, p. 312). According to Bowersox and Closs (1996, p. 312), transportation consists of two major functions: product movement and product storage.

- **Product movement** is the main function of transportation. Transportation utilises temporal, financial and environmental resources, and items should be moved only when it enhances product value. According to temporal resources, this means that the products are inaccessible during transport and thus, it represents an in-transit inventory. This fact has become a significant consideration in a variety of supply chain strategies.
- **Product storage** is the logic possibility from the reasoning above. Although product storage in transportation can be costly, it may be justified from a total-cost or performance perspective. This perspective includes for example loading or unloading costs and the ability to extend lead-times.

From these theories, we could state that through well-planned transportation, it is possible to add value to the goods or the production process. It may be done by turning an unwished in-transit-inventory into a planned and wished product storage.

2.4. A basic approach to sea-born transportation

2.4.1. Sea transportation applied on the network model

From the network perspective, sea-transportation may be compared with any physical movement in the network, no matter if the distance is long or short. The sea-born transport system only describes one single link and two nodes in a wide transport network, but in reality it is of course more complex than that. However, the network model shows in a simple way the role of ports and vessels in a larger perspective (figure 2.5).

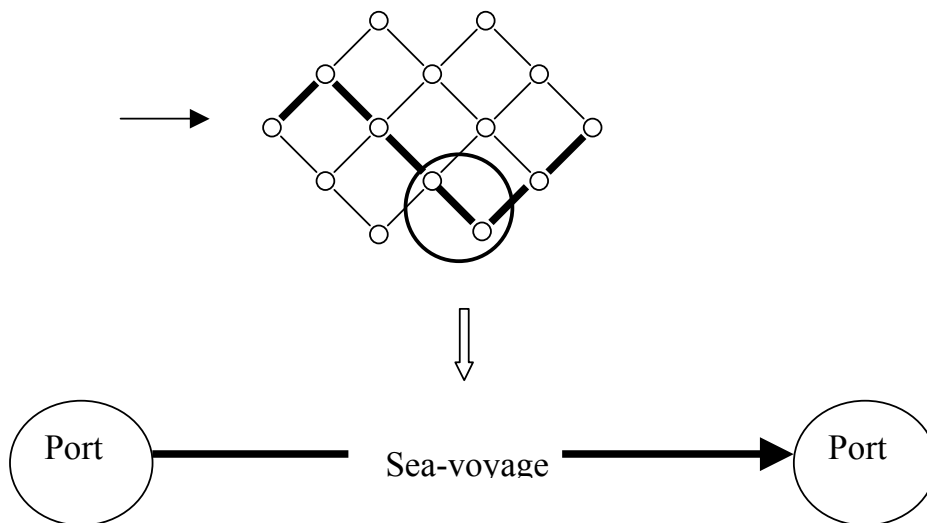


Figure 2.5: Sea-borne transportation in a network perspective (Garberg, 2001).

As shown in figure 2.5, the port terminal is a node in the network. Waidringer (1999, part 2, p. 3), describes the port terminal in terms of logistical flows (figure 2.6). In this model, the port is seen as a black box, with cargo, information and resources going in and out of the box. The model also conforms with the theories concerning flows in the transport network, described by Lumsden (1999, p. 59).

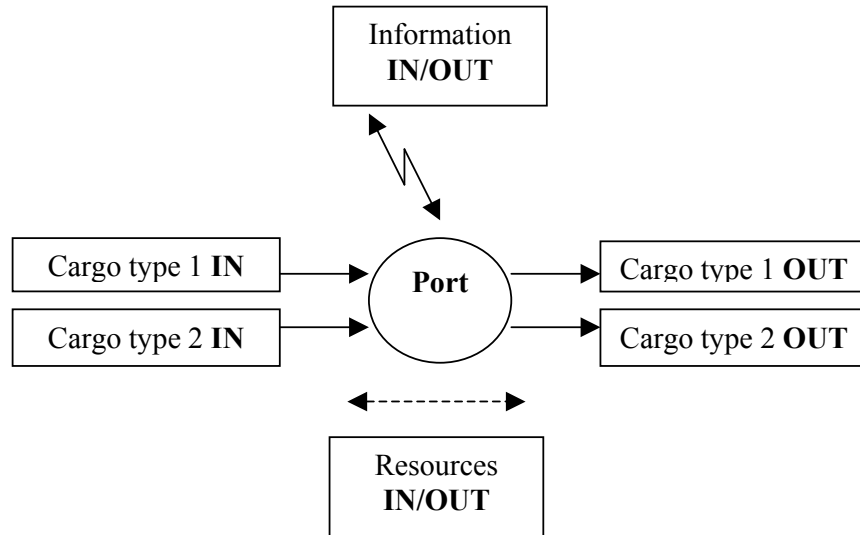


Figure 2.6: Different flows through the port terminal (Waidringer, 1999, part 2, p. 3).

As shown in the figure above, the port is an important co-ordination point in sea-borne-transportation. How the different activities are co-ordinated depends on the relationship between the port authorities, the ship-owner and the charterer. This indicates that sea-borne transportation involves co-operation between a number of independent actors on the market.

2.4.2. Actors

The following description focuses on short-sea roro-shipping, where the time-charter³ is the most common way of leasing a vessel. Therefore, it mainly concern actors involved in sea-borne transportation based on time-charter agreements.

Initially, the need for specific transport is caused by a sales agreement between a seller (sender) and a buyer (receiver) of a product. The sales agreement includes a transport clause, stating who should arrange the transport and how it should be carried out (figure 2.7) (Gorton et al, 1989, p. 41). In the further

³ A transport agreement valid for a specific time (Gorton et al, p. 46).

discussion we assume that the seller also is responsible for the transport arrangements and thus, he is also is the formal transport buyer.

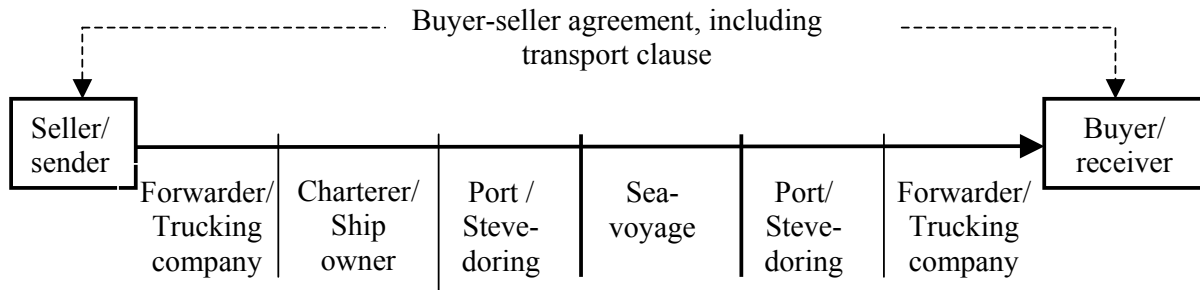


Figure 2.7: The sales agreement
(based on Gorton et al, 1989, p. 41)

The actors, their functions and their internal relationship is of great importance when strategic decision are to be taken by the actors on the market. Therefore, a brief overview over the most important actors is necessary for the further discussion, as well as how they are defined in the study.

- **The sender** generates the demand for transport, and is the original transport buyer. Often busy in the industry, he usually doesn't buy the transport service direct from the transport provider, but from the forwarder. In the following, the sender is often referred to as an industrial customer.
- **The forwarder** acts as an intermediary between the sender and the transport providers. He administrates and organises the transport and make up agreements with the transport companies (Abrahamsson and Sandahl, 1996, p. 37). Nowadays, many of the traditional forwarders have developed towards third-party logistics providers, offering a number of logistics services. In this thesis, forwarders are described both as intermediaries, 3PL-actors and trailer-operators.
- **The trucking company** owns and operates the trucks involved in the shore-based part of the transport. (Abrahamsson and Sandahl, 1996, p. 55) The company is contracted by forwarders, for long- as well as short hauls. Rail

transportation is an alternative transport mode, but is not further developed in this example.

- **The charterer** hires a vessel and offers customers (for example forwarders) space on the ship. A common charter contract is the time-charter, which means that the charterer leases the vessel for a certain time period. (Abrahamsson and Sandahl, 1996, p. 51).
- **The shipowner** owns, and in many cases manages the ship. In some cases, the ship-owner also acts as a charterer. In reality, the charterer is often called ship-owner, no matter if he owns the ship or not (Lumsden, 1999, p. 607). However, in the following, Stena Line and DFDS Tor Line are described as charterers rather than a ship-owners. Expressions such as roro-operators and roro-providers are used in the similar meaning.
- **Port authorities** in Sweden are in most cases owned by communities. As a node and a terminal they play an important role in the transport network, and in the future they may be even more important. Lars Karlsson, managing director for CM Port, claims that port terminals have to develop from parking lots towards logistical centres to be competitive. (Sydsvenska Dagbladet, 010414).
- **Stevedore companies** in Sweden have a monopoly position in the ports. Old agreements worked out by trade-unions states that only one stevedore company in each port is allowed to offer stevedore services in Sweden. Stevedore services may include for example loading and discharging operations on vessels, berthing of vessels and terminal activities (Swedish Competition Authority, 1999). In Göteborg, the stevedore company is a part of the port authority (www.portgot.se/FAQ).
- **The receiver** receives the goods, and he has no relationship to the other actors than the sender.

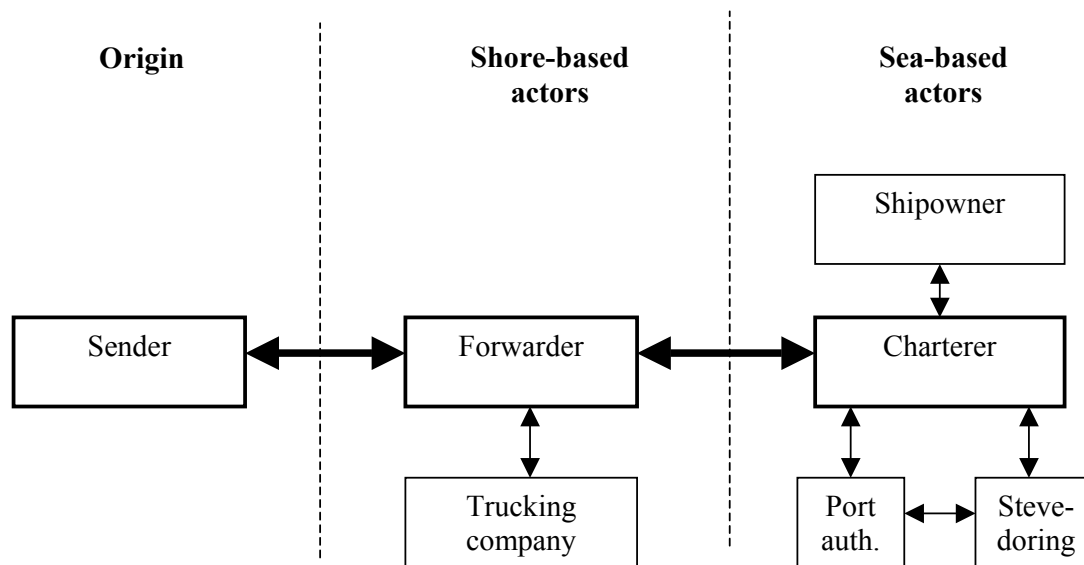


Figure 2.8: The actors and their relationship (Garberg, 2001).

2.4.3. Basic design of ro-ro-vessels.

Roro is a shortening for roll-on roll-off, which also gives some explanation to the concept. The vessels are designed for taking cargo either equipped with wheels, or loaded onto cargo-units equipped with wheels. Common self-rolling cargo are private cars, trucks and lorries (Swedish Shipping Gazette, 50/2000, p. 18). Cargo-units with wheels includes for example trailers and mafi-wagons. For short sea roro-shipping (including sea-voyages of about 48 hours), trailer-units are the most common cargo. (Swedish Shipping Gazette, 50/2000, p. 18). In cases where container units have to be shipped, they are loaded on mafi-wagons equipped with wheels, in order to cope with the roro-concept. Cargo transported by deep sea roro vessels (ocean-crossing) rather consists of a cargo-mix, including for example containers stacked on deck, pallets and forest products in slings.

The vessels are equipped with at least two decks, but more common are three or sometimes four decks. (Larsson, L-E, 1995, part 1, p. 7). Usually, the cargo is brought onboard by trucks or tug-masters through the stern-ramp, located on the main-deck level. The vertical movement between the different decks is

carried out either by driving on ramps or by using hydraulic lifts. For ensuring efficient loading and discharging operations, modern vessels are rather equipped with ramps than with lifts, and sometimes also with two stern-ramps (one for each deck) or one bow-ramp (Larsson, L-E, 1995, part 1, p. 7). Examples of some ro-ro-vessels can be found in Appendix 1.

A certain kind of ro-ro-vessel is the car carrier, specially designed for transporting private cars. However, this includes deep sea ro-ro-shipping, not included in this study.

2.5. Transport quality

2.5.1. Fundamental dimensions of service-quality.

As stated before, transportation is rather a service than a product. The quality of a service is often more difficult to define than that of a product, mainly because the heterogeneity and intangibility of services normally is greater than it is for physical products (Hellgren, 1996, p. 13). Hellgren (1996, p. 13), mentions five service quality dimensions, originally defined by Zeithaml.

- **Tangibles** are the physical components, such as vehicles or personnel.
- **Reliability** is the conformance to specification or agreement.
- **Responsiveness** describes the willingness to respond to customers wishes.
- **Assurance** is the skills, knowledge and courtesy of the company's employees and the confidence that they convey to customers.
- **Empathy** is the caring and individual attention.

Hellgren (1996, p. 14) also mentions Gummesson's description of service quality. Gummesson divides service quality into two different elements: The quality of intangible elements and the quality of tangible elements. Intangible elements are responsiveness, assurance and empathy. Tangible elements are performance, features, conformance, durability, serviceability and aesthetics. In addition to the elements, reliability is listed as a separate dimension. According to Hellgren (1996, p. 14), this approach should be feasible to finding a terminology that is applicable to all forms of output. However, independent of

preferring Zeithaml's or Gummesson's approach, those dimensions form the base when describing service quality.

2.5.2. Fundamental dimensions of transport quality.

According to Lumsden (1999, p. 63), transport may be divided into a physical part and an immaterial part. As a consequence, the concept transport quality may be divided in a similar way. Following this logic, transport quality is by Lumsden (1999, p. 63) described in two different aspects: core quality and shell quality (figure 2.9).

- **Core quality** describes the physical movement, which should be the core business for a transport provider. It focuses on how the goods are moved considering for example transport time, transport frequency, covered market area and safety.
- **Shell quality** describes the immaterial part in transportation, which is how the transport provider meets the customer's requirements. A customer's requirements against the transport provider may concern for example flexibility, availability, responsibility and shell services.

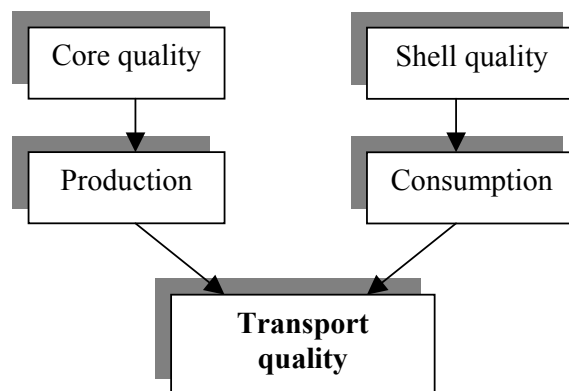


Figure 2.9: The aspects of transport quality (Garberg, 2001).

According to Jensen (2000), the quality of transport systems is affected by some main, non-categorised parameters:

- **Transport frequency** describes the number of departures per time unit.
- **Transport time** is the time required for moving from A to B.
- **Regularity** is the ability to maintain the promised or scheduled time table for departures and arrivals.
- **Comfort** is the protection for goods and passengers against unsuitable conditions, such as impact, vibration, damp, noise, high/low temperature etc.
- **Security** is the protection of goods and passengers against accidents and theft.
- **Controllability** describes the possibility of following the transport process with regards to deviations from schedule and communication deviations to external parties.
- **Flexibility** is the ability of the transport system to adapt to changes in the pre- and post transport system in dimensions such as time, load carriers, packaging and handling.

Jensen also mentions that additional dimensions may be added in specific cases. However, at this stage, we may make some assumptions to be valid in the following discussions:

- High transport quality is reached when customers' expectations are met.
- The specific activities or operations that make a high transport quality should not be defined by the transport provider, but by the transport customer.
- To reach a high transport quality, the transport provider has to adopt a customer focused strategy.
- By offering the customers something more than a high level basic service, more value may be added to the transport.
- Through value-adding services, the transport provider may gain competitive advantages over their competitors.

2.5.3. Measurements

In order to determine the quality of a specific transport, it has to be measured. Structuring the quality concept into core-quality components and shell-quality components, it is easier to find a conceptual model for measuring transport quality (Hellgren, 1996, part 2, p. 9). Although a transport per definition is

consumed simultaneously with its production, the production phase is roughly covered by the core quality concept, while the consumption phase is covered by the shell quality concept. By linking the quality components to the transport production process, it is then possible to obtain a conceptual model of quality in a transport company (Hellgren, 1996, part 2, p. 9). (figure 2.10)

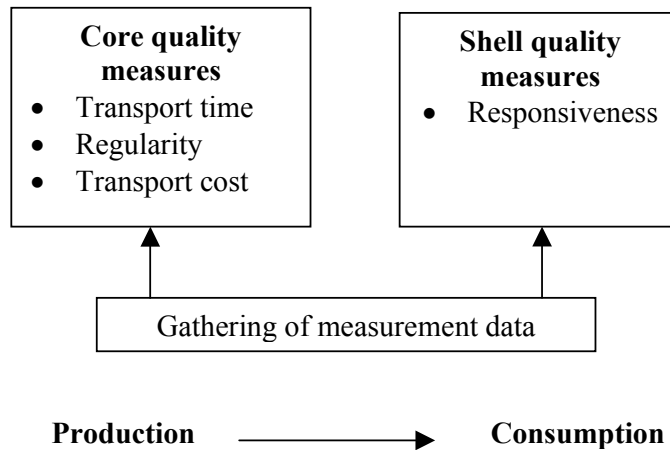


Figure 2.10: Conceptual model of transport quality (Hellgren, 1996, part 2, p. 9)

The measuring of core quality is by Hellgren (1996, part 1, p. 5) described as how closely the core quality parameters conforms to specification. He suggests three measurements principles (Hellgren, 1996, part 2, p. 10):

- Measurements should be usable in the day-to-day operations.
- Measurements should be able to merge into a measurement of the overall quality level of the transport.
- Measurements should be able to serve as a basis for identifying where there is potential for improvement in the transport company.

When discussing value-adding services, its relevance to the transport customer has to be measured in terms of transport quality. In this context, the principles and measurements mentioned above are essential for the decision if an extra service should be offered or not.

2.5.4. Trends in customer demands

Demands and requirements upon transportation seem to change over time, but often production techniques in the industry decide which transport specifications that are valid. Lumsden (1999, p. 24-27) mentions several recent trends in production and logistics. These trends and their impact on transportation are listed and commented on below:

- **Quantity per shipment** is decreasing. Frequent deliveries and consolidation are required.
- **Lead-times in production** are decreasing: Short transport-times and small time-windows for deliveries are required.
- **The assortment of articles** used in production is cut. A more generalised assortment means a higher value per article. Short lead-times, small time-windows for deliveries and short transport-times are required.
- **Decreasing number of suppliers** means that functions are moved from the assembling plant towards the suppliers. In turn, the supplier in some cases makes the transport provider responsible for some of those functions. Value-adding services are required.
- **Increasing number of sequenced articles.** Shipments have to be delivered in a pre-defined order to fit with the production. High transport security is required.
- **A high delivery service** is required and no shipments should be refused by the transport provider. As a consequence, an over-capacity in the transport system is required, which leads to a low utilisation of resources.

These trends only illustrate what has been said earlier: that transportation is not only a movement of goods, but often an integrated part in the production process. Therefore, adding an extra value for customers in connection with the transport is an important issue when discussing customer service.

As mentioned above, the level of core quality in transportation depends on how close the actual performance conforms with the specifications set by the customer. In other words, the final service level depends on whether the transport is able to meet customer's expectations or not. This means that transport quality is not a fixed parameter, since specifications concerning transport requirements vary from customer to customer. However, the quality

dimensions mentioned above are fundamental, but their individual importance may vary. This is also shown in an investigation by Hellgren (1996, part 2, p. 6), involving a sample of Swedish manufacturing companies. He also concludes that the components considered as most important by the respondents are the regularity and the transport time. This means that what the customers want above all else is fast and reliable transport (Hellgren, 1996, part 2, p. 6).

2.5.5. Customer value, satisfaction and expectations

When a transport customer is about to take a decision about which transport provider to choose, he is most likely to choose the one capable of delivering the highest customer value. Customer delivered value is by Kotler et al (1999, p. 472), defined as the difference between total customer value and total customer cost:

- **Total customer value** is described as the total of all product, services, personnel and image values that a buyer receives from a marketing offer.
- **Total customer cost** is the total of all the monetary, energy and physical costs associated with a marketing offer.

Christopher (2000, p. 49) has a similar definition. He means that customer value is created when the perceptions or benefits received from a transaction exceed the total cost of ownership. Furthermore, he states that the marketing task is to find ways to enhance customer value by improving the perceived benefits and /or reducing the total cost of ownership. Those basic principles could be adopted for describing some of the ways in which customer value can be enhanced by developing logistics processes (figure 2.11).

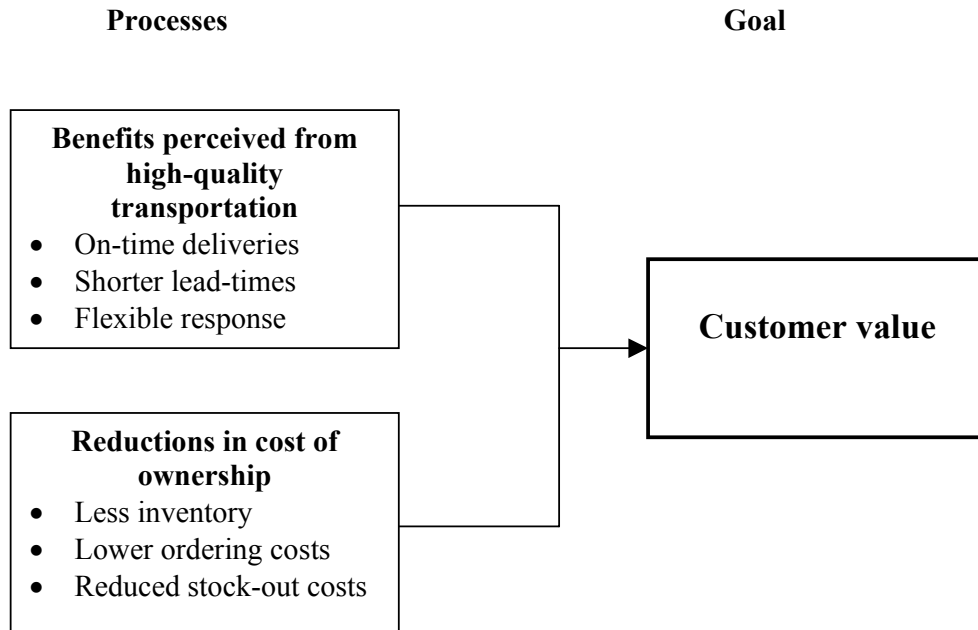


Figure 2.11: Logistics processes and customer value (based on Christopher, 2000, p. 53)

As figure 2.11 shows, the ultimate goal of performing logistics services should be to create customer satisfaction. According to Kotler et al (1999, p. 475), customer satisfaction with a purchase depends on the products' performance relative to buyer's expectations. Various degrees of satisfaction might occur:

- If the product's performance falls short of expectations, the customer is dissatisfied.
- If the product's performance matches expectations, the customer is satisfied.
- If the product's performance exceeds expectations, the customer is highly satisfied or delighted.

The transport customer's expectations is based upon the specifications stated in the agreement between transport buyer and transport provider. Out of this, we might conclude that if the transport conforms with the basic requirements, the transport customer will be satisfied. If it is possible to add an extra service connected to the transport, the performance would exceed expectations and the customer would be highly satisfied (figure 2.12). Therefore, the importance of meeting the rising demands, derived from changes in production techniques described above should be underlined.

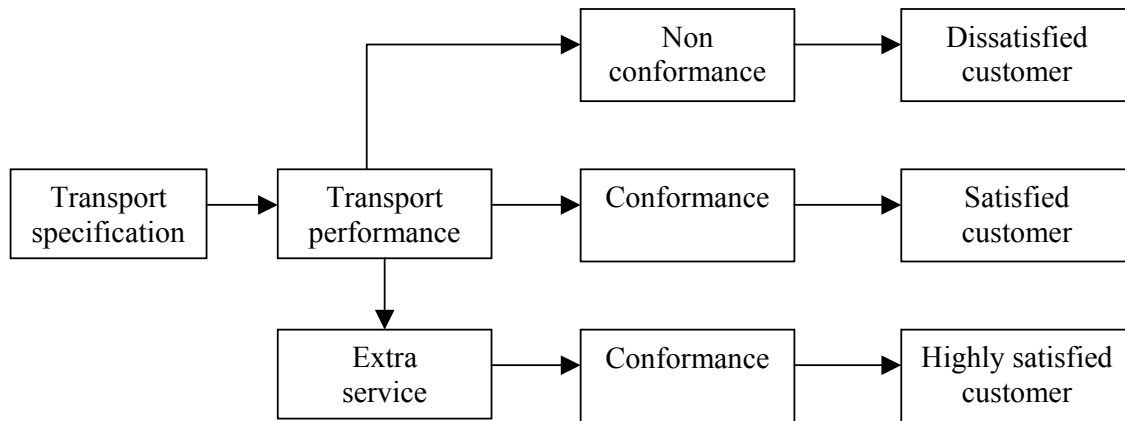


Figure 2.12: Customer satisfaction and transport performance (Garberg, 2001).

In the worst case, the dissatisfied customer described in figure 2.12 may become a lost customer. The cost of a lost customer is significant, but difficult to estimate. Therefore, many companies have started to recognise the importance of retaining current customers (Kotler et al, 1999, p. 483).

2.6. Value-adding services

2.6.1. Definitions of customer service

A general definition of customer service is difficult to find, but basically it concerns relationships at the buyer and seller interface. According to Christopher (1992, p. 26), the role of customer service is to provide time and place utility in the transfer of goods and services between buyer and seller. He means that there is no value in the product or service until it is in the hands of the customer or consumer. LaLonde has a more supply chain related definition: “Customer service is a process for providing significant value-adding benefits to the supply chain in a cost-effective way” He also states that this illustrates the trend to think of customer services as a process-focused orientation that includes supply chain management concepts (Bowersox and Closs, 1996, p. 66). This definition clearly indicates that there is a close relationship between supply chain management, customer service and value-adding activities.

Christopher, et al (1979, p. 1), describe customer service as the end of the pipeline, constituted by the flow of goods from supplier to customer. Coughlan et al (2001, p. 514) have a similar opinion. They mean that supply chain management (SCM) is an organising concept that starts with customer service and argues that this results from the cumulative efforts through the entire channel. Furthermore, they think that a guiding principle should be to unify product flows and information flows up and down the production and distribution chain. Christopher (1992, p. 24) simply suggests that the ultimate purpose of any logistics system is to satisfy customers.

Concluding the definitions above, customer service should be the final outcome of the supply-chain, but also the outcome of each link and node in the transport network. Each transport provider in every link through the whole supply chain should aim at offering every transport customer a high transport service. That means that every transport should fulfil a number of parameters in order to create customer satisfaction, and in this matter value-adding services play an important role. The meaning of value-adding services will be further described in the following chapters, but the basic principles are shown in figure 2.13.

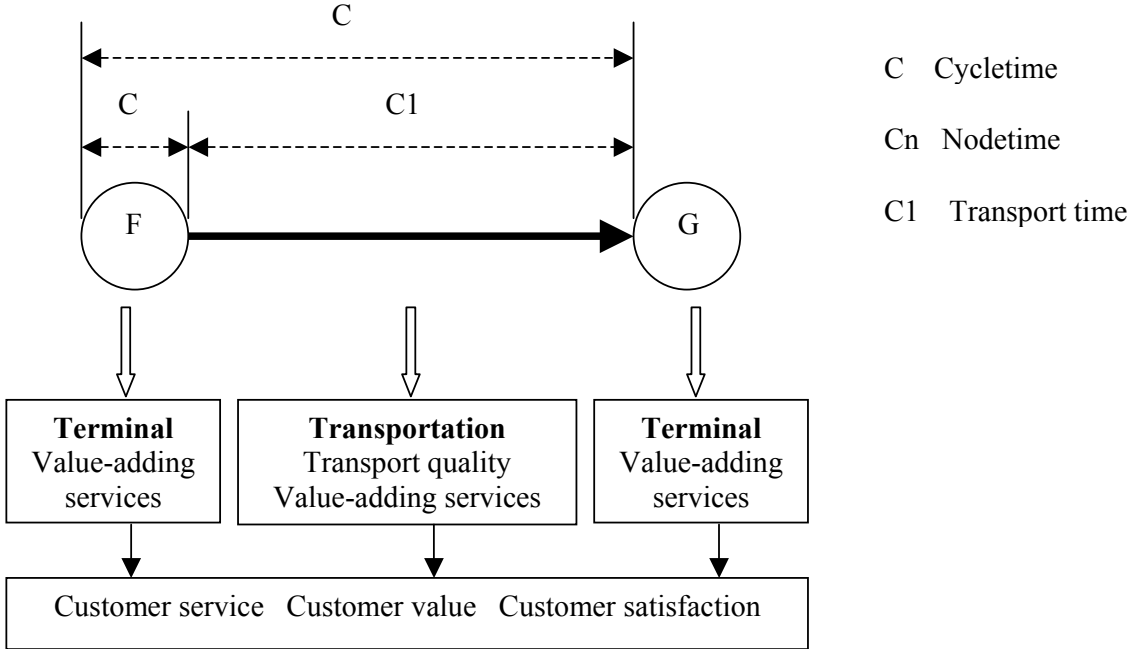


Figure 2.13: The outcome of the transport channel (Garberg, 2001).

2.6.2. Reasons for adding service-value

Christopher (1992, p. 16), shows the connection between value-adding services, customer service and the time- and place utilities. He means that a prime source of adding value to the customer is through customer service, and defines customer service as “the consistent provision of time and place utility”. Christopher has a quite product-orientated view, but this statement should be valid for a transport service as well. Grönroos (1996, p. 119), suggests that the technical quality in a service package represents a basic value to the customer. A service level above the basic value contributes as a positive value-adder to the service, if properly performed. If not properly performed, the value added will be negative, which in turn causes negative effects on the basic service value as well (figure 2.14).

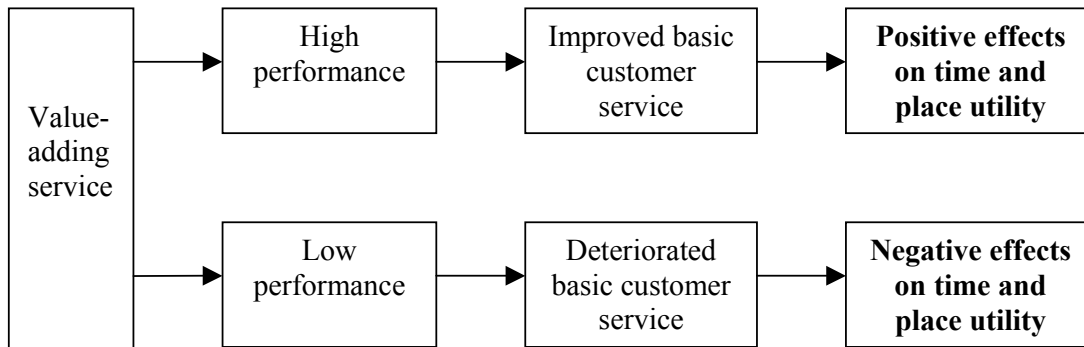


Figure 2.14: The effects of value-adding services (Garberg, 2001).

Bowersox and Closs (1996, p. 78), define value-adding services as unique or specific activities that firms can jointly work out to increase their effectiveness and efficiency. They also underline that value-adding services are easy to illustrate but difficult to generalise, because they are customer-specific. This means that what adds value to one customer doesn't necessarily add value to another customer, unless they have similar requirements. Bowersox and Closs (1999, p. 78), make a clear difference between three levels of logistical performance:

- **Basic service** is the customer service program upon which a firm build its fundamental business relationships. All customers are treated equally at a specified service level to build and maintain customer loyalty.

- **Zero defect** is the maximum level of logistical availability, operational performance and reliance. The outcome is the perfect order, and can be offered to select customers as a way of being their “preferred supplier”.
- **Value-adding services** represent an alternative to build customer solidarity and become their “preferred supplier”.

To conclude the theories above: value-adding services are offered by the transport provider in order to build relationships with new and old customers, and gain a competitive advantage over the competitors.

2.6.3. Adding value through activities

Traditionally, extra services are performed when the flow of goods is stopped, e.g. in terminals. Many of the activities in the terminals focus on making the actual transport more efficient, but there are also activities adding value to the goods (products) instead of to the transport. By adding value to the product in terminals, the cycle-time may be better utilised and the total lead-time in production may also be cut. Lumsden mentions several typical terminal activities (1999, p. 498-500, 507-508). They may be divided into transport-focused and product-focused activities:

Transport-focused activities:

- **Consolidation**: goods are picked up by lorries in the local area, delivered to the terminal and consolidated with goods with the same final destination for the long-distance haulage.
- **Transshipment**: the terminal work as a shifting point from one transport mode to another.
- **Co-ordination**: vehicle movements are co-ordinated in order to make efficient transshipments between transport modes or vehicles.
- **Cross-docking**: goods pass the terminal without being stored. By this technique, consolidation is performed directly from inbound cargo-units to outbound cargo-units and the time-loss is minimal. This requires a precise co-ordination and value is added through cutting the transport-time rather than performing value-adding activities.

Product-focused activities:

- **Sorting:** goods are sorted in a way specified by the customer in order to improve the shipment on arrival.
- **Kitting:** products that will be assembled at the receiving facility are put together in the terminal.
- **Sequencing:** the departures of various products are arranged in an order suiting the receiver's specified needs.
- **Commercialising:** products are adjusted for delivery to end-user.
- **Storing:** sometimes storing of products is necessary. Instead of having own warehouses, transport customers may put this function in a terminal.

2.6.4. Adding value through information

As the information technology has developed, value-adding has got another dimension: value adding through information. Lumsden et al (1997, p. 2-3) compare the production of information with the production of products. The inbound raw-data is structured and refined into information, which in turn is transformed into knowledge. This means that data is not a usable product until structured into information. As information is communicable, it may be analysed, interpreted or modelled. Then it turns into knowledge, which is the final outcome of information (figure 2.15).

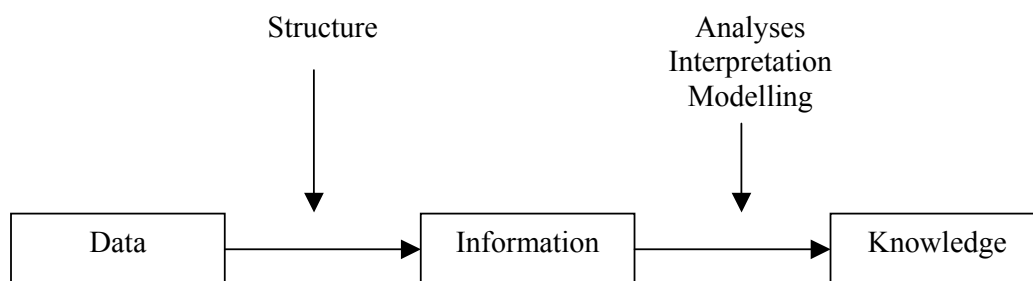


Figure 2.15: The information value chain
(Lumsden et al, 1997, p. 3)

Kanflo (1999, part 1, p. 34), suggests that information has a value only if it helps in decision making. This means that the knowledge one gets from information should be an important tool when making decisions, otherwise it doesn't represent any value to the user. Therefore, to create valuable

information the problem has to be approached from the right end (Kanflo, 1999, p. 35):

1. Which decisions should the information support
2. Which information do we need to support the decisions
3. What data is needed to create the information needed.

Thus, when adding value through information, the starting point should be to find out what decisions to take. Another important aspect to consider when adding value through information is that the value of information in most cases varies over time. In practice this means that the earlier the information the better (Kanflo, 1999, p. 35). However, putting a monetary value on information is more difficult. King and Griffiths suggests two approaches for estimating the value for information (Lumsden et al, 1997, p. 4-5):

- Estimating an organisation's willingness to pay.
- Estimating an organisation's cost savings or other advantages derived from information.

The use and value of information is not a new science. What is new are the possibilities of collecting and structuring data through the use of modern information technology. Nowadays serious amounts of data may be rapidly collected and structured into advanced information which opens up enormous possibilities. However, putting a specific price tag on offered information in order to finance hardware investments is difficult.

2.6.5. A framework for value-adding in transportation

According to Lumsden (1999, p. 34), a transport commission involves both the node-time (terminal) and the link-time (transportation). This could also be described as the cycle-time in the transport network. Since the transport commission sometimes also involves the node-time, it could be assumed that terminal activities have a close relationship to transportation. As stated before, the basic function of transportation is to create time- and place utility to goods. From this perspective, value-adding services in transportation should contribute to increasing those utilities by improving the core quality as well as the shell

quality of transportation. Connecting the two kinds of value-adding activities to the quality-dimensions, it is possible to conclude the following:

- Transport-focused activities in terminals are mainly related to the physical movement of transportation. Those activities contribute for example to cutting transport-times and increasing transport frequency.
- Product-focused activities are more related to how to meet customer requirements according to special handling of the shipments.

Having said this, transport-focused activities in terminals roughly relate to the core-quality of transportation and product-focused activities roughly relate to shell quality of transportation. On the other hand, value-adding through information may be regarded as a service supporting both the core-quality and the shell quality, since qualified information may improve both the physical movement and the relationship to customer (figure 2.16).

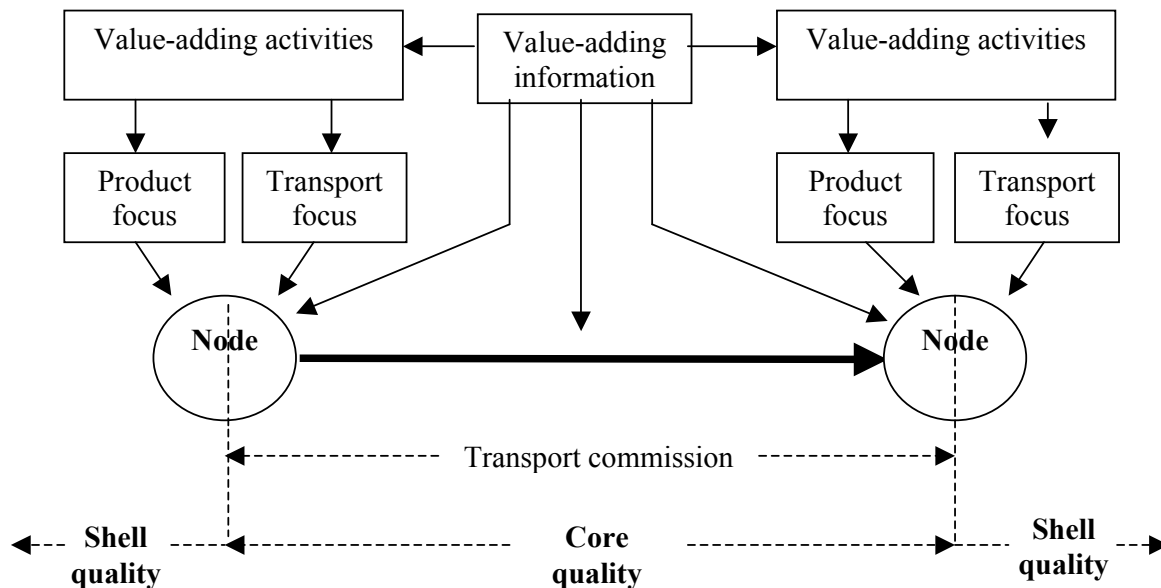


Figure 2.16: Value-adding services and transport quality (Garberg, 2001).

3. Roro business at Stena Line and DFDS Tor Line

3.1. Market description

3.1.1. Routes and destinations at Stena Line

Stena Line is a world leading ferry company, where Stena AB is the main owner. It is divided into 4 business areas named Scandinavia, Irish Sea, North Sea and Freight. The charterer function within Stena Line is operated by Stena Line Freight. This function is responsible for developing, marketing and selling of freight services and operates 19 routes on 29 destinations in Northern Europe. In total, 775 507 cargo units were transported in 2000, on a fleet including conventional ferries, RoPax⁴-ferries, rail freighters, conventional freighters and High Speed Service catamarans (HSS). (www.freight.stenaline.com).

In the further investigation, we will focus on the service between Göteborg in Sweden and Travemunde in Germany (Appendix 3). This route is a pure cargo service, similar to DFDS Tor Lines' services from Göteborg. Therefore, it may also work as a substitute for some of them. It offers daily departures at 1900 from Göteborg and arrives in Travemunde the following morning at 1030. The vessels are conventional ro-ro-vessels built in 1977, with a cargo capacity of 1700 lane-meters.⁵

Stena Line also operates a service between Göteborg and Harwich in Great Britain. However, this service is a joint venture with DFDS Tor Line and will be further described in the next chapter.

⁴ Combined passenger- and freight vessel.

⁵ A common cargo capacity-measuring on ro-ro-vessels, stating the total length of lanes.

3.1.2. Routes and destinations at DFDS Tor Line

DFDS A/S in Copenhagen focuses on two business areas: passenger shipping (DFDS Seaways) and ro-ro liner traffic (DFDS Tor Line). DFDS Tor Line has subsidiary companies in Denmark, Sweden, Norway, United Kingdom, Belgium, Germany and Lithuania. Similar to Stena Line, DFDS Tor Line charters their vessels on their own. They are primarily a ro-ro-operator on the North Sea and the Baltic Sea and the business is divided into 14 market areas. (www.dfdstorline.com/infobridge) They call their routes “bridges”, and from our perspective the most interesting routes are the AngloBridge and the EuroBridge (Appendix 2).

The AngloBridge connects Göteborg with Immingham and Harwich in United Kingdom. Limited cargo space could also be offered on DFDS Seaways’ passenger ships to Newcastle. (www.dfdstorline.com/infobridge/anglobridge). The service includes in total 12 departures a week, with daily departures between Göteborg and Immingham, 3 departures a week between Göteborg and Harwich and 2 departures a week between Göteborg and Newcastle. However, this route focuses on passenger services and will not be further discussed.

Three newly-built vessels with a cargo capacity of 2772 lane-meters offer a 26 hour seavoyage between Göteborg and Immingham. (www.dfdstorline.com/infobridge/the fleet). Departures from Göteborg are at 2100 and from Immingham at 1400. As mentioned before, the route between Göteborg and Harwich is operated on the basis of a pool agreement with Stena Line. The pool is called Stena Tor Line HB and offers a 36 hours sea-voyage with two ro-ro vessels with a cargo capacity of 1575 lane-meters each. (www.dfdstorline.com/infobridge/the fleet). Departures from Göteborg as well as Harwich are on Tuesdays and Thursdays at 1900.

The EuroBridge is a route between Göteborg and Ghent in Belgium and some vessels also call at Brevik in Norway. It offers six departures a week from Göteborg and Ghent and three departures a week from Brevik. Departures from Göteborg as well as from Ghent are between 0100 and 0300 except for Sundays, and departures from Brevik are at 0800 or at 1400, depending on which day it is. The total transport-time between Göteborg and Ghent is 42 hours, and the service is maintained with four ships with a cargo capacity of

about 2500 lanemeters (with some variations depending on vessel).
(www.dfdstorline.com/infobridge/the_fleet)

3.1.3. Main cargo flows

According to DFDS Tor Line, there are five general cargo systems for utilising the ro-ro-technology in full: trailers, cassettes, automobiles (cars, trucks, lorries etc.), lift units and special cargo (www.dfdstorline.com/infobridge/presentation). The dominating cargo-units transported by Stena Line and DFDS Tor Line in the Göteborg-relations are the trailers. Some years ago, a certain flow of lift units (containers) were transported with Stena Line, but due to inefficient loading operations on the ro-ro-vessels, those units are often refused today (Kenneth Johansson, Stena Line Freight). Concerning DFDS Tor Line as a whole, trailer goods stands for about 70 % of total cargo volumes.

www.dfdstorline.com/infobridge/presentation). Both Stena Line and DFDS Tor Line put a heavy focus on trailer traffic, and DFDS Tor Line has in recent years made heavy investments in new vessels with innovative solutions concerning trailer-handling. With the use of special loading- and lashing technique, the loading and discharging operations of the vessels have been cut by several hours (Lennart Dahlbäck, DFDS Tor Line). However, today there are only three vessels in DFDS Tor Lines fleet using this technique, all servicing the route between Göteborg and Immingham.

The second most important cargo flow at Stena Line and DFDS Tor Line is the flow of private cars. This cargo mainly concern an export flow from Göteborg of Volvo- and Saab cars and Volvo trucks, and is also very sensitive to strategic changes in the production. Recently, allocation changes in the production seriously reduced the flow of private cars from Volvo in Göteborg to Ghent. (Dahlbäck, L). Anyway, DFDS Tor Line is the largest operator in transporting export cars from Göteborg, even larger than special car carrier operators such as Wallenius-Willhelmsen (Dahlbäck, L). The transport of private cars has some certain advantages making it a good business:

- Smooth and fast loading and discharging operations
- No lashing required

- High utilisation of the vessels, if equipped with hang-decks.⁶

You might say that hang-decks increase the cargo capacity on the vessels in question of lane-meters. However, this is only suitable for private cars, since the height on the hang-decks is insufficient for trailers.

3.1.4. Customers

The customer structure is quite similar at Stena Line and at DFDS Tor Line. A typical characteristic concerning the connection between goods volumes and customers is that a few customers stand for a significant share of total volumes shipped. Johansson, K, claims that 5 % of the total number of customers at Stena Line stand for 80 % of their total goods volumes. Holger Johannisson, Booking Manager at DFDS Tor Line, expresses the connection in another way: “Less than 10 of our largest customers stand for the majority of the total cargo volumes”.

You might say that there are two main types of customers: industrial customers and forwarding customers. In general, agreements direct with the industry are unusual, except for the transportation of private cars. According to Kenneth Johansson and Lennart Dahlbäck, the charterers are afraid to put up agreements direct with industrial customers, since it may be regarded as a competitive business by the forwarders. Therefore, such agreements mainly concern goods not suitable for trailer transportation. Except for private cars, there are only two examples of transport agreements between the industry and the roro operators in this investigation:

- **Avesta Polarit** and DFDS Tor Line has an agreement concerning an internal flow of steel-products between Avesta and Sheffield, the so called “steel-bridge” (Ewert Wijkander, Avesta-Polarit). This is an example of system transportation⁷, involving an integrated flow of goods including both rail and sea transportation. Since the products are heavy, trailers are not

⁶ Cargo decks with reduced height, often adjustable by hydraulic equipment.

⁷ Transport system specially designed for working as an integrated part of a company’s production line (Lumsden, 1999, p. 114).

suitable to be used as cargo units and instead, the cargo is loaded on cassettes specially designed for this certain flow.

- **Volvo** co-ordinates their flow of car-parts themselves, by signing agreements direct with DFDS Tor Line. However, the actual haulage is carried out by forwarders and thus, these agreements don't affect them in a negative way.

Obviously, the most common way of transporting goods on ro-ro-vessels is by using forwarders. As mentioned before, many large forwarders also offer a number of logistics services in their terminals, such as consolidation, storing and commercialising of products. Having large cargo-volumes and a focus on trailer-traffic, they often own and operate trailers themselves. Their customers are usually from industry, but also food-stuff is a common commodity. Food represents a special kind of cargo, often requiring special fridge-trailers and special treatment onboard the vessels.

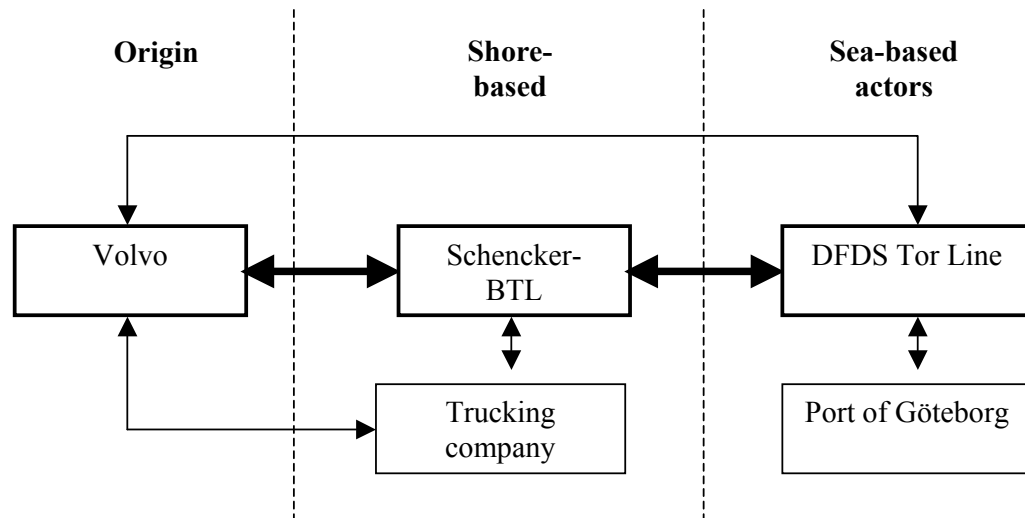


Figure 3.1: Examples of actors and their relationship (Garberg, 2001).

Figure 3.1 illustrates how the different actors interact when shipping goods with DFDS Tor Line. As mentioned before, the port authority is responsible for the stevedoring activities in Göteborg, but in this matter Stena Line has a unique position in Sweden. They have succeeded in keeping an old internal agreement with the port and are thereby allowed to run their own stevedoring company (Johansson, K). However, this agreement is only valid for the

stevedoring at the Majnabbe terminal, who operates Stena vessels bound for Germany.

3.2. Current transport service

3.2.1. Booking

In the following, a brief description over the booking systems at Stena Line and Tor Line is given. The facts presented in this chapter are based on site-visits at the booking-offices of the two companies. As both systems are similar, but not identical, differences exists. Therefore, the description is rather a combination of both systems, but when significant differences exists, they are of course mentioned.

Routines concerning booking involve a wide range of different policies among the transport customers. Telephone bookings and manual way-bills sent by fax are still in use, but the trend is a change towards electronic bookings. In its simplest form, the customer books his goods through the internet on Stena Line's or DFDS Tor Line's web-site, either by using the booking service or e-mail. The electronic booking services on the web are free from costs and quite similar at Stena Line and at DFDS Tor Line. To be able to use the service, the customer has to be registered as a user. However, a short introduction to the system is required before becoming a registered customer.

When booking the cargo, the customer registers all data needed concerning the shipment, such as type and size of unit, content, weight and unit number. Having done this, he simply chooses a suitable departure and waits for confirmation. Departures between three months and eight weeks ahead may be chosen, depending on which booking system is considered. Confirmation could be expressed either by the term "booked" or "stand-by". If receiving "stand-by", the ship is full and the cargo will be transported with the next departure, unless no bookings are cancelled. In fact charterers often overbook their ships, since they calculates with a certain amount of cancellations. According to Kenneth Johansson at Stena Line Freight, the over-bookings at Stena Line are about 10 % of the total cargo capacity. Many large customers have standing

bookings, which means that they reserve a given number of cargo-spaces specified for each departure.

EDI is by Kanflo (1999, part 2, p. 4), defined as “the automatic transfer of structured data between two applications in two different computer systems, where a data message from one application initiates a logical reaction in the other system, without human interface”. It enables direct links between the transport customers and the charterers. Bookings are made direct in customers’ booking systems and automatically transferred to charterers. In contrast to the internet, the communication is internal with a higher degree of security. Furthermore, since bookings are done in customers booking system, the operator doesn’t have to type the same booking twice, as is the case when using internet booking. However, very few customers use EDI, as it requires investments in the information system.

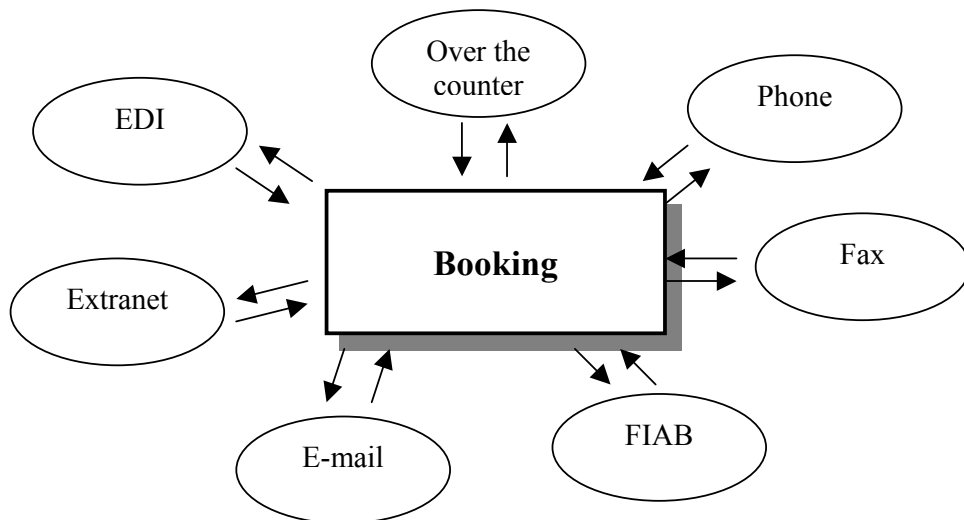


Figure 3.2: Information flow in the booking system (Johansson, K, Stena Line Freight).

The figure above shows different information channels used at Stena Line’s booking office. FIAB stands for Freight In A Box, which could be defined as something between on-line booking and EDI-booking. Stena Line install their own system at the customers and teach them how to use it. The customer makes the bookings in the system and sends them direct to Stena Line, either through a direct link or through the internet. Using the internet is the cheapest solution for the customer, but when transmitting the bookings a pin-code is required in

order to ensure high security. Compared with the on-line bookings, FIAB is an expensive system for Stena Line to run, and is only offered to large customers.

Extranet refers to the on-line booking system described above and “over the counter” refers to manual booking, just before passing the gate. However, regardless of which information channel is used, Stena Line has the intention to use the same channel when replying (Johansson, K). This means that if booking is done by fax, the confirmation will be by fax as well.

3.2.2. Transport information

The service on the internet is not only a way of booking cargo. It is also an information forum, offering the customers both general and detailed information concerning the transport. General transport information is available for all visitors on the web-site and shows only slight variations between Stena Line and DFDS Tor Line (www.freight.stenaline.se and www.dfdstorline.com/infobridge). General information includes for example:

- **Time-tables** for every destination in respective network. Stena also updates ETA, if changed.
- **Freight conditions** for carriage goods at sea. It explains for example responsibilities and liabilities in the transport agreement.
- **Dangerous goods** information and special requirements for shipping.
- **Freight Magazines** with recent news and interviews from the transport sector.
- **Vessel descriptions** showing ships data and which route it is following.
- **Transport policies** explain useful definitions connected to the transport.
- **Standard terms of business** describe rules and routines to be followed by the transport customer.
- **Tariffs and surcharges** show extra cost for non standard units and also occurring variations in transport price depending on bunker prices, currency-rates and port fees.

Detailed transport information is available only for registered transport customers with log-in numbers. Examples of detailed information are:

- **Status information.** At DFDS Tor Line, three stages of status information are possible to receive, after received definite booking: received at terminal, loaded on vessel and released from vessel. Thus, it is possible for the transport customer to follow exactly when a specific unit passes the terminal gate, when it is loaded on the vessel and when it is discharged from the vessel. At Stena Line, status information is only given according to when the ship has sailed, and it is not possible to track units between different port operations.
- **Changes** may occur in the transport system, planned as well as unplanned. Planned changes, such as changes in time-tables are posted on the web-site and transmitted by e-mail. Unplanned changes, such as delays due to rough weather are also sent by e-mail. At Stena Line however, such changes are indicated directly in the time-table.
- **Shippers manifest** is a service at Stena Line consisting of an e-mail including a summary of shipped data. How often it should be sent is decided by the customer, but the most common wish is one summary per departure (Johansson, K, Stena Line).
- **Reports and statistics** of shipped goods over long time-series may also be available to each transport customer.

A special kind of information is to inform the customer when something differs from the normal. It may involve for example cargo damage, but in such cases the customer is informed by telephone. The damage needs to be described to the customer, and it also has to be discussed how to solve the problem in the best way.

EDI-customers may receive all the information mentioned above in a closed link direct to their own business systems. Figure 3.3 shows an overview of different information channels used in connection to the roro-transport.

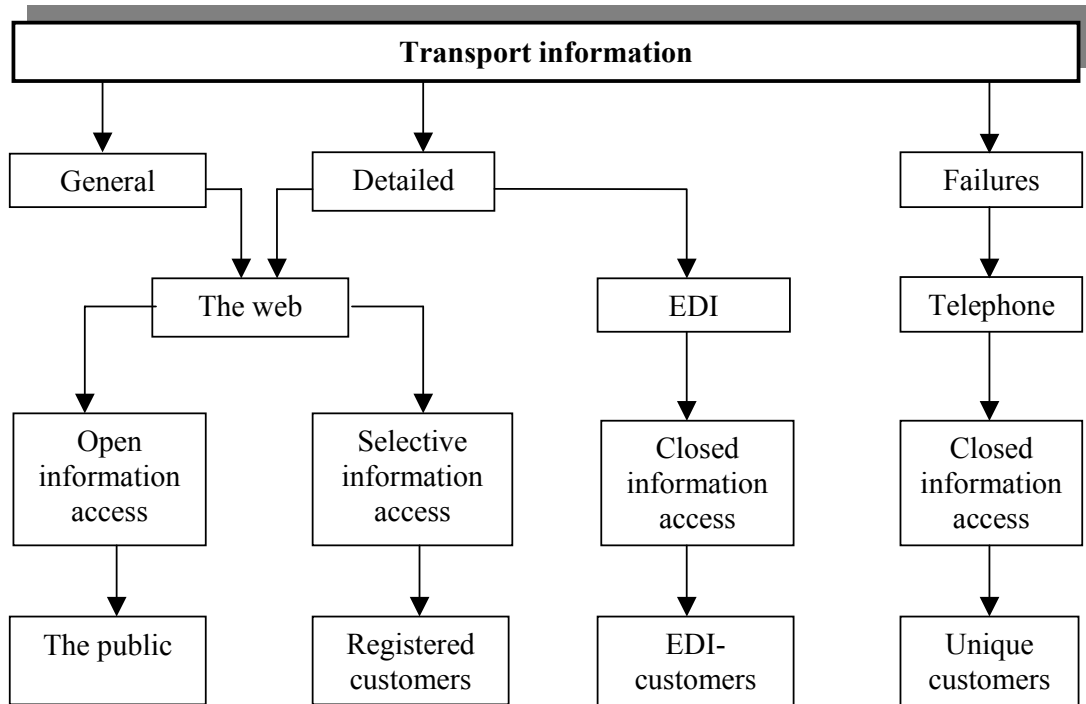


Figure 3.3: Information channels (Garberg, 2001).

3.2.3. Port operations

Port operations involve all the activities performed from when the cargo unit arrives at the terminal gate till the cargo is placed onboard the ship. As mentioned before, there is one fundamental difference between the port operations at Stena Line and at DFDS Tor Line: Stena Line owns and operates their own stevedore-company, but DFDS Tor Line is dependent on the Port of Göteborg, due to the Swedish stevedoring monopoly. Therefore, you might say that Stena Line controls the port activities to a higher degree than DFDS Tor Line does. Nevertheless, DFDS Tor Line has a more sophisticated port system than Stena Line.

At DFDS Tor Line, every tug-master⁸ is equipped with an information terminal, enabling the tug-driver to register when and where he picks up or put

⁸ A truck used in ports when moving trailers.

down a unit. The operator at the terminal's gate is connected to the same system, where he registers every unit that passes the gate. Primarily, information is registered in the system used by the port authorities (TICS), but it is further linked direct to DFDS Tor Line and their system (Phoenix). Thereby, all the information concerning the status of each unit is also made available to the transport customers. However, slight problems between the two systems sometimes occur and then status information doesn't reach the customers. Since DFDS Tor Line has access to TICS, they also have the possibility to inform the customers by telephone in such cases, if requested.

A recent system not yet introduced is the so called distance notification, developed in the port of Göteborg. Distance notification assumes that information concerning inbound cargo units is sent to port's gate in advance. In return, the customer receives a pin-code to be used by the truck-driver as a clearance through the gate. With that, the units can pass the gate without stopping. This system aims at reducing queues at the gate, which is a slight source of uncertainty today, especially for units arriving late.

At Stena Line, there are no possibilities of tracking cargo units. Inbound units are registered only when passing the gate and on the final loading list, if loaded. The tug-masters are not equipped with any terminals, and as a consequence the only information transferred to the customers refers to if the ship has sailed or not and if customers cargo is registered on the final loading list. However, according to Kenneth Johansson, Stena Line is about to make investments in tug terminals in the nearest future. By that, Stena Line aims at increasing customer service, improving the security and making internal cost-savings. Just like the port of Göteborg, Stena Line also investigates how to make the clearance through the gate faster and simpler.

As mentioned before, DFDS Tor Line has developed an innovative solution for loading and discharging operations, but it is only in use at the service between Göteborg and Immingham. The system involves an automatic trestle⁹, hydraulically secured in ship's deck by tug-master. No lashings are necessary, except in case of bad weather, which enables reductions in loading- and discharging times and reduces labour-costs and cargo-damage. At Stena Line,

⁹ During the sea-voyage, the front of the trailer rests on a separate trestle, instead of on its own legs.

as well as on other DFDS Tor Line destinations, a conventional trestle system is used, manually operated by stevedores.

3.2.4. Additional services

DFDS Tor Line offers a service they call LOFO, which stands for “last on, first off”. This means that if the customer has an urgent shipment, he has the opportunity to ask to be loaded on the ship as one of the last units. As a positive consequence, he will be one of the first units to be discharged at the port of destination (figure 3.4). In total, twenty cargo-spaces are available for this service, and if booked as a LOFO the customer is guaranteed his goods to be discharged during the first hour. Thus, if the vessel arrives at 0300 in Ghent, the customer knows for sure that he can pick up his cargo at 0400, at the latest. However, according to Lennart Dahlbäck at Tor Line, this service is not used full out today, which means that less than twenty units on each departure are booked as LOFO. At Stena Line this is not a formal service, but may be offered by telephone, if required.

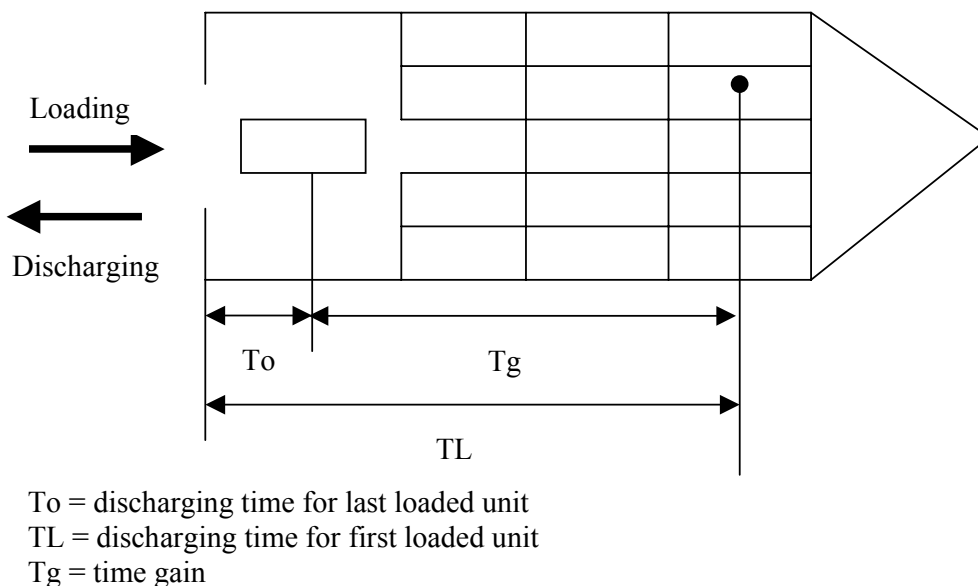


Figure 3.4: Basic principle for LOFO-service (based on Lumsden et al, 1997).

Stena Line investigates a service by sending booking confirmations by SMS. Such information should be sent direct to truck-driver, when goods initially put on stand-by get an ordinary booking. Today, such information is given to the driver by telephone, if requested. However, such a service will probably not be introduced until Stena Line has launched their new information system in 2003 (Johansson, K, Stena Line).

DFDS Tor Line is also offering storing services in self-owned port terminals located abroad. However, in Sweden such services are difficult to offer, due to the stevedore-monopoly discussed before.

4. The study

4.1. Description

The following study includes nine in-depth interviews with some of the most important customers at Stena Line and DFDS Tor Line. First, the participating transport customers are described, but only briefly since this is not the main issue of the study. Then the results of the interviews are presented, together with a short description of each topic. In order to structure the interviews, the topics are divided into three different categories: actual topics, hypothetical topics and general topics (figure 4.1):

- **Actual topics** involve value-adding issues already discussed, planned or offered by the charterers. The idea of using actual topics was to find out how the service works today according to the customers and if there are any suggestions for improvements. Furthermore, actual topics aim at investigating customer's opinion concerning future improvements in customer service.
- **Hypothetical topics** involve ideas and suggestions to value-adding services, mainly based on a theoretical framework. The main purpose of using hypothetical topics was to reach dynamic discussions, and to some extent

controversial answers. In this aspect, only using actual and general topics was regarded as an insufficient method.

- **General topics** involves both general ideas and questions concerning the market as a whole as well as questions focusing on specific areas. It was regarded as most convenient to present these topics in a special chapter, since they don't fit neither under actual nor hypothetical topics. However, ideas that came up often had a connection to transport quality and were considered as a valuable contribution to the investigation.

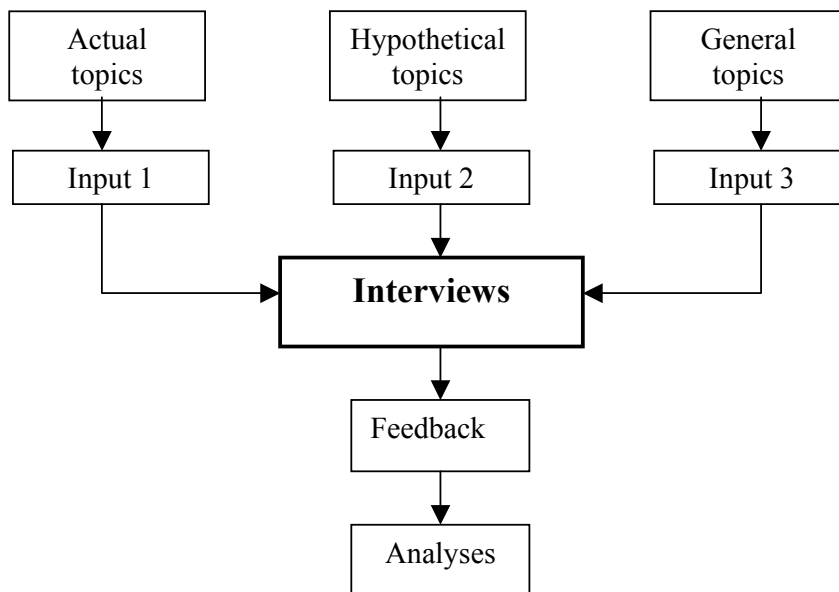


Figure 4.1: Structure of the study (Garberg, 2001).

4.2. Responding customers

4.2.1. Sample structure

As mentioned before, the sample consists of nine customers and may be divided into the following sub-groups:

- **3PL-actors** includes companies offering a full range of third port logistics services. Such services may include all the value-adding activities described

in previous chapters, and they are specialists in transporting part-loads, consolidated into large shipments.

- **Trailer-operators** includes companies mainly dealing with the operating of trailers. They don't offer a full range of logistics services, but focus instead on full truck-loads and to some extent cross-docking.
- **Industrial customers** includes industrial actors, signing agreements direct with the charterers.

In the following, the actors within each sub-group will be described briefly.

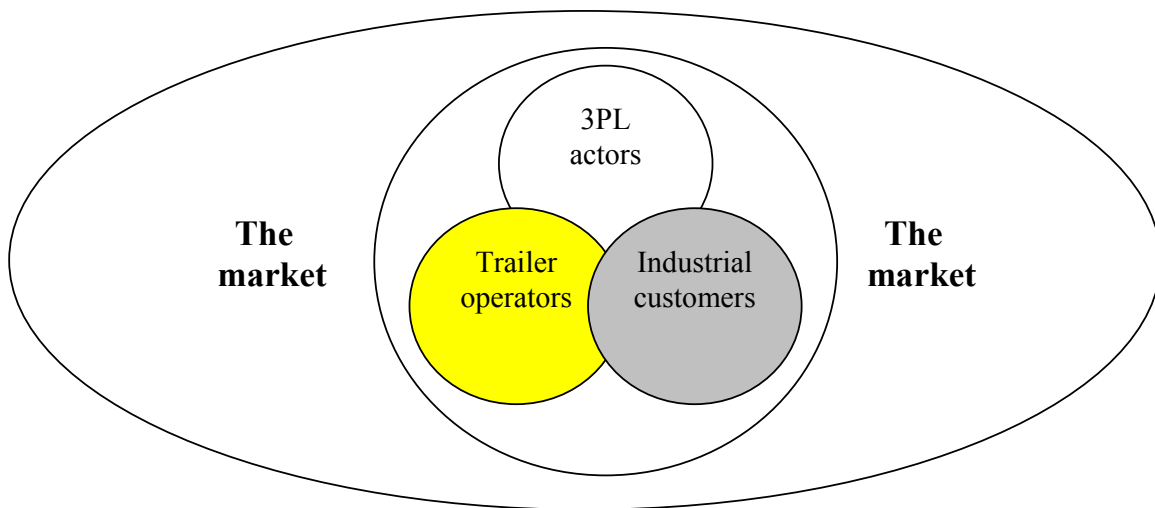


Figure 4.2: The three sub-groups within the sample (Garberg, 2001).

4.2.2. 3PL-actors

- **Schenker-BTL AB.** As a part of Schenker Ag, Schenker-BTL is also a part of one of the largest land-based transport networks in Europe. Having the best market-coverage in Sweden, the company has a leading position on the Scandinavian market, when it comes to land transportation and integrated logistics solutions (www.schenker.btl.se). Schenker-BTL is one of the largest customers at Stena Line, with a shipped volume of about 12 000 units on the routes between Göteborg and England (Hans-Erik Kröjtz, Schenker-BTL AB). They are also a large customer at DFDS Tor Line. Just

about to introduce EDI-communication with Stena Line as well as DFDS Tor Line, Schenker-BTL was of certain interest for the study.

- **Danzas ASG AB.** Owned by the Deutsche Post, Danzas ASG offers a full range of logistics services. The company is divided into three business units, named Solutions (customized logistics solutions), Intercontinental (worldwide air- and sea-freight) and Eurocargo (domestic and international overland transport) (www.danzasasg.com). In this case, Eurocargo is the unit doing business with the Stena Line and DFDS Tor Line. Approximate volumes per year are 5000 units with Stena Line to Travemunde, and 4000 with DFDS Tor Line (2500 to England and 1500 to Ghent) (Åsa Mattsson, Danzas ASG Eurocargo AB). They are one of the largest customers at Stena Line, which was their main characteristic in the study.

4.2.3. Trailer operators

- **DFDS NTS Food.** Originally owned by DFDS, the forwarding functions within the company were sold in September 2000 and became DFDS Nordisk Transport. This was a part of a long term strategy at DFDS, stating that they should focus their business on sea-born roro-transportation. As a whole, DFDS NTS offers a full range of logistics services, and they are a large customer at both Stena Line and DFDS Tor Line. Their business is quite similar to Schenker and Danzas, which makes them less interesting as a participant in the investigation. However, through their business unit DFDS Food, they are a very large actor on the market for transporting cold and frozen goods. Therefore, the interview with DFDS NTS focused on requirements specific for food transportation and fridge units. They use both Göteborg-Ghent, Göteborg-Immingham and Göteborg-Travemunde and ship in total 500 fridge units per year (Lennart Lilja, DFDS Food).
- **Euroute** is a trailer operator within the Norfolk Lines. They offers consolidation of partloads, and one main destination from Göteborg is Immingham. Sending about 15 000 units a year on this route, they are one of the largest operators on this route (Magnus Ryding, Eurocargo). The approach to the interview was taken from this perspective.

- **Ewals Cargo** is one of the leading developers of a concept called mega-trailer. This unit is built higher than the standard trailer and the cargo-volume is about 20 % larger. The business in Sweden focuses on rail-transport, trailer-transport and forwarding and if other services are required, they are bought from external operators. Shipped volumes at Stena Line is about 7000 units a year, but they are also large customers at DFDS Tor Line (Peter Klemetz, Ewals Cargo). Since they use both the Immingham-route and the Ghent-route, a main purpose with the interview was to compare the service on these two destinations.
- **Halléns Transport AB** was mainly interviewed concerning their role as an intermediary, working directly with a number of large, industrial customers. As one of the largest customers at DFDS Tor Line, they ship about 20 000 units a year mainly between Göteborg and Ghent. They also offer some consolidation at their terminal in Göteborg (Roger Rietz, Halléns).
- **Frans Maas** is a large European logistics operator, but their service in Sweden mainly focuses on trailer transportation and cross-docking in terminals. They ship about 12 000 units/year Ghent and Göteborg, 6500 units/year between England and Göteborg and 2000 units/year between Göteborg and Travemunde (Monica Hultqvist, Frans Maas). They are one of the customers not using on-line booking services at DFDS Tor Line, which was one of the reasons for interviewing Frans Maas.

4.2.4. Industrial customers

- **Volvo Logistics** deals with both outbound and inbound logistics, offering Volvo full transport packages all the way from origin to destination. They buy all transport services from external providers, but avoid long term partnerships (Viking Johansson, Volvo Logistics). The outbound flow consists of private cars to be delivered to final consumer, and the inbound flow consists of parts shipped mainly in trailers to be used in production. In both cases, transport agreements are worked out direct with the charterers, but concerning the inbound flow Volvo, also use trailer-operators and 3PL-actors. The intermediaries are responsible for the actual transport, but Volvo book and pay required space on each departure direct to DFDS Tor Line

(Gunilla Nyblom, Volvo Logistics). Two interviews were carried out at Volvo logistics: one focusing on private cars and one focusing on the arrangements around inbound logistics.

- **Avesta-Polarit** is a large manufacturer of stainless steel with production facilities in England, Sweden and Finland. They have a large internal flow of semi-finished products between Avesta in Sweden and Sheffield in England. This involves system transportation including railway and roro-shipping, and transport agreements have been arranged directly with DFDS Tor Line. This relationship, together with their investigations in using transponders on their cassettes were the main topics in the discussions. Avesta-Polarit also uses trailers going by road for deliveries to external customers and in total, about 20 % of shipped volumes are shipped by trailers (Ewert Wijkander, Avesta Polarit).

4.3. Actual topics

4.3.1. Precise time-information

A certain problem when discharging roro-vessels is connected to the time-perspective. Conventional roro-vessels may take up to six hours to discharge, and since you don't know exactly where on the ship the different units are located, it is impossible to specify in advance when each unit will be discharged. Today, information in advance concerning time of discharging relates to when all the units are discharged. As mentioned before, DFDS Tor Line has the possibilities to inform customers exactly when each unit is actually released from the vessel, but they can't do it in advance. Thus, if the customer plan his future activities based on a late discharging time and the unit is discharged at an early stage in the operations, this may lead to a certain time loss for him. According to Kanflo (1999, part 1, p. 35) and Lumsden et al (1997, p. 11), information should be given as early as possible, in order to achieve the highest possible value. This means that if it was possible to notify the customer in advance when his goods will be available in the port of destination, this would generate a certain value for him. A suitable point of notification would be just after when the loading operations are completed. Then the notice time for the route Göteborg-Immingham would be at least 26

hours, for Göteborg-Ghent at least 36 hours and for Göteborg-Travemunde at least 15 hours (figure 4.3).

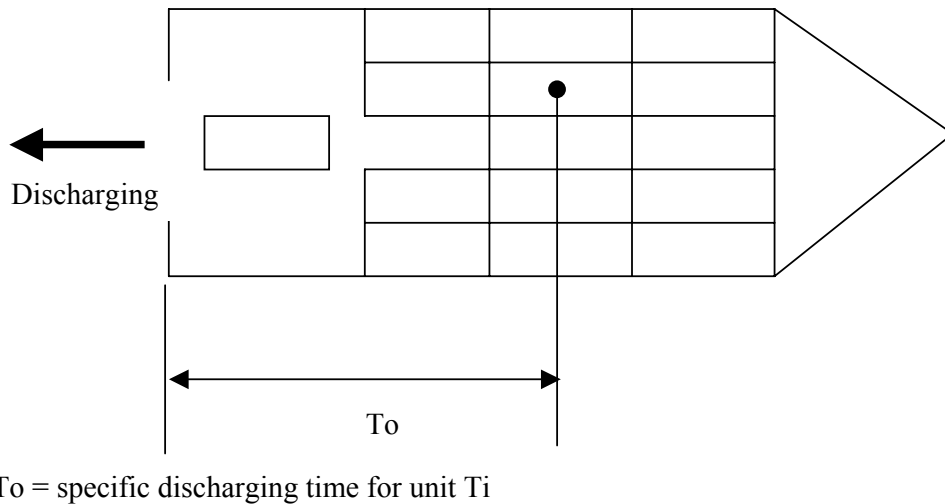


Figure 4.3: Principle for specifying time of discharging (based on Lumsden et al, 1997).

In this matter, the following questions were discussed:

- Is it important to get precise information in advance concerning when each unit is available in the port of destination?
- What accuracy is needed?
- Are you willing to pay for such service?

Most of the customers responsible for trailer movements thought that this is an important issue, but the majority of the people interviewed were not aware of the fact that this had been discussed. One of the customers claimed that this service is more important for trailers transporting part-loads, since the schedules for these units often are more tight than the schedules for full truck loads. The answers also depended on which side of the transport commission to consider. When talking to staff responsible for export goods, some of them couldn't see the advantages of this service, but people working with incoming goods could immediately see the opportunities. What relation to consider also had impact on how important the customers thought this service could be. Several of the customers underlined that the new vessels on the Göteborg-Immingham route enable much faster discharging operations than older roro-

vessels. As a consequence, the value of precise time-information is less when using new vessels than it is when using older vessels.

However, the transport customer agreed upon the fact that this service should be included in the basic roro-service, and that it shouldn't be billed. None of them was willing to pay for it, and a common statement was that the roro-actors would be more competitive by introducing this service. According to the roro-customers, this should bring enough gain to the charterers. A 30-minute accuracy was suggested by most of the customers, but some even mentioned 15 minutes as a suitable accuracy.

4.3.2. LOFO-service

Another service, less sophisticated but closely related to the one discussed above, is the LOFO-service. As mentioned before, it involves an option for the customers to be discharged the first hour, but this option is not fully utilised today. Therefore, the LOFO-services raises several questions:

- Are the customers aware of the LOFO-service and do they use it?
- What is most important: to know exactly when the cargo is available or having the cargo discharged early.

With one exception, all of the relevant customers were aware of the service and use it frequently. However, it is only used for emergency shipments, requiring a fast transit through the port terminal. It was also mentioned that the service has to be carefully used, in order to work properly. With over-bookings on the LOFO service every day, units really needing the service may lose their LOFO-space. Therefore, the service seem to be used with mutual respect among the customers, which may explain why it isn't fully utilised. The common opinion about what is the most important factor concerning the discharging time was that this varies from case to case, and is individual for each trailer.

4.3.3. Booking system and EDI

Both DFDS Tor Line and Stena Line Freight offer on-line bookings, but this service does not necessarily mean a higher level of customer service. By some, transferring information over the internet is not regarded as a reliable method, and conventional information channels are still in use. It is also important to state that the driving force behind introducing booking over the web rather was to reach cost-reductions at charterers than increase service level to customers. In this perspective, it could be valuable to summon up the customers opinion about the booking service:

- What booking system is used?
- Is the on-line booking a good service?
- Should any functions in the systems be added?
- Are there any plans to introduce EDI?

In the study, customers using different booking principles were represented. Most of DFDS Tor Line's customers use their web-service Infobridge, and two of them have EDI-links. As mentioned before, one customer still uses manual way-bills only, but the reason behind this was problems in having two information systems working together. Furthermore, one customer use manual waybills as a complement to electronic booking, which means that each unit is booked twice. However, in total the customers are very satisfied with the booking system. At Stena Line, customers in the study use the web-site as well as the internal system FIAB. FIAB is used by larger customers at Stena Line and was regarded as a simpler and a faster system.

The overall opinion concerning electronic booking systems was that they work very well and contribute to a mutual gain among the customers and charterers. Some of them thought that they were doing charterers' work, but considered the systems as improvements in the daily work anyway. Complaints and suggestions for improvements were mentioned by some operators, but mainly concerned minor adjustments, not relevant for the study.

In the study, two of the customers were using EDI and another one was in an introduction phase. However, when discussing EDI, the difference between EDI and the web-service was not always clear. There is a common interest in EDI, but nevertheless the remaining six of the customers had no immediate

plans to introduce EDI. One customer mentioned technical problems and lack of will in letting another company take part of their information systems, as likely reasons for hesitating in introducing EDI.

4.3.4. Electronic invoices

The possibility of sending invoices by electronic means is closely related to the discussion in the chapter above. Instead of sending invoices to customers by mail or fax, it is possible to send them through a company's information system direct into customers' accounting systems. Thus, instead of being manually handled and typed down by customers' personnel, invoices would enter the accounting system without any manual treatment. Since this requires minimal resources of personnel, the advantages of such routines are obvious. However, the question is whether this could be regarded as a value-adding service or not, from the customer's perspective?

All the customers in the study agreed upon the importance of this issue, pointing out the opportunities of cost-savings on an administrative level. However, no one is willing to pay for it, and some customers pointed out the irony of "being billed for being billed". Since electronic invoices enable cost-savings among the customers, it also adds value to them. Nevertheless, it hardly makes the roro-operator more competitive, because electronic billing will probably be regarded as a basic service in the near future. For example, in 2002 Volvo Logistics will require such a system of all of their suppliers. However, since electronic invoices requires EDI-links, the low interest in introducing EDI and the high interest in electronic invoicing doesn't make sense.

4.3.5. Transponders

The handling of information has recently become an essential part of the port operations. As a consequence, the manual registering of data stands for a considerable part of the daily operations. In a transponder, it is possible both to store information and to read and register the data automatically. In each step,

information need to be registered or updated and signals from the transponder may be automatically received and transmitted through the system. Connected to a GPS, it is also possible to combine the position and information concerning the cargo unit, and display it on a digital map. Using radio frequencies as a complement, transponders may also communicate with other mobile units or ground station networks (www.transpondertech.com/technology).

However, according to Kenneth Johansson at Stena Line, the problem with introducing transponders is to find a common standard, so the transponder may be used in every system it passes. The problem has been discussed with the Swedish Road Administration, without finding a solution (Johansson, K). In spite of the fact that the system will not be introduced in the near future, it involves huge opportunities. Except from the track-and-trace function, an alternative option would be to store all cargo-information needed, to be used instead of transport documents in border-crossing transportation. The transport customers are the ones who finally will operate the system, and the following were discussed:

- If they are investigating the use of transponders.
- What opportunities they see in using transponders.

With two exceptions, none of the transport customers investigates future use of transponders and thus, these customers don't see any opportunities in using transponders. As a matter of fact, the majority of the persons interviewed are not familiar with this technique, and a common reaction was simply: "what is a transponder?". Two of the customers investigated the use of transponders and mention different opportunities in this technique. One of them mentions the advantage in making current registration of cargo units automatic. Manual typing would be minimised and as a consequence, the risk for failures depending on the human factor may be eliminated. The other customer points at the possibility of having full control of every trailer in the system. According to this customer, it happens that single trailers are sometimes standing still for a long or a short time-period without anyone noticing them. A lot of capital is tied up in a trailer, and it should be used as much as possible.

4.3.6. Distance notification

As mentioned before, distance notification involves an opportunity to simplify the entrance to the port area. The advantages to the port administration are obvious:

- No manual typing at the gate.
- Fast transit of cargo units through the gate reduces queues in rush hours.

Distance notification is investigated in order to improve the administrative work in the port, but reduction of queues also generates positive effects to customers. This raises the following questions:

- Do the customers see any value-adding in distance notification?
- If they do, how could they draw advantages from a such value?

The majority of the customers haven't seen queues at the gate as a common problem, with some exceptions. They believe that distance notification mainly is an internal improvement in the port, showing positive effects on cargo operations at DFDS Tor Line and the port of Göteborg. However, one customer pointed out that queue problems do occur sometimes, and distance notification contributes to reducing the uncertainty, especially in case of late arrivals.

4.4. Hypothetical topics

4.4.1. Terminal activities

Theoretically, it would be possible for the charterers to offer terminal activities in connection to the sea-voyage. The stevedore monopoly makes actions difficult to realise in Sweden, but it may be possible in terminals located abroad. Referring to the discussion in chapter 2.6.4, such activities may be product-focused as well as transport-focused. However, in both cases it assumes a widening of the charterer's service package above the basic service

(figure 4.4). A service-widening may be described from two different approaches:

- **The transport-focused approach** may include for example cross-docking operations, temporary storing, consolidation and co-ordination of goods and resources. In this case, the service widening is limited to improving the actual movement of goods.
- **The product-focused approach** assumes a considerable service widening. Besides transport-focused activities, it may also involve all kinds of value-adding to products, for example customisation, labelling, packaging and also warehousing.

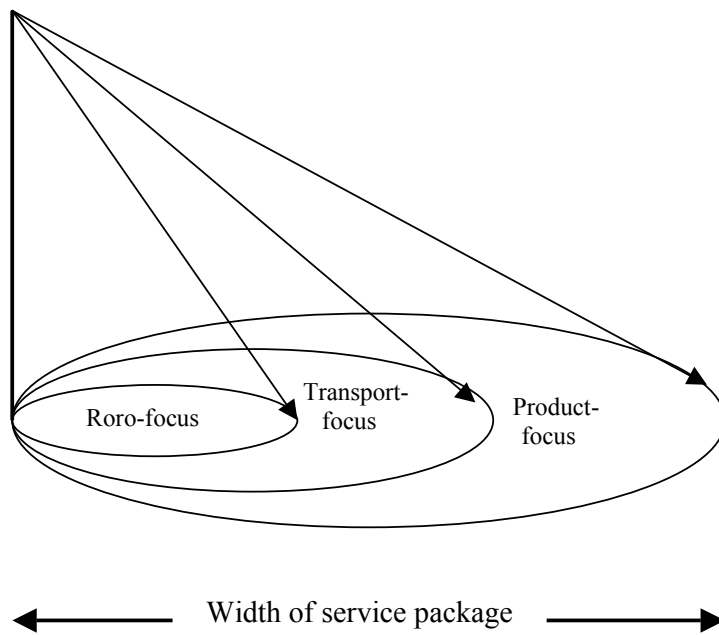


Figure 4.4: The widening of the service package (Garberg, 2001).

The main questions to customers concerning terminal activities were as follows:

- If the charterers offered to widen their service package by offering terminal-based activities, how would this affect the relationship between the charterers and the transport customers?
- Is there any demand among the customers for terminal-based activities, offered by charterers?

Concerning the relationship to the charterers, the roro-customers in the study have a similar opinion. They mean that as long as the charterers don't steal customers directly from 3PL-actors and trailer-operators, the relationship between roro-provider and roro-customer won't be seriously affected. Thus, the fact that charterers may widen their services to include logistics activities isn't enough reason to look for another roro-provider. Logistics solutions being worked out between charterers and certain customers seem to be an accepted way of doing business, according to the roro-customers.

However, the interest for this kind of service varies among the customers. Basically, the study show that customers already buying logistics services (trailer operators) are positive to having one more option, and some of them underlined the positive effects of increased competition. Customers offering this kind of service themselves, mainly 3PL-actors are not that interested. However, some customers (including one of the 3PL-actors) pointed out the advantage in having one more opportunity to buy terminal activities when being short of resources themselves. Furthermore, one of the customers mentioned time savings as a possible gain for goods being consolidated or cross-docked near to the port, but at the same time he concluded that certain kind of flows are required.

All together, this means that there is an interest but no real demand for logistics services offered by charterers. Furthermore, one customer underlines the importance of securing the quality of a company's core business before offering any additional services.

4.4.2. Database

The idea with a database is based on the assumption that a lot of information concerning for example cargo flows and transport utilisation passes the charterers without any use. Today, information contains for example the content and the weight of each unit. However, it should be possible to add more information concerning the shipments, for example final destination, specification of each shipment, filling grade of each unit and so on. Such information could be added by customers on a voluntary basis, but it should be treated confidentially by the charterer. If gathering this information in a

database valid for a specified departure, it would be possible for a customer to send queries to the database, concerning for example free space in cargo units bound for a certain destination (figure 4.5).

Another possibility would be to provide the customers with traffic information, valid for a specific situation and other ways of using the information may also be possible. However, the basic approach to the discussions was if there is a demand at all for this kind of database among the customers.

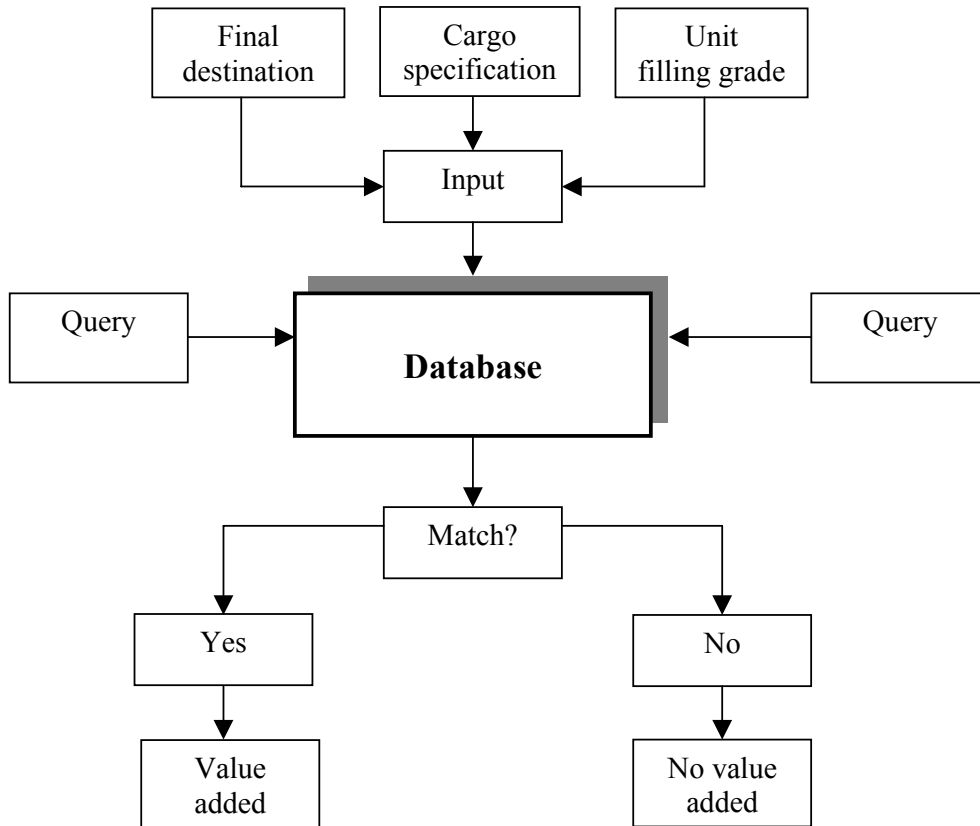


Figure 4.5: Basic idea of a database (Garberg, 2001).

Offering a data-base is closely related to the widening of the service-package discussed above and thus, the customers responded in a similar way. Roro-customers dealing with integrated logistics solutions reacted in a sceptical way to data-base services, and one of them even described it as a dangerous development according to the competition on the market. Others, who in turn buy logistics services themselves, were very positive and pointed out environmental- and economic issues as the main advantages. Some also mentioned the advantages of having different choices. However, it was

questioned if freight volumes on a ship are large enough for making a database usable.

4.4.3. Information during the sea-voyage.

It should be possible to provide the customer with information concerning his shipments continuously, but the question is which kind of information represents a certain value to him? Sending information without any value rather deteriorates the transport quality, since important information may disappear among all the worthless information. The possibility of sending extra information during the voyage was primarily discussed under three different issues:

- **Status information** includes the possibility of crew-members checking and registering the status of sensitive goods continuously. Sensitive goods may include shipments requiring controlled atmospheres, for example frozen food and information may be sent either continuously or when something diverges from the normal.

In this matter, customers dealing with fridge units agreed upon the fact that there is no need of such information today. Temperatures on fridge units are controlled frequently today and logs are registered manually onboard. If something diverges from the normal, the customer is contacted by telephone, and this routine works satisfactorily. However, according to the logs it was mentioned that they should be signed by the personnel in charge. This is not done today.

- **Information in case of damage** may be much more detailed than it is today. Crew-members or truck-drivers equipped with a digital camera may take photos of damages just after something has happened. The photos may be sent immediately to the customer's office, to support the decision of which actions to be taken. Today, inbound cargo units are photographed when passing the gate, in order to register unit's condition before entering the port.

The main part of the customers were very positive to the possibility of getting instant photos of cargo damage. However, since this service assumes some kind of failure in the system, it is not possible to charge. Furthermore, regardless of getting photos and detailed information direct to customers' information systems, many of them still underline the importance of personal contact by telephone. Obviously, there is a need for holding a certain person at the charterer responsible for the damage.

- **ETA- and weather information** are essential in case of delays. Delays may have serious effects on customers distribution plans, and as a consequence such information has to be given to customers as early as possible. The question is if the information is sufficient today, and if it is desirable to have early warnings based on weather information.

Today, information concerning delays is given in e-mails, and Stena Line also updates a vessel's ETA continuously on their web-site. The majority of the customers were positive towards having ETA updated on the web-site, and in this matter Stena Line's web-service is more sophisticated than the InfoBridge is. However, some of the customers thought that mail-subscriptions were enough. As a desire, a twelve-hour notice-time for information concerning delays on the DFDS Tor Line's routes was mentioned. Some of the customers also underlined the importance of giving the right information concerning delays. Others mentioned that they would prefer an early warning if a delay is expected, not necessarily including a precise updated ETA. All together, the information concerning delays appeared to be very important to all the transport customers in the study. None of the customers was interested in taking part in weather forecasting.

4.4.4. Value-adding during the sea-voyage

Instead of performing value-adding activities in terminals, it should be possible to do some product handling on board instead of ashore. This approach is basically the same as a common production strategy, assuming that the lead-time may be cut by doing different processes in parallel. By that, the sea-voyage would be utilised and the lead-time would be cut in proportion to the transport-time at sea (figure 4.6). For these kinds of shipments, the port will

work as a transit-point only, and no stop is desirable in the port terminal. However, the problem is very complex and involves solutions concerning for example ship's design, imbalances in cargo flows and adoption of a special kind of production, from shore to ship. Nevertheless, this idea hides such great opportunities for the manufacturing company as well as for the ro-ro-operator, that it calls for a discussion. Since this kind of solution primarily concerns industrial customers, the topic was discussed with them only.

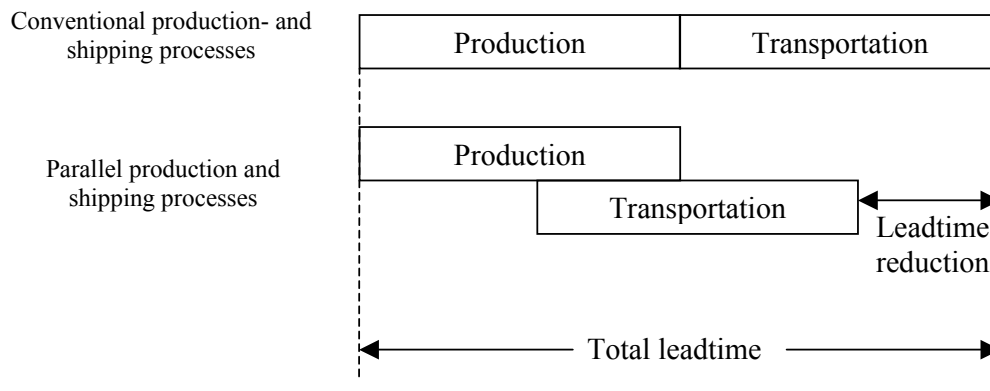


Figure 4.6: Basic principle for parallel processes. (Garberg, 2001).

Neither Aveasta-Polarit nor Volvo Logistics closed the door to this kind of solution, but both of them simply concluded that their business didn't suit it. In the case of Aveasta-Polarit, the main problem is the product itself. The company couldn't see any possibility of adding value to their products, mainly consisting of heavy steel-constructions, during the voyage. Concerning Volvo Logistics, it is rather the complexity in the system causing problems. A considerable amount of different car parts are collected at different manufacturers in Sweden, to be sorted and consolidated in the terminal at Volvo Logistics, for further distribution. Under such circumstances it was regarded as unrealistic to add any value to any of these products.

4.4.5. Trailer service

For natural reasons, passing a port terminal includes a short or a long stop. In contrast to the cargo, the cargo unit is available for all kind of care and maintenance in the port terminal. By offering trailer service, emergency repairs

and washing facilities, even a short stop may be utilised in full. The question is if there is any need for this kind of service among the customers?

In reality, the option of performing emergency repairs already exists today. The port offers the required space and the customers sign contracts with expert firms, standing-by when needed. The idea of offering washing facilities was raised by one of the customers in the study, since this service is not available today. However, the interest for this kind of service was great among the customers, except for one customer. This customer claimed that they have built their own washing system and they could not see any reason to change this. Washing facilities is a service the customers are willing to pay for.

4.4.6. Cargo securing.

One customer brought up the problem of securing the cargo on the trailer, according to governmental rules and regulations. Different nations have different regulations, but in general the requirements in Sweden are higher than in the rest of Europe. As a consequence, cargo loaded and secured abroad often doesn't cope with Swedish regulations. During the discussions, it was asked for charterers to take a larger responsibility concerning lashing and securing inside the trailer. If inspection and securing could be carried out before the departure or even during the sea-voyage, time would be saved compared with having the truck-driver doing it in the port of destination. The question is if the ro-ro-customers in general regard it as an interesting option having charterers checking whether cargo-securing meets national requirements or not?

All the trailer-operators in the study agreed upon this problem and were very interested in this option. However, some of them pointed out the difficulties concerning responsibilities when performing this kind of service. It includes both a responsibility for how the securing is performed and a responsibility to ensure that no goods are stolen while secured. The 3PL-actors stated that they prefer to carry out the securing themselves, holding the truck-driver and the trucking company responsible for goods being properly lashed. By one of the customers, it was mentioned that after having cargo-damage due to bad

weather, DFDS Tor Line have offered customers to re-secure the cargo. However, their offers have been regarded as too expensive by the customers.

4.5. General topics

4.5.1. Daily operations

In this matter, transport service refers to how the daily operations work today. Three aspects were discussed:

- **Stand-by.** When having a unit on stand-by, it is not guaranteed to be shipped at desired departure. In that case, what extent do the transport-customers seek other solutions. Would the SMS-service at Stena Line, as discussed before, contribute any value in this matter?

The extent to which customers accept stand-by is very individual and depends on the degree of urgency of the shipment and destination. However, most common is that the customer tries to find other ways of shipping the goods. The main part of the customers prefer a central co-ordination of their transports. This means that direct communication between charterer and truck-driver is not desirable, unless the driver doesn't follow the trailer during the sea-voyage. In that case it may be useful with a SMS-service, but the overall gain with such a service is limited.

- **Time-tables.** Putting up time-tables involves trade-offs between customers' demands on one hand and vessels' technical specifications on the other hand. According to the customers, are the time-tables planned properly in this aspect?

Some of the DFDS Tor Line's customers are dissatisfied with the arrivals from Immingham, since they are not able to reach Stockholm the same day. Another complaint is that units going with Stena Line to Travemunde have to be at the gate at 1700, during the worst rush-hour. However, the main part of the customers show an understanding of the complex problem of putting up time-tables. The only reasonable way of changing the schedules is to make investments in faster vessels. One customer underlined that if tightening the

time-tables by using faster vessels on the Benelux-destinations, roro-shipping would be much more competitive compared with road-transportation, than it is today. Another customer mentioned that the main gain of using faster vessels between Göteborg and Travemunde would be that time-tables for departures could be set later in the evening.

- **Ship's mail.** According to governmental rules and regulations, cargo documentation has to follow every unit during the road-transport. As a consequence, those documents follow each unit during the sea-voyage as well. When transported on road the driver is responsible for the document, but during the sea-voyage documents are often handled by the charterer. The question is how these routines work today and if they may be improved in order to offer a higher level of transport quality?

How to handle cargo documentation during the sea-voyage varies among the customers. Some leave all their documents to the charterer and some put the documents on the trailer. If putting the documents on the trailer, they always follow the cargo, but no one could be held responsible if they disappear. Furthermore, if put among the cargo they may be difficult to find for the truck-driver who picks up the cargo. The customers underline the importance of bringing the documents, since it is not allowed to go by road without them. The majority of the customers have complaints to how the handling of ship's mail works today. If problems with distributing ship's mail occurs, it may lead to delays. Not being able to offer a 100% safe mail service means an uncertainty for the customers, and the common opinion is that the mail service should be improved. One customer stated that with today's technique, ship's mail is an unnecessary handling of documents, but he also concluded that as long as some customers prefer ship's mail, it has to be properly handled.

4.5.2. Fridge units

Fridge units involves the flow of goods requiring cooling facilities during the voyage. The flow mainly consists of food products transported in special fridge trailers. The general approach when discussing transportation of fridge units was to find out if there are any value-adding issues specific for this business.

Several topics came up when discussing the problem with fridge operators, but they rather had a transport-quality-approach than a value-adding service approach:

- Ship's crew should be trained in performing limited repairs on fridge units during sea-voyages. Operating problems on fridge units are sometimes easy to repair, but it requires knowledge of the equipment. Since these kinds of problems may cause serious damage to the cargo, even simple proceedings could be the difference between a successful shipment and a total loss. Some training is in process today, but it concerns shore-based personnel only. Customers mean that this service is already paid for today, and thus they are not willing to pay any extra for it.*
- Routines concerning electricity provision while standing on the quay don't work satisfactorily today. Stena Line don't offer such service at all, and fridge units have to run on own diesel machinery while waiting to be loaded on the ship. Concerning DFDS Tor Line, the port of Göteborg offers plug-in¹⁰ facilities, but this service is separately billed and not included in the transport agreement between the charterer and the customer. Customer opinion is that this arrangement is unnecessary, and instead billing should be based on agreements between DFDS Tor Line and the port authority.*

4.5.3. Market situation

DFDS Tor Line has a unique position on the ro-ro-market between the Scandinavian countries and England. The competition on this ro-ro-relation is weak, and DFDS Tor Line has a dominating position on the market. Referring to common transport theories, transport customers and society suffer from monopolistic markets (Jensen, A). The situation is not as extreme in this case, and it should be underlined that there are alternatives for transporting goods to England. However, generally they are slower and the question is how this

¹⁰ A common expression for being connected to electricity supply.

market situation affects customers' opinion concerning customer service and transport quality?

The customers agreed that a dominant position has negative effects on transport quality, and many of them got seriously engaged when discussing monopolistic markets. Several of the customers mentioned situations where charterers had taken decisions with the primary purpose of satisfying own interests instead of satisfying customers interests. They claimed that with a higher degree of competition, such situations would never occur. It should be underlined that Stena Line also was mentioned in this discussion, but objections mainly concerned the Denmark-relations.

4.5.4. Private cars

Private cars is the flow of cars to be exported from Swedish manufacturing plants to the European market. Producers in Sweden are Volvo in Göteborg and Saab in Trollhättan. Volvo Logistics is responsible for export and import of Volvo-cars, shipping between 80000 and 90000 cars per year with DFDS Tor Line. In this matter, the Stena Line service between Göteborg and Travemünde is used for trucks only (Viking Johansson, Volvo Logistics). Today, nine special car-loaders are running between the factory in Torslanda and the port at day-time, and three at night-time. Volvo has its own staff handling the cars in the ports, but according to Viking Johansson, this is not an ideal solution.

In the interview, Viking Johansson at Volvo Logistics suggested that transportation based on liner terms¹¹ would be preferable in this matter. This means that DFDS Tor Line should take care of all the operations performed from the point where the cars are delivered, to the point where the cars are picked up. Such activities include for example scanning of bar-codes and preparation of import cars to local requirements. However, this solution assumes that the charterer is able to perform the service at a competitive price.

¹¹ A condition in the transport agreement, stating that the charterer take a larger responsibility than he usually does (Gorton et al, 1989, p. 66).

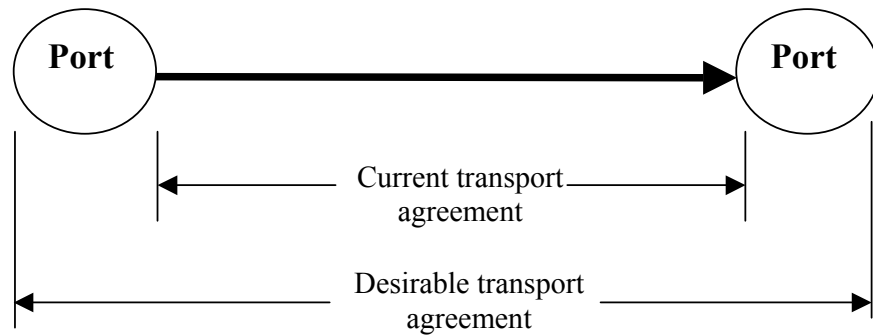


Figure 4.7: The extended transport commission concerning private cars (Garberg, 2001).

5. Analyses

5.1. Approach

A main decision to be taken by any company is to decide what business to focus on. Regarding the ro-ro-business, many of the operators use a quite narrow business concept, mainly aiming at being a high-qualitative ro-ro-provider. However, just like the forwarders the ro-ro-operators have the option to enlarge their service offerings to include either a complete transport service, or even a complete logistics service. This assumes charterers offering several additional services and also charterers having a closer relationship to the industry.

With this assumption as a basic approach to the analyses, value adding services in ro-ro-shipping may be described on three different levels (figure 5.1):

Level 1: Roro-services. In this level, the ro-ro-operator focuses on his basic service (core-business) only. By focusing on improvements in information systems and transport operations, the operator refines his business to become a perfect ro-ro-service. However, his responsibility is limited to be valid only from quay to quay.

Level 2: Transport services. Level 2 assumes a broader business perspective, focusing on being a complete transport provider. Transport-focused activities, such as cross-docking and consolidation are included, and the transport responsibility extends from transport mode to transport mode, or from link to link.

Level 3: Logistics services. This is the broadest concept, including product-focused activities in terminals as well as onboard. The responsibility is still from link to link, but includes not only a transport dimension, but also a product dimension.

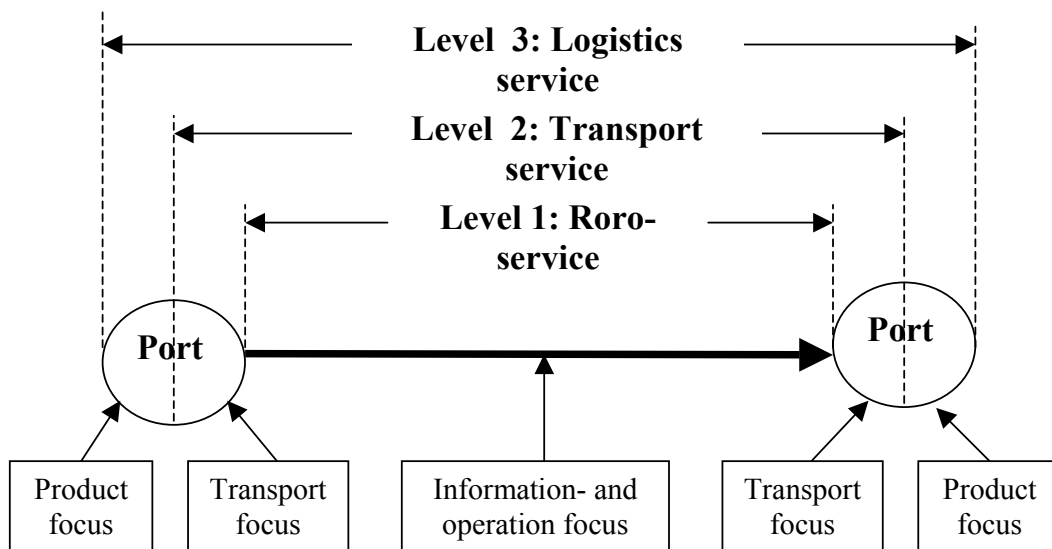


Figure 5.1: Possible service levels in ro-ro-transportation (Garberg, 2001).

It should be underlined that the services described in the model refer to the topics discussed in the interviews. Primarily, it describes a method of categorising the topics and structuring the interviews. Therefore, it shouldn't be directly compared with common definitions of transport- and logistics services.

When connecting these levels to the interviews, each topic will fit in one of these levels. In the following, the meaning of each level will be described, analysed and put together in a final analysis. The final analysis is based on the result from the study, as well as from concluding interviews at Stena Line and DFDS Tor Line. This analytical chapter is to some extent a developing of the

hypothetical discussion in chapter 4.4.1, where a widening of charterers service package was suggested. It should be mentioned that the complicated relationship between charterers and port authorities in Sweden, due to the stevedore-monopoly, is not regarded in this discussion. That means that in the analyses, charterers are assumed to be allowed to perform port operations in order to develop their service-offerings.

5.2. Analysing the levels

5.2.1. Roro-service

The topics connected to the roro-service have a narrow focus, aiming at improvements on the roro operations (figure 5.2). Referring to the interviews, the topics discussed have a few things in common:

- They are limited to include changes in the roro-service
- There is an actual demand for these services, with some exceptions.
- The customers are not willing to pay any extra for these services

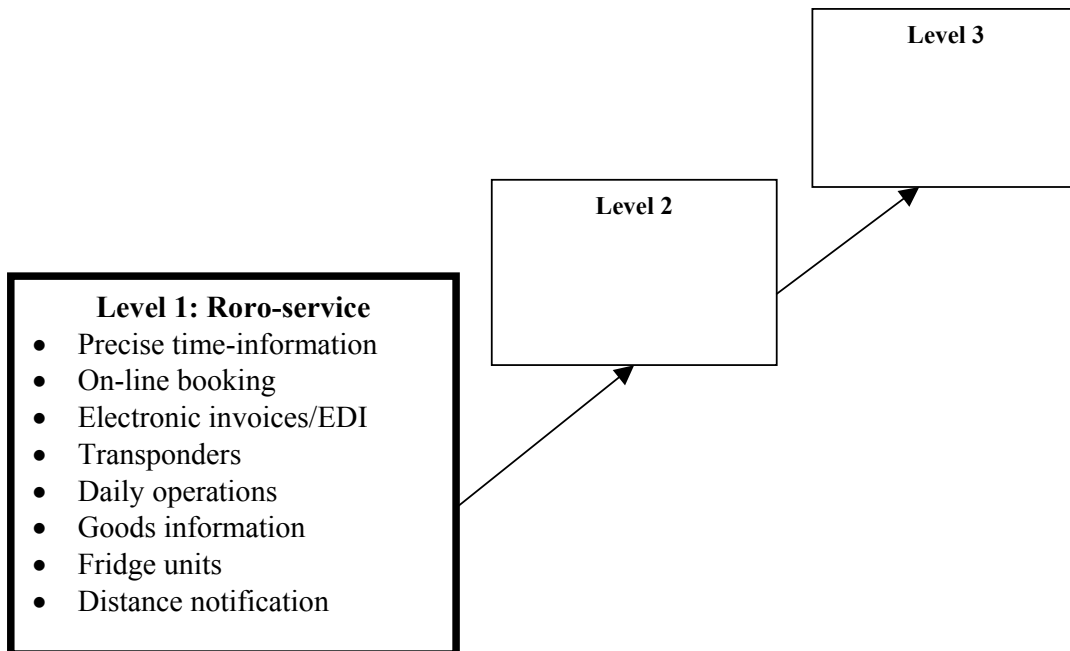


Figure 5.2: Inbound elements in the roro-service (Garberg, 2001).

Exceptions in the demand included the following topics:

- Status-information of sensitive goods during the sea-voyage
- The use of transponders
- The introduction of distance notification

Concerning the status information, there seems to be no doubt: no demand for this service exists. When it comes to a future use of transponders, the result in the study is not that simple. Most of the persons interviewed were not familiar with this technique, and obviously it hasn't been discussed among the customers up to now. Today, the customers don't see what advantages they can draw from using transponders, but it could be assumed that the issue will be further discussed and developed in the future. However, as stated before by Kenneth Johansson at Stena Line, a common standard is necessary in order to give transponders a broader meaning. As far as the charterers are concerned, a common use of transponders would simplify and improve the port operations. Discussions concerning introduction of distance notification passed without receiving either negative or positive reactions among the customers. Asking a trucking company or even a truck-driver would probably give another degree of feedback, since distance notification generates positive effects for their daily work.

Concerning the roro-service, both Stena Line and DFDS Tor Line are very sensitive to customers' desires. They are willing to take further actions, and in some cases investigations are already in progress. Concerning the issue of providing the customers in advance with precise information concerning units' arrival times, charterers are taking a careful position. DFDS Tor Line has already the basic system ready, but still they don't dare to go further with it. They have the option to register a units position onboard, but they haven't decided how to handle this information. At the moment, there are no plans for finishing such a system, since the customers don't openly require it. According to Lennart Dahlbäck at DFDS Tor Line, the system hides large uncertainties in being able to make any guarantees concerning the discharging time. However, it is most likely that when the first charterer has a reliable system ready, the others have to follow. This was also confirmed by DFDS Tor Line, but Stena Line only agreed to some extent.

One of the customers mentioned that changes and improvements in the roro-system tend to happen very slowly. He claimed that charterers have to be even more sensitive to customers demands than they are today, in order to be competitive in the future. Therefore, how fast improvements on the roro-service will be introduced probably also depends on how determined the customers are in their demands. The dominating position among the roro-operators on some

relations may affect charterers' willingness to actually meet customers' desires. In these relations, the roro-providers have a powerful position against the customers, and some of them may hesitate in putting high demands on the roro-providers.

5.2.2. Transport service

Transport-service involves a wider service concept than roro-service, but activities are still limited to transportation. Mainly it aims at developing the port area to become an intermodal co-ordination point, but also to offer some additional services. Terminal-activities here are given the meaning of transport-focused activities, including for example consolidation and cross-docking operations (figure 5.3).

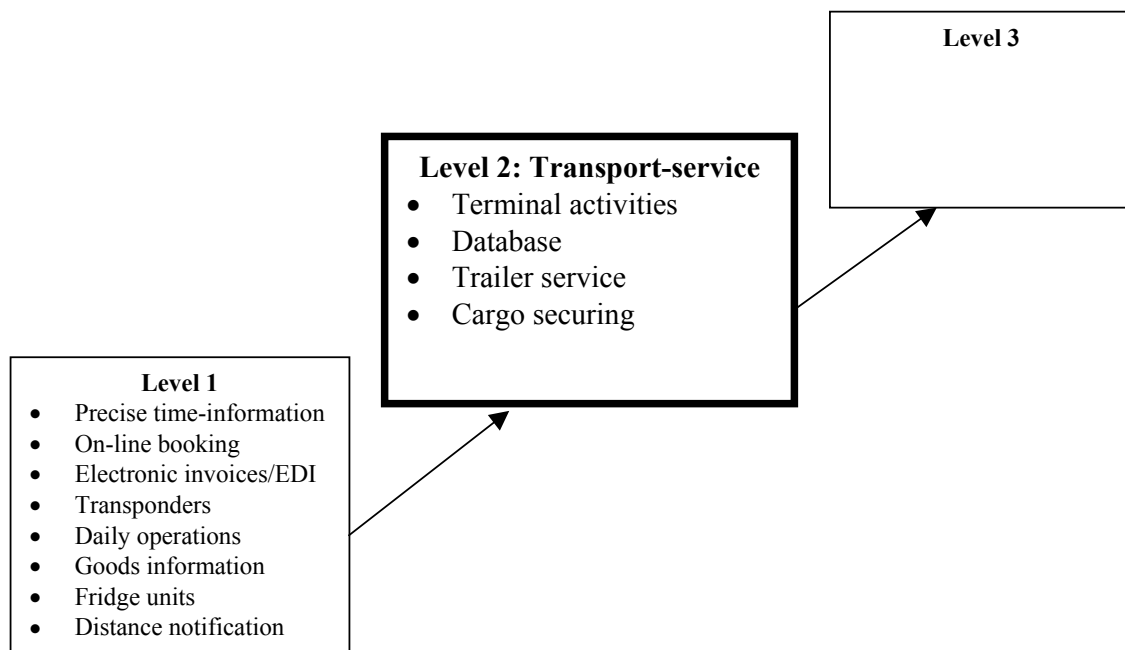


Figure 5.3: Inbound elements in the transport-service (Garberg, 2001).

To conclude the result of the interviews, it is possible to say that there is a general interest for charterers offering transport services, but no real demand could be identified. Basically, this means that the majority of the customers were positive to having one more option to buy transport services, but they couldn't say that they would use these services frequently. On the other hand, most of the customers couldn't see anything strange in charterers offering other

transport-services than the roro-transport itself. If this statement is right, charterers don't have to be as careful as they are today when it comes to offering additional services. One of the customers believed that customers using these services would probably use them as a complement, and the main part of the services would be performed as before.

Two of the services discussed were suggested by the customers themselves, and they received a positive feedback from the majority of the remaining customers. These services included:

- Washing facilities for trailers
- Cargo securing

Those services are quite simple, they don't require any large investments and the financial risk of introducing them is probably low. As mentioned before changes happen slowly, but if customers are putting pressure on the charterers, the process would probably speed up. A more intensive dialogue between the charterers and the customers would probably result in a faster complying with customers' demands.

When discussing these issues with the charterers, a certain difference between Stena Line and DFDS Tor Line occurred. Basically, Stena Line prefers a much more narrow business focus than DFDS Tor Line do, but with some interest they noted that there is a desire among the customers for using services such as trailer-wash and cargo-securing. When it comes to broader services such as terminal activities, Stena Line refers to the relationship to their present customers and states that they are not interested in this kind of business. They also mention their limited space in the port as a further reason for not offering such services.

Compared with Stena Line, DFDS Tor Line shows a larger interest in widening their service. However, a service-widening assumes that there is a real demand for wider services and that it could be carried out without negative effects on customers' business. They noted the data-base with a certain interest, but concluded that this should be provided by an external, independent actor.

5.2.3. Logistics service

Charterers offering logistics services is the most extreme form of how roro-providers could widen their services. This assumes that the charterers take a responsibility not only valid for transportation, but also for logistics activities concerning the products (figure 5.4).

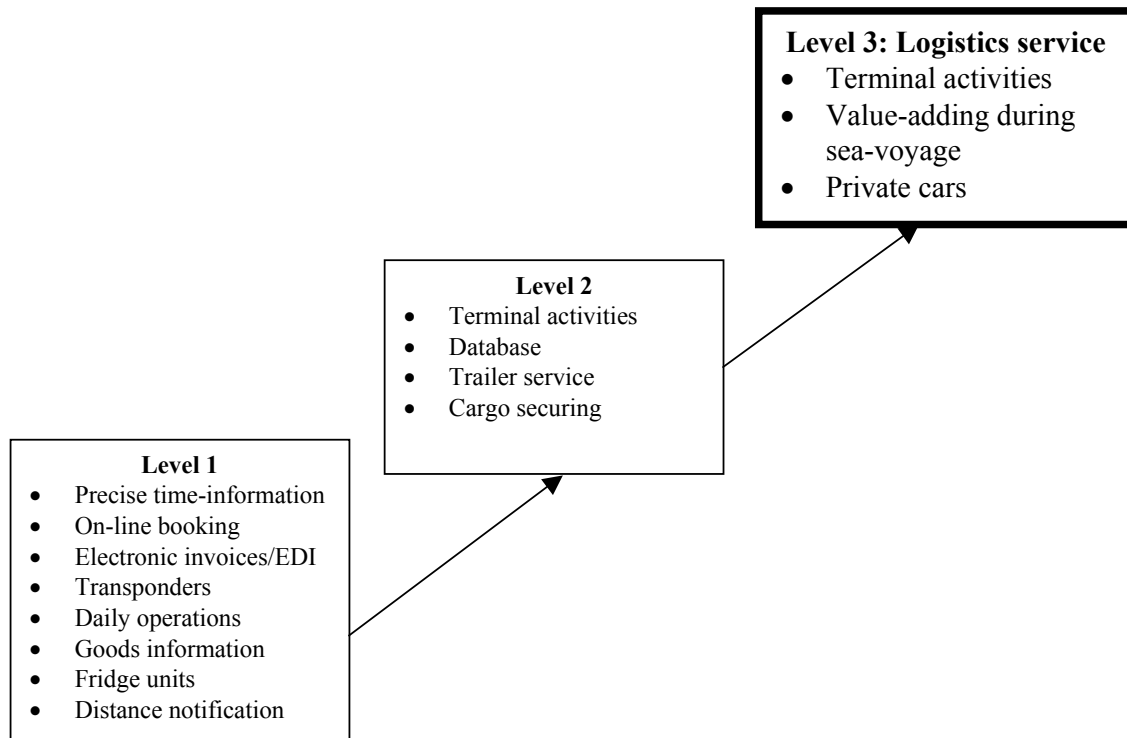


Figure 5.4: Inbound elements in logistics service (Garberg, 2001).

Similar to the transport-services discussed above, no demand for logistics services could be identified. However, only two industrial customers were included in the study, represented by three persons. It should be pointed out that these kinds of services probably fit only with a certain kind of production and a certain kind of flow, having special characteristics. Therefore, a study including a larger part of industrial actors may give another result.

Furthermore, to be able to offer logistics services as well as transport-focused terminal activities, large goods flows are required. Therefore, solutions including these kind of services are probably valid only for large actors, or for small actors building a common transport system.

Private cars represent a special kind of flow with special requirements. Concerning this flow, there is a demand for some product handling and

discussions between DFDS Tor Line and Volvo have been made. However, no concrete solutions have been suggested, and no further action has been planned at the moment.

As mentioned before, Stena Line put main focus on being a roro-provider, and the flow of private cars is not as significant as is at DFDS Tor Line. Anyway, when discussing value-adding activities during the sea-voyage, none of the actors closes the door on having vessels designed to be a part of a production line. This assumes that none of the present customers is negatively affected by such solutions. As an example, it was mentioned that cargo capacity onboard the vessel must remain sufficient in order to serve customers' transport needs. Since the driving factor behind such solutions is improvements in the production, the relationship with present roro-customers are not likely to be negatively affected.

5.3. Final analysis

In order to describe how service width and service levels relate to each other, they might be put in a diagram. Then offered service width and present service level could be given a connection. (figure 5.5)

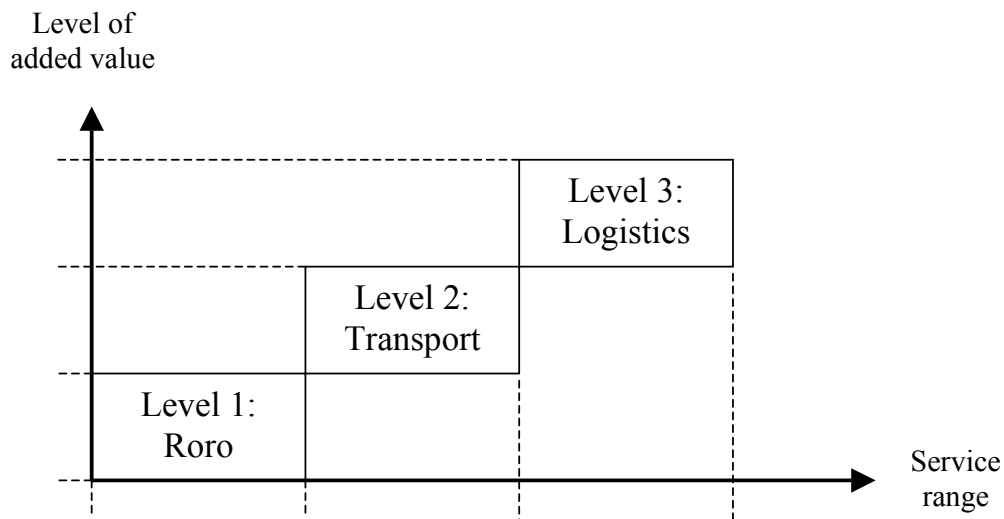


Figure 5.5: The connection between service range and service level (Garberg, 2001)

The x-axis represents the service width and graphically, its meaning could be described as shown in figure 5.6 (simplified model).

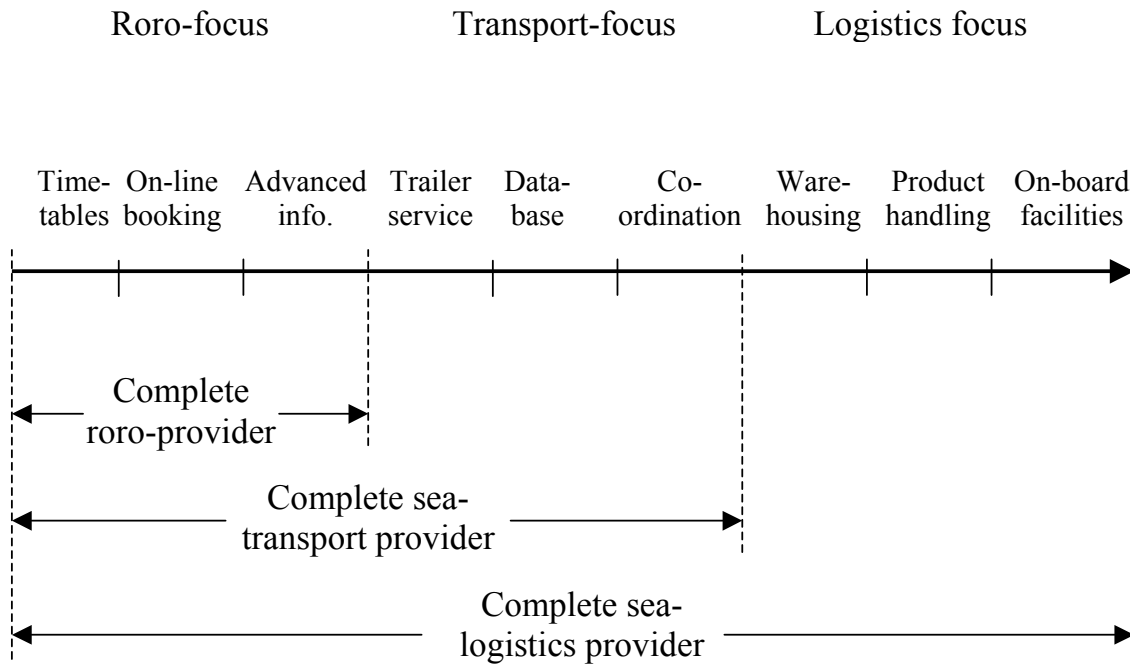


Figure 5.6: From roro-provider to complete sea-logistics provider (Garberg, 2001).

The offered services get more and more sophisticated along the scale, and the accumulated value of services increases as further services are added to the transport commission. Having said this, we might position the roro-operators and their customers in a diagram (figure 5.7). The diagram doesn't reflect the reality precisely, but principally it shows how the actors relate to the market, and to each other. Since industrial actors are the ones buying the services, they are not a part of the transport market and not positioned in the diagram either.

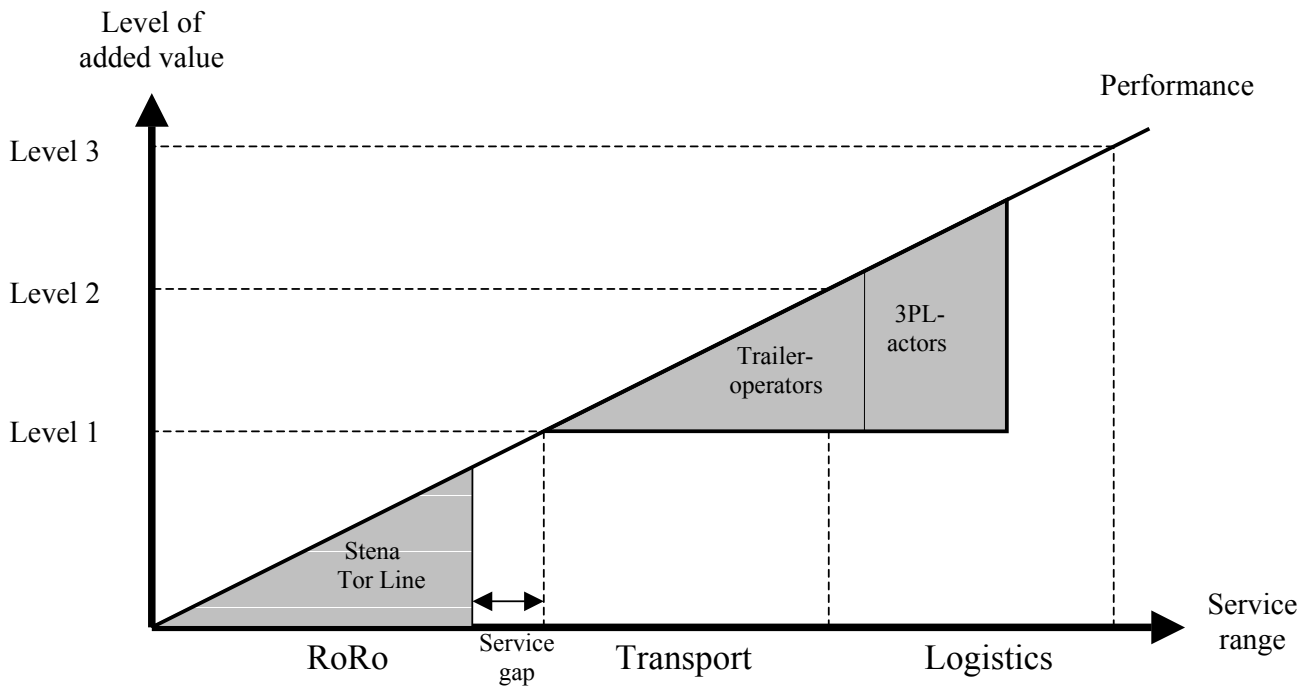


Figure 5.7: Segmentation of the market (Garberg, 2001).

According to the diagram, neither Stena Line nor DFDS Tor Line fulfils the requirements to be complete roro-providers. In this context, being a complete roro-provider relates to the inbound elements analysed in chapter 5.2.1 (Roro-service). Thus, the diagram doesn't tell us that the level of the roro-performance itself is low, only that the number of offered services is limited. As a consequence, the accumulated value of added service becomes low. However, if a roro-customer doesn't draw any benefits from further services, this might be the optimal level.

Trailer-operators and 3PL-actors are put in the diagram in order to illustrate present differences between them and the roro-actors. The business at the 3PL-actors are assumed to cover services similar to them offered by trailer-operators. However, the services on the x-axis relates to the roro-actors, and all of them are not applicable to land-based transportation. Anyway, the diagram principally shows that there exists a service gap between the roro-providers and their customers, according to the service width.

The results from the interviews show that there is an actual demand for additional roro-services, but only an interest in transport-services. Concerning logistics solutions, some interest could be identified, but such solutions were not suitable for any of the industrial customers interviewed. It was also

mentioned that the sample of industrial customers was not large enough to draw any conclusions from. Using these conclusions as an approach for a future strategy, a suggestion for how a roro-provider could position itself in the future may be shown in a diagram (figure 5.8).

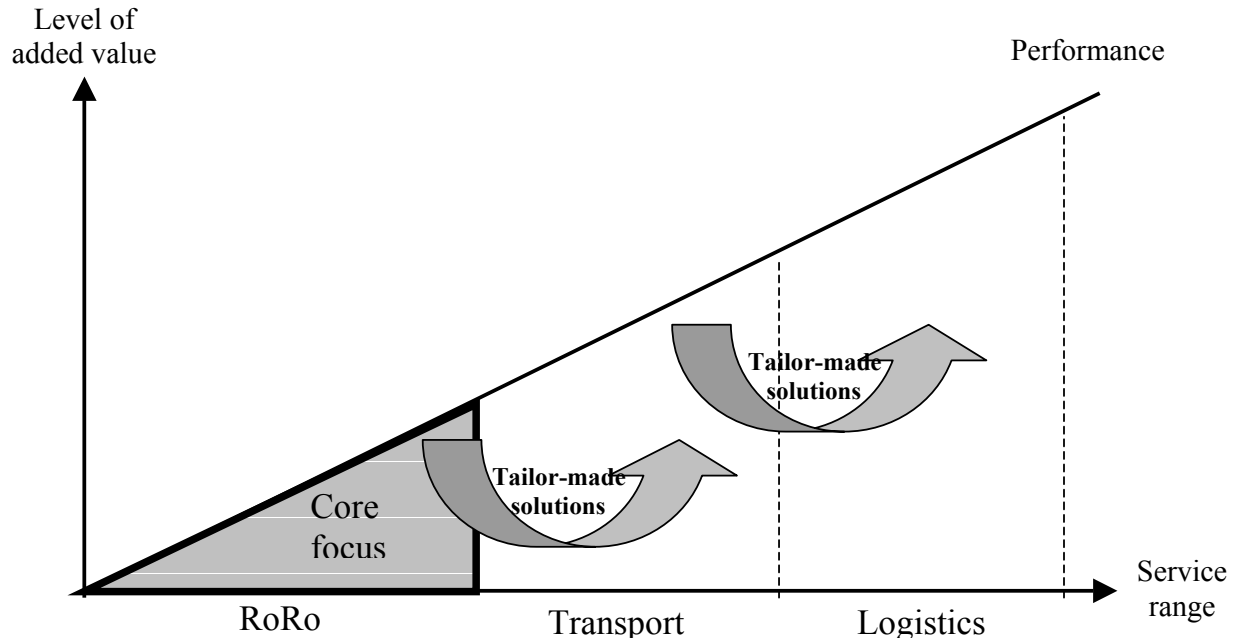
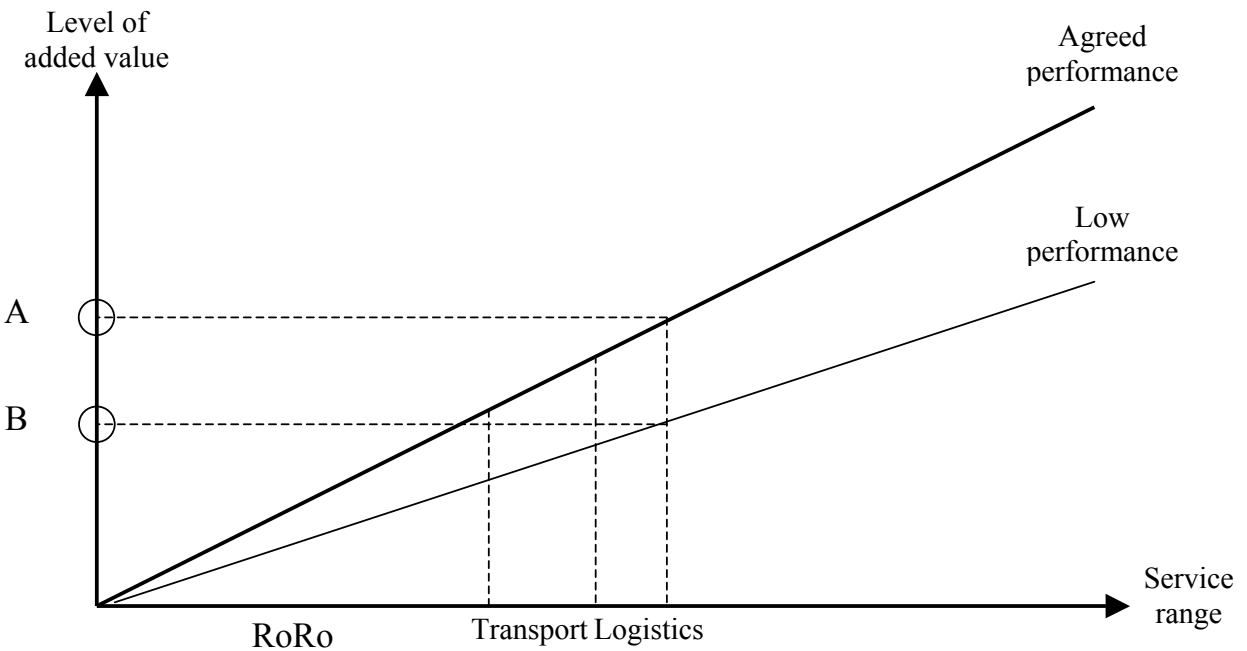


Figure 5.8: Possible positioning for roro-operators (Garberg, 2001).

This diagram tells us that the roro-providers should primarily secure their basic service, which is the roro-service. It is mainly done by meeting customer's demands presented in the study. Since there is no general demand, either for transport services or for logistics services (with some exceptions mentioned earlier), there shouldn't be any general offers of such services. Instead, a flexibility enabling individual solutions for each customer should be adopted. This means that suitable parts of each level could be included in individual transport solutions, graphically shown in figure 5.9.



A: agreed performance = expected service level = satisfied customer
 B: low performance = unexpected service level = dissatisfied customer

Figure 5.9: Example of tailor-made solution (Garberg, 2001).

As long as the services are performed on an agreed level, a certain value is added to the customer. However, if not properly performed, additional services add no extra value to the customer, only different degrees of losses. This indicates the importance of performing the offered service as promised.

6. Conclusions and recommendations

6.1. Conclusions

From the analyses, it is possible to make some general statements:

- There is a demand for value-adding services in ro-ro-shipping, but the demand mainly concerns services focusing on improvements in actual ro-ro-operations.
- There is an interest among the customers for wider services to be included in the ro-ro-concept (such as transport services and logistics services). However, no real demand could be identified.
- The interest concerning wider services depends to some extent on whether the customer is a trailer-operator, 3PL-actor or an industrial actor.
- Customers are not willing to pay for additional services concerning ro-ro-operations. Instead, they state that such services should be included in the basic ro-ro-service.
- Concerning wider transport- and logistic solutions, there is a willingness to pay for them as long as the price is competitive.

The following could be concluded:

- Roro-providers should have a network perspective, instead of a link perspective. The aim should be not only to offer the customers an efficient sea-link, but being a part of an efficient transport channel. This calls for integration rather than for competition, and a basic assumption in this context is to meet customers' demands.
- Customers' demands should be the driving force behind improvements and changes in the ro-ro-service. This means that when the ro-ro-service is designed, ro-ro-providers have to be sensitive to customers' wishes. The fact that the customers don't clearly state their demands concerning value-adding services doesn't necessarily mean that they don't desire additional services. It has to be the ultimate goal to satisfy every customer, and in the future a larger flexibility concerning individual solutions may be required.

6.2. Recommendations

As concluded above, ro-ro-providers should introduce value-adding services in ro-ro-shipping according to customers demands. Together with the statements made before, a general recommendation may be given:

- Roro-providers should primarily focus on offering the customers value-adding services that improve the actual roro-service (the basic service). Wider services, such as transport- and logistics solutions, should be offered on a tailor-made basis.

Whether a roro-provider should offer such wider services or not has to be investigated from case to case. However, some basic aspects should be considered when designing future services:

1. **Decide customer mix.** As concluded above, different kind of services attract different kind of customers. This means that a wider service focus also assumes a wider customer focus. Therefore, the initial decision should not be which service to offer, but which customers to service. If focusing on trailer-operators and 3PL-actors only, the business will be limited to services attracting those customers. However, if including industrial customers in the business, future possibilities of being a strong co-operator on the transport market will be almost unlimited. This means that initially there are two ways for a roro-operator to choose between:

- **Narrow customer focus** includes 3PL-actors and trailer-operators.
- **Wide customer focus** includes 3PL-actors, trailer-operators and industrial customers.

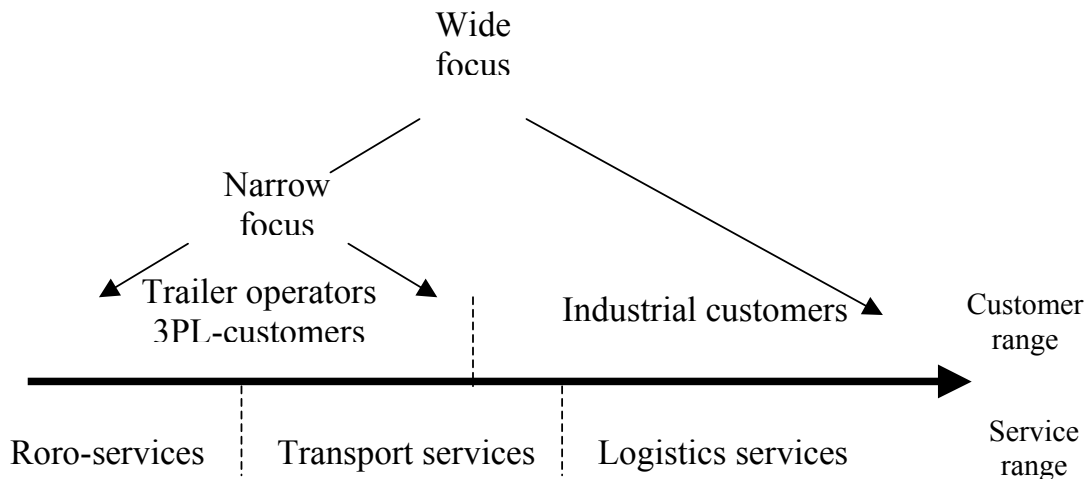


Figure 6.1: The relationship between service mix and customer mix (Garberg, 2001).

It should be pointed out that the figure above shows a principle relationship only, and no clear limitations between the different services have been identified in the study. Furthermore, the broad need for logistics solutions among the industrial customers is not deeply investigated in the thesis. The positioning of industrial customers in the figure is only based on the general discussions during the interviews.

2. **Decide roro-service.** After deciding which customer to focus on, the roro-providers should decide which extra services are to be included in the roro-service. Such a decision should be based upon the demands for value-adding services in roro-operations, as described in the study. Hereby, primary focus is put on satisfying customers' basic transport demands by being a complete roro-provider. Roro-shipping should be the core-business for every roro-provider.
3. **Decide wider services.** Having done the customer-mix and the core-business, the charterer has refined and developed his core-business to perfectly cope with customers demands. The next step should be to investigate which additional services he can afford to offer, in order to widen his services. His own possibilities according to for example financial risks, available space and personnel resources should be considered before taking any decisions. Of course, a roro-operator may also decide not to offer wider services at all, and in that case he will stay as a pure roro-specialist. After having decided which services to include in the service-package, the basic conditions for the design of tailor-made solutions are formulated.

How tailor-made solutions should be designed more specifically is a question of negotiations, and no suggestions are included in this thesis. However, great logistics knowledge among the roro-providers is important, as well as great knowledge concerning customers' demands. This indicates that a close communication between the actors is necessary. When the sample in the study was made, it was assumed that if interviewing intermediaries, a picture of transport- and logistics needs among the industry would also occur. This assumption turned out to be false, since information concerning industry's needs were limited. Obviously, intermediaries work as a communication filter between the industry and the roro-providers, and one of the customers also admitted that they select the information they transfer to the roro-providers.

When doing business with intermediaries, such information may be sufficient. However, if having the intention of making integrated solutions for industrial customers, they will also become the primary customers. As a consequence, further information concerning the industrial demands is needed, which calls for direct communication with the industry (figure 6.2). Communication with

the industry should be performed not only when making agreements, but also at an earlier stage in order to gather information supporting future decisions.

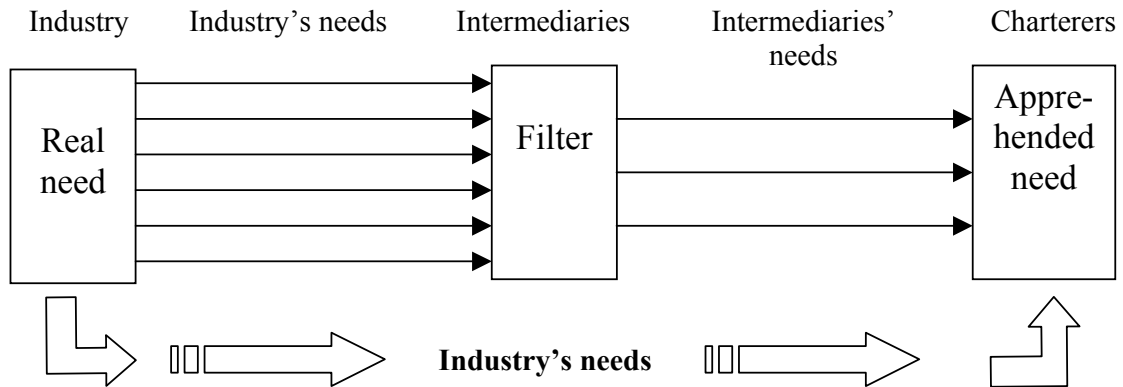


Figure 6.2: Communication links between charterers and their customers. (Garberg, 2001)

Finally, it should be underlined that the conclusions and recommendations in this thesis are drawn from a study only including nine actors on a huge transport-market. Therefore, they should not be seen as an absolute perfect reflection of the reality, but as a possible approach built on the results in the study. Being aware of this, the reader may apply the conclusions to his own reality himself.

7. FURTHER RESEARCH

As mentioned above, this study doesn't have any attention to make any concrete suggestions for tailor-made solutions. The main reason is that the material in the study is insufficient in this matter, and a deeper knowledge concerning customers' demands is needed. However, from the study we can conclude that tailor-made solutions could be worked out for fitting both trailer-operators, 3PL-actors and industrial actors, but the content will be different. Furthermore, it could be assumed that large flows are required, in order to reach integrated solutions and co-operation between customers may be necessary in some cases. As a logical consequence, further research should investigate the following:

- To identify the needs among the intermediaries concerning integrated roro-solutions, based on transport services and logistics services.
- To identify the needs among the industrial actors concerning integrated roro-solutions, based on transport services and logistics services.
- To identify possible goods-flows suitable for integrated roro-solutions.

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Appendix 1: Examples of roro-vessels



Appendix 2: Routes within DFDS Tor Line



Appendix 3: Routes within Stena Line

