



“Information Sharing Needs”

Introduction of a web-hosted portal
in the ship broking business

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Preface

Writing a thesis on a new theoretical subject in combination with a subject that we, the authors, already were familiar with has been of great interest and a source of learning and inspiration.

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Abstract

This thesis investigates how a web-hosted portal could be developed and designed in order to assist customer information updates in micro-enterprises in the ship broking business. Based on well-established system development theories and collected material, the web-hosted portal concept was developed. The development process included a case study at a ship broking company in Karlshamn, southern Sweden.

Ship broking companies handle information as a mediator between other actors, thus the information becomes sensitive. In the ship broking business there is a constant need and flow of information. As the shipbrokers' customers demand constant information 24 hours a day it is important to meet this demand in a service minded fashion.

Today all customer updates are handled manually and are considered very time consuming and generate duplication of work. To solve these issues a possible solution could be to introduce information technology in the organisation. The introduction of information technology in the ship broking organisations has been slow. A contributing factor might be the widespread conservatism and resistance to changes in the ship broking business.

The conclusions show the needs and demands for a web-hosted portal among shipbrokers and interested parties in the logistic chain. The result of the thesis should be considered as a foundation for further development and implementation of the concept.

Keywords: Web-hosted portal, information sharing, ship broking, system development, system requirements, customer relationships

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Glossary

Term	Description
Agent / Shipbroker	Representative for the ship owners in the harbour, a free-standing company which mediates cargo/or cargo space (Advokatfirman Ihre, 2003).
Bunker status	Fuel quantity on board a vessel. (Joachim Pyk at Gillis Shipping AB, May 7, 2003).
Clearance	Care-taking of different formalities and payments of port fees, customs etc. in connection with a vessel's arrival and departure at the port (Advokatfirman Ihre, 2003).
EDI	Electronic Data Interchange.
EDIFACT	Electronic Data Interchange for Administration, Commerce and Transport. An international standard used in many industries.
ETA	Estimated Time of Arrival.
ETC	Estimated Total Call.
ETS	Estimated Time of Sailing.
Final D / A	Final dispersement account. The total cost for a clearance (Joachim Pyk at Gillis Shipping AB, May 7, 2003).
Forwarder/Shipper	The party that concludes an agreement with a conveyor regarding transport of general cargo at sea (Advokatfirman Ihre, 2003).
Freighter/Charterer	The party who rents the vessel for freighting goods (Advokatfirman Ihre, 2003).
IMO-number	A unique identifier for each specific vessel controlled by International Maritime Organization (IMO) (Anders Magnusson at the Port of Karlshamn, April 3, 2003).
Intranet	Internal communication networks in corporations based on the use of Internet technology.
IS	Information System. A system storing and providing access to a predefined class of information, e.g. airline schedules, library catalogues (Hoepelman, Mayer, Wagner, 1997, p. 133).
IT	Information Technology. A broad term embracing computer science and all fields of other sciences that are related to information processing, including both the theory and the engineering (Hoepelman, Mayer, Wagner, 1997, p. 133).
Micro-enterprise	Enterprise having fewer than ten employees (Commission of the European Communities, Article 1 § 5, 1996).
Pro forma D / A	Estimated dispersement account. Estimated total cost for a clearance (Joachim Pyk at Gillis Shipping AB, May 7, 2003).
Shipper	Party who leaves goods to the vessel for transportation (exporter, shipper, freighter, forwarder) (Advokatfirman Ihre, 2003).
SoF / Time Sheet	Statement of facts. A document specifying times in the port connected to a specific vessel (Joachim Pyk at Gillis Shipping AB, May 7, 2003).
Web-hosted portal	A tailored web site, which is used as an information medium, customized for specific purposes, e.g. updating customers with business-related information.

1 Introduction

This chapter gives a brief introduction to the problem area, which is described and motivated. Underlying questions, the aim and delimitations of the research are defined here. Finally, a short run-through of the chapters' disposition is given.

1.1 Problem background

In the ship broking business there is a constant need and flow of information. As the shipbrokers' customers demand constant information 24 hours a day it is important to meet this demand in a service minded fashion. The ship broking companies handle information as a mediator between other actors, thus the information becomes sensitive. Still they need to provide information to the customers. Today this is handled by phone, fax, e-mail and telex, which, according to Joachim Pyk at Gillis Shipping AB (personal conversation, February 27, 2003), is considered time consuming and develops a significant amount of papers.

How do the employees at a ship broking company look at their own work? A significant amount of time is spent on updating customers with new information. Can this be done in a more efficient way with other tools and new thinking? To find new ways of doing procedures as they always have been done is hard and requires a thorough analysis of the current work situation and attitudes among the employees. Is it possible that a resistance against new ways of doing old work procedures exist? A possible solution to improve the efficiency concerning information forwarding could be to find alternate ways to convey the information. What information is conveyed to the shipbroker's customers? How is this done? To find out if the shipbroker would gain on introducing new ways of forwarding information, it is necessary to find out the views among the shipbroker's customers. Does the shipbroker have a well functioning customer relationship today, could it be improved? Could the shipbroker's customers be interested in participating in a new collaboration concept through a web portal? Are all the customers interested or only a few? Can all customers use the new technique?

The questions are many and it is impossible to answer all of them in this thesis. To limit the quantity of questions the discussion above has been compressed and drawn up here below in section 1.2. The intention is that these questions will form a main thread that runs through the entire thesis.

1.2 Research questions

Trying to investigate how shipbrokers can satisfy their customers with relevant information in an efficient way, a number of questions arise. If these questions can be answered it may help to meet the aim with this thesis. To answer the two main questions other sub questions need to be answered first.

- **How would a web-hosted portal look like if it was introduced in a micro-enterprise in the ship broking business and what features would need to be implemented in order to support their activities?**
 - What kind of information needs to be provided between shipbrokers and their actors?
 - What kind of system can be implemented to support the communication flow between shipbrokers and their actors in the logistic chain?

- **Would a web-hosted portal developed by the authors improve customer relationships, by providing updated individual information?**
 - Who might be interested to participate in such information exchange collaboration?
 - What is the demand for a web portal among shipbrokers and their actors?

1.3 Aim

Small family businesses in the ship broking business are, according to Joachim Pyk at Gillis Shipping AB (personal conversation, March 6, 2003), often considered to be conservative and afraid of changes. As a small example can be mentioned that Gillis Shipping AB is one of few shipbrokers in Karlshamn that have a web page on the Internet.

It is the authors' opinion that it is the large, often multinational, shipbrokers that are in focus for new technical solutions and projects. Smaller actors are often overlooked and ignored as they are considered to be too small to participate in such a co-operation. To the authors' understanding the amount of produced papers and investigations on small ship broking businesses, especially in Sweden, is virtually non-existent.

The purpose of this work is to investigate if a micro-enterprise in the ship broking business would improve their customer relationships if they introduced and supplied a web-hosted portal to their customers.

As the shipbroker's core activity is to share information, the main stress is put on the constant information sharing with customers, to find participating customers in the information sharing and to find out if some sort of improvement is needed and if a web-hosted portal could be a solution to this possible need.

This thesis is to consider as an introductory part in the life cycle model described in section 2.1 and could be used as a base for further development of a web-hosted portal used by shipbrokers and their customers.

Finally, it is the authors' intention to gain more knowledge and understanding within the complex and vast area of ship broking.

1.3.1 Aim details

To fulfil the purpose there are many tasks that need to be carried out and they are as follow:

1. Describing the ship broking industry and its actors.
2. Collecting and describing the information need and finding out what kind of information that is desirable for shipbrokers and their actors.
3. To analyse what sort of individual information can be made available to the different customers without risking that the own business is undermined, i.e. threatened by competitors.
4. Through the results of the analysis determine if a web-hosted portal alone could be the solution to the information needs.
5. Develop a model for the introduction of a web-hosted portal in a micro-enterprise who wants to introduce IT in their business.

1.4 Target group

This thesis is intended to micro enterprises in the ship broking business who want to introduce IT in their business. The thesis could also be interesting to people who are to implement the web-hosted portal concept.

1.5 Delimitation

As mentioned earlier, the core activity for a shipbroker is to collect and forward information to its customers. Since most information is connected to this activity, the authors find it natural to study this particular part of the business. No consideration is taken to other parts of the business. The administrative and economical parts are ignored.

This study will only focus on the first four phases in the life cycle model, described in section 2.1, from the analysis of change to the conceptual technical solution. No consideration will be taken to the following phases as the aim is to develop a web portal concept in the ship broking business, thus no technical details will be accounted for.

1.6 Disposition

The first chapter (introduction) gives a brief view of the problem background and research questions, aim with the thesis and delimitations are presented. In chapter two (theoretical framework and previous research) the life cycle model, Theory W and previous research are described and discussed. The following chapter (methodology) describes the information gathering process and the methods used in order to collect correct data. Finally, the reliability and validity is discussed. In the fourth chapter (empiricism) a short background to the research area is given. The collected data from the literature study and the case study is presented. The collected data in chapter four is analysed in the fifth chapter (analysis and results) followed by a reflection on the literature study. The final chapter (conclusions) evaluations, reflections, aim fulfilment and continued work are discussed.

2 Theoretical framework and previous research

The theoretical framework constitutes the foundation on which this thesis is based. Theories used to collect useful data as the life cycle model and Theory W are described and motivated. The theories are used to formulate questions regarding the current issue. The previous research is a starting-point from which this report takes off.

2.1 Introduction to the life cycle model

Andersen (1994) declares the importance of having both a comprehensive view of the situation and to use methods and techniques that describe the development tasks in more detail when developing a new information system (IS) (p. 32). The overall view must include the fundamental features and involved parties in order to get the users to be an active party in the development work. Further, Andersen (1994) describes a useful model to demonstrate the different phases in the development of an IS, the life cycle model (p. 41). The model is divided into nine phases from 0 to 8. Each phase is divided into four main areas where problem, tasks, basic documents and participants of each phase are defined. See Figure 1 below for more details.

System development									
	Analysis of changes	System design				Realisation	Implementation	Administration and operation	Termination
	0	Analysis		Design		5	6	7	8
Problem area		1	2	3	4				
Problem	Problems and opportunities in the organisation	The information system's support to the organisation	The content of the information system	Choice of essential technical solution	Designing of technical solution based upon current equipment	Prepare the information system	Start	Maintain the system and make improvements	Terminate the system
Tasks	Describe current situation Describe desired situation Describe need of changes Describe alternate actions Describe further development	Analyse the organisation and decide in what way the information system can make the organisation's work easier	Estimate and decide the content of the information system	Estimate and decide the technical solution of principle	Choose technical solution. Estimate and decide technical solution	Prepare adp- programs and new manual routines	Take new adp- programs and manual routines into usage	Make corrections. Estimate needs of and possibly implement improvements. Operation	Secure information
Data for decision-making	List of problems Wish list List of changing needs List of possible development alternatives	Descriptions showing the connection between the information system and the organisation	Descriptions of the information system, i.e. what information that should be received and handled	General descriptions of technical solutions	Detailed description of technical solution	Detailed description of technical solution	Directives from systems engineers and users	Experience material from the users. Operation instructions	Descriptions of data and databases
Discussion participants	Company management Company co-workers Company consultants	Director of usage Representants of usage Systems engineers	Systems engineers Users	Systems engineers Programmers	Systems engineers Programmers	Programmers Users	Users Programmers Systems engineers	Users, programmers and systems engineers Director of usage and operation personnel	System responsible, systems engineers, users and operation personnel

Figure 1 Life cycle model. Andersen, p. 41, 1994

2.2 Analysis of changes

Andersen (1994) writes that the reason to do an analysis of changes is to map what problems/opportunities the organisation phases (p. 42). In this phase of the process the employees are very much involved in the work and the result will determine whether or not a better IS will solve the problems of the organisation. Andersen (1994) further describes the X- and Y-model as structured methods that could be used in order to prevent a swift analysis of changes (p. 57-65).

2.2.1 Y-model

The starting point of the Y-model is a description of the current state of the organisation as seen in Figure 2. When the description of the current state is done the description of the desired situation will take place. It is often easier to describe the desired situation if someone first has described the current situation in the organisation. When these two parts are done the differences are examined in order to determine the need of changes. The process now comes to determine how the need of changes can be satisfied and the result from this phase will be a recommendation of action. The final step of the Y-model consists of a selection process of the list of recommendations since it is not always possible and necessary to accomplish every recommendation in the list.

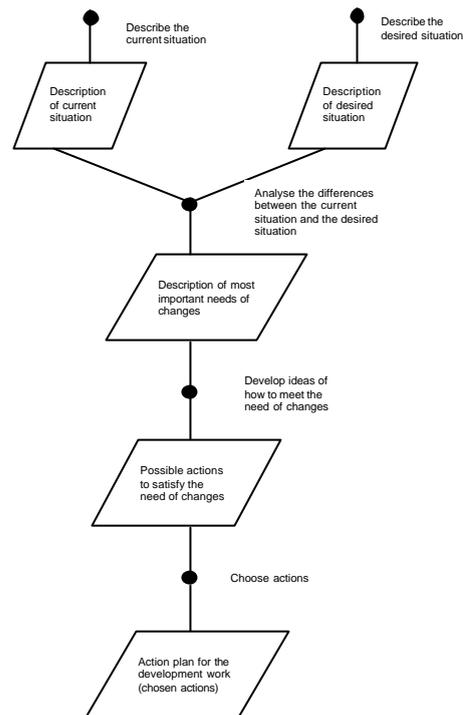


Figure 2 Y-model. Andersen, p. 59, 1994

2.2.2 X-model

In the analysis of changes the X-model is used to describe the current and the desired situation. The model emphasizes that person and object are two distinct things that ought to be described separately. The model seen in Figure 3 on next page consists of 5 parts: person prerequisites, person results, object prerequisites, object results and method of working.

Each participant answers questions regarding the current situation and thereafter everyone's answers are put together to form an X-model over the current situation. Next, the participants answers questions regarding the desired situation and form an X-model over the desired situation. The final step is to analyse the two models and come up with a list of changes.

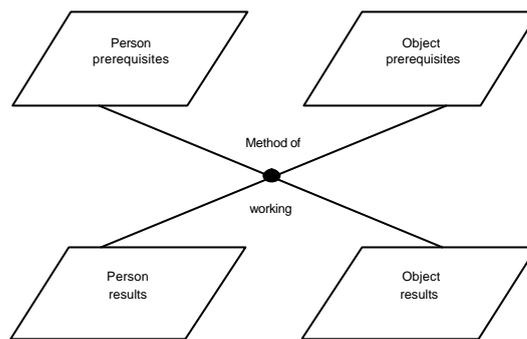


Figure 3 X-model. Andersen, p. 62, 1994

The X-models' two situations: current and desired constitute the base for the Y-model. From this point it is possible to analyse the differences in the two situations.

2.3 System design

The system development task is according to Andersen (1994) initialized by the system design phase, and contains the following problem areas (p. 43):

- | | | |
|-------------------|---|--|
| Phase of analysis | { | <ul style="list-style-type: none"> • Activity analysis • Information system analysis |
| Phase of design | { | <ul style="list-style-type: none"> • Conceptualising technical solutions • Design of equipment-adapted technical solutions |

Only the three first problem areas are playing a significant role in the realisation in this thesis, thus the focus in this theoretical framework will be kept on these.

2.3.1 Activity analysis

The main reason to introduce an IS is to serve the activities in the organisation. For that purpose it is necessary to discuss and analyse in what way an IS can assist the daily work. This is achieved by defining the activities going on in the organisation and what connection they might have to an IS. The result will hopefully be clearly defined and delimited main tasks for the IS.

In order to achieve the objectives in system development, Andersen (1994) points to the importance to delimit the extensive task (p. 97). Since the organisation's main problem is not yet known in the phase of analysis of changes, the delimitation needs to be carried out with a very broad perspective. If the results from the phase analysis of changes show that the organisation is in need of an IS, then phase number one (activity analysis) in the life cycle model is initialized. A more narrow delimitation in the activity analysis is necessary to avoid a too extensive development work.

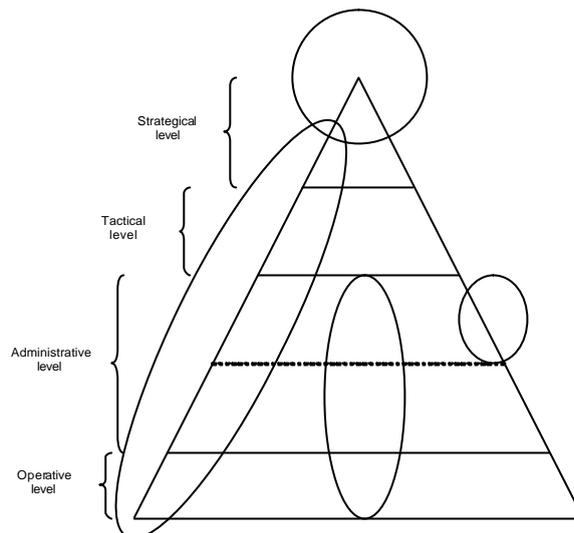


Figure 4 Possible delimitations of the organisation. Andersen, p. 97, 1994

Figure 4 shows how delimitations in system development can be drawn, e.g. the system development can be narrowed and focused to improve administrative functions or to assist specific organisational operations.

2.3.2 Information system analysis

The outcome from the activity analysis assists to get more defined requirements in this problem area. Employees with special skills in the activities are involved in this phase (phase 2) by contributing their knowledge. This analysis results in documented specific system requirements and restrictions, a so-called specification of requirements. This document works as a link between the analysis and the design phases (Andersen, 1994, p. 44).

2.3.3 Conceptualising technical solutions

Once the specification of requirements is documented the foundation of the IS is set. At this point it is made clear that there is a need of change within the organisation. It is also known that an IS is the solution to this need. The employees have been an active party in the process of finding requirements and wishes on the future IS. System developers and programmers try to realize these demands by first producing a conceptual technical solution upon which the future implementation relies (Andersen, 1994, p. 41, 45).

2.4 Theory W

To assure the IS to be successful, Karlsson (1998) states that IS development demands consideration to many interested parties and must therefore, as far as possible, correspond to all expectations. This is often difficult to achieve since several parties have different objectives and expectations considering the future IS. Next to these objectives, so-called “win conditions”, that often stand in conflict with each other, exist. In order to please the interested parties, accurate compromises need to be done (p. 81).

2.4.1 How to make all parties winners

Bohem and Ross define Theory W in Karlsson (1998) as a management theory, dealing with the problem with many interested parties with contradictory objectives and how to resolve this in an effective way. The purpose with Theory W is to make all the involved parties become winners, i.e. to guarantee that everybody's goals are fulfilled to the maximum (p.82).

According to Bohem et. al (1994), "win-lose conditions" exist in situations where both winners and losers are among the interested parties. Such situations can occur when a new IS only corresponds to expectations from a few interested parties. These situations will probably pass to "lose-lose conditions" where every party becomes a loser (Karlsson, 1998, p.83).

By systematically identifying every party's win-conditions, the goal in making all interested parties become winners can be achieved. The next step is to find those conditions that stand in contradiction to each other and make appropriate compromises between them to find alternatives. By defining alternatives, agreements that hopefully will result in a "win-condition", are found.

2.4.2 How to produce "win-win conditions"

The Theory W is used in the system requirement process. In the specification of requirements, every requirement has its origin in a win-condition from an interested party. "Win-win-conditions" will be the agreed requirements the IS must fulfil to make all parties winners.

"Win-win conditions" and thereby the demands for the IS are produced in a process containing of four steps, see Figure 5.

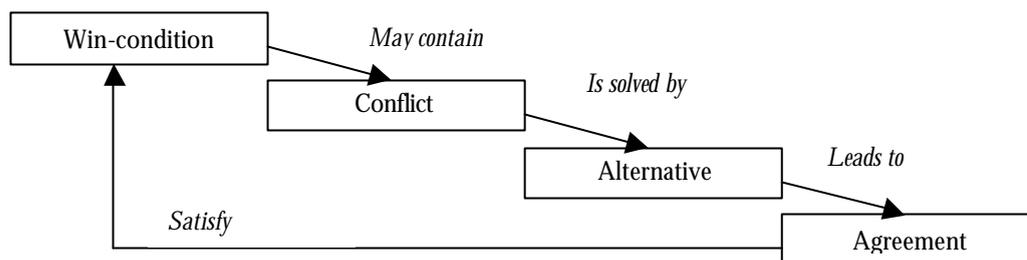


Figure 5 "Win-win-conditions". Lee & Bohem in Karlsson, 1998, p. 85

2.5 Previous research

The previous research is a starting-point that describes current relevant issues from which this report takes off.

2.5.1 Internet

Internet is today one of the most popular and efficient ways to communicate with people all over the world. Internet is introduced everywhere, e.g. in homes, schools and workplaces. Since IT and Internet were introduced, the ways of handling information and how we communicate have dramatically changed. As can be seen today, IT has influenced almost every branch to various extents and this development of information technology means a change of prerequisites in the transport and logistics branch (Edifact, 1999, p. 4). The advantages with Internet are many; the operating cost is low, the speed is good and the functionality is large and open. The Internet and its complement WWW could support a cheap, highly accessible and reliable transmission tool for much of the information concerning the transport of goods (Bollo & Stumm, 1998, p. 430-431).

2.5.2 EDI

EDI, Electronic Data Interchange, is a structured way of sending electronic information (Pettersson, 2001, p. 30-31). EDI is often considered as the fundamental means to facilitate better relationships within transportation chain partners. This is only achieved if EDI is completely integrated in the IS of the firm and their partners' firms, and if information message exchanges are voluminous (Bollo & Stumm, 1998, p. 432). EDI has existed for more than 30 years now, but has not yet reached micro-enterprises to any significant extent. Smaller companies who do not implement EDI run the risk of being totally excluded from the logistics supply chain (Stefansson, 2002, p. 136). Two possible causes to the low interest of implementing EDI can be the high entrance costs and the lack of operability between different information systems (Jui-Lin Lu & Hwang, 2001, p. 1).

2.5.3 Information sharing

As IT has developed, many businesses in logistics have adapted to the new technology as Internet and EDI, but in some cases within ship broking, communication and information handling are still done manually. Communication is done by phone, e-mail, fax machine or telex. The information is handled manually by collecting and forwarding it through some of the mentioned medias and then registered by typing it e.g. on a computer.

"The makers, suppliers and sellers of products need information to guide their operations" (Holopainen, Lillrank, Paavola, 2001, p. 11). A supply chain from producer to consumer is a complicated process consisting of many different independent actors. In order to keep control of the goods and make the route through the chain efficient, information needs to be shared between the actors.

As problems such as information sharing with other systems and reluctance to exchange information with other companies with standardised solutions like EDI exist, other communication solutions are needed. Boyson et al. (2003) describe an Internet portal as a good solution to overcome these problems. It is also their opinion that a portal can help to standardise communication and that it can become a trusted party between different actors (p. 176).

Future actors, i.e. new companies with connections to the shipping business in Karlshamn, could create a greater demand for information sharing and might possibly create a need for a web-hosted portal. After initial discussions with Gillis Shipping AB (personal conversation, February 27, 2003) regarding their situation as a shipbroker, the opinion that a web portal solution could cause a threat to their and other shipbrokers' needs of resourcefulness, trustworthiness and discretion was mentioned. Since critical information can get available to parties that can take advantage of it, it is of high importance to protect this sensitive information.

This study is based on the idea that a web-hosted portal maintained by Gillis Shipping AB could increase their competitive advantages as a mediator. The possibility to assist the shipbrokers' customers with individual, protected information in a standardised and customised fashion 24 hours a day should be seen as an opportunity instead of a threat.

Kanflo (1999) suggests that companies in the logistic chain should prepare themselves for increased demands on information services, both when it concerns management of the goods, and the need of totally new services for integration of communication between different actors in the chain. It will be especially important to provide information regarding transport status, the good's location and if any delays or other problems have occurred (p.54).

2.5.4 US Department of Defence pilot project

Information technology makes it possible to process more information, more accurately, more frequently and from more sources, even from all over the globe. The Internet is the first channel that makes information located at a specific source available to anybody. Electronic exchange of information leads to a reduction of errors and increased efficiency of the work processes. In a supply chain many parties are reluctant to share information with other parties since they believe that this will threaten their competitive edge. A way to solve this issue would be to introduce a portal where the access to the information is restricted to a need-to-know basis. Another issue that a portal solves is that it is easier to interact with one portal than dealing with many peer-to-peer relationships (Boyson, Corsi, Verbraeck, 2003, p. 175-177).

Boyson, Corsi and Verbraeck (2003) describe a pilot project for the US Department of Defence (DOD) to create a portal for supply chain integration that was carried out for the Office of the Secretary of Defence earlier this year. Since the DOD interacts with many partners worldwide they thought a portal would be a solution for them (p. 176).

The presentation layer of the DOD portal gives the user access to information depending upon the user's level of security clearance and/or need to know. This layer can be personalized based on the requirements of the user. This system allows the users to log onto a single portal site and immediately get the element information they need to

make certain decisions i.e. a customer can log onto the portal and gain access to real-time information about their order (Boyson, Corsi, Verbraeck, 2003, p. 177).

2.6 Motivation to selected theories

Collecting system requirements is a very important task but can also be associated with difficulties. Loucopoulos and Karakostas in Karlsson (1998) define the most common problems in the phase of collection and analysis (p.15):

- Customers and users do not always have a clear picture of their requirements of the IS.
- Customers and users often have difficulties in expressing and mediating their knowledge for the specific situation.
- Many times customers and users use specific expressions related to their organisation and areas of expertise. Since developers do the same, the communication gets ineffective and misunderstandings occur.
- Some parties might not be interested in introducing a new IS since it might change their assignments. This can also lead to problems in the communication between the developers and the interested parties.

To overcome the problems mentioned above, various theories will help the authors to collect and analyse the system requirements. To overcome the difficulties, Karlsson (1998) suggests a straight and open dialog between the interested parties (p.15).

The X-model, which is used in the analysis of changes, serves to make it easier for the users to find a desired situation. Once the current situation is described, the process to define the desired situation is much easier since one has something to relate to. The Y-model will help to see how the need of changes can be satisfied and what actions need to be taken in order to achieve a desired situation.

In case the analysis of changes points that an IS, i.e. the web-hosted portal, can help to achieve a desired situation the next step is to develop the specification of requirements. In this thesis, the process of handling requirements has one goal; to find the best way how to make the involved parties benefit from a future web portal concept. By considering Theory W, the specification of requirements can meet the objective to satisfy all the interested parties.

3 Methodology

The purpose of this chapter is to clarify the validity of the following results, interpretations and generalisations (Davidsson & Patel, 1994, p. 109). By describing the methods, an equal study can be made again with similar results as in this thesis. The used methods will assist the authors to find relevant information.

3.1 Type of study

According to Patel and Davidsson (1994), two different types of methods exist in order to collect data, quantitative and qualitative. In a quantitative study the emphasis is to collect a great amount of data that can be analysed, compared and categorized. This great amount of data constitutes the statistical foundation from which it is possible to find tendencies and patterns in the investigated area. The result from a quantitative study is often easy to measure which makes it is easy to test a possible hypothesis with the collected data (p. 90).

The contrast to a quantitative study is a qualitative study in which the central point is to gather a more valid data and gain a more profound knowledge. The aim of a qualitative study is to examine the separate parts' relationships to each other and possibly to the entirety (Davidsson & Patel, 1994, p. 99).

In order to fulfil the purpose of this thesis, it is necessary to link different areas of interest together, such as system development and ship broking. These areas need to be explained in order to see how they can be related to each other. From established theories in system development, the authors' intensions are to gather relevant information and in a hypothetic-deductive way, interpret the information to be able to come to an adequate conclusion (Davidsson & Patel, 1994, p. 21).

The gathering of information in this thesis will be carried out through a qualitative study in order to gain the previously mentioned profound knowledge in the area of information opportunities and threats in the ship broking business. A literature study together with interviews and observations with shipbrokers and their actors will represent the basis of the material in the analysis in order to answer our research questions.

3.2 Information gathering process

In the very initial phase of this study an exhaustive literature study was carried out. From this vast quantity of written scientific reports, published books and recent newspaper articles in the areas of logistics, IS and shipping, a thought was created and formed through frequent discussions with the authors' supervisor.

This thought was then tested on a respondent in the ship broking business, Gillis Shipping AB, who during initial discussions was somewhat pessimistic to the chosen subject and wondered if it could be investigated in their business. The impression of pessimism can have its origin in lack of knowledge regarding IT among employees at Gillis Shipping AB and lack of skills among the authors expressing the subject area in a proper way. The purpose of the meeting was to get brief information on ship broking in general and associated tasks in the branch.

A succeeding meeting with the same shipbroker a week later showed a different result. The employees had given the subject some more thought and discussed it among themselves. An entire day was spent at Gillis Shipping AB with whom a fruitful discussion took shape. More emphasis was put on the work processes and the specific tasks connected to the employees dealing with ship broking. Another main purpose of the meeting was to begin to find out what information Gillis Shipping AB collects, sorts and forwards to its customers.

The impressions from this second meeting were used to formulate questions regarding the current situation and a desired situation to be used in the analysis of changes in the life cycle model (Questions and brief answers in Appendix 1). During the third meeting with Gillis Shipping AB three employees were interviewed in an open fashion with the questions as a frame for the discussion. At the end of the meeting Gillis Shipping AB contacted two customers on “either side” of the shipbroker in the logistic chain; freighters at Mörrums Bruk and the stevedores at the Port of Karlshamn. As these customers are in constant need of information regarding ships’ arrivals and departures, weather and wind etc. it was considered interesting to find out their reactions on an investigated web-hosted portal.

After analysing the received information from Gillis Shipping AB, relevant questions were formulated to be asked to Gillis Shipping AB’s customers (Questions and brief answers in Appendix 2). These answers were in their turn together with the answers from Gillis Shipping AB analysed with emphasis on requirements and needs in respect to Theory W. The results from this analysis were used to develop a future web portal concept in the ship broking business.

To summarize and clarify the data collection, the study was carried out through three iterative steps; finding relevant questions, generating results and analysing the results.

Following examples might help to make the iterative process even clearer:

- Finding relevant questions: Could an introduced web portal help to make customer relationships better?
- Generating results: Yes, it might improve customer relationships.
- Analysing the results: In what way can the customer relationships be improved? Will information sharing get faster? Can a web portal reduce the quantity of information? Will it add more pressure on the party receiving information?

With one generated result many new questions and perhaps some conclusions are generated in the analysis. The analysed results form the foundation for a new question, thus it becomes an iterative process described in Figure 6 below.

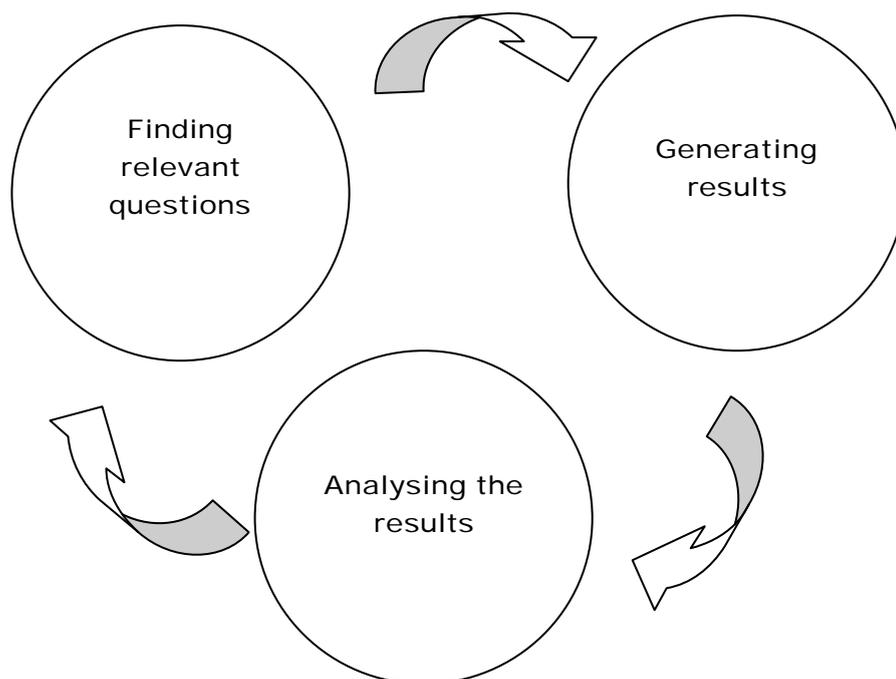


Figure 6 Model of the iterative process in the data collection phase.

3.3 Data collection methods

The iterative procedure above is of great importance in order to develop a useful model that can be adapted by a micro-enterprise within the ship broking business. By the use of a case study the authors' intention is to gather adequate information to come to a relevant and valid conclusion.

Data collection can be performed in many ways and in the case of this thesis some techniques are more likely to give relevant information than others (Davidsson & Patel, 1994, p. 54). Since this thesis will deal with a qualitative research, techniques like interviews, journal writing, observations and literature review can assist to collect information that is relevant to fulfil the aim.

In the following subheadings, the proceeding work with the techniques mentioned above will be described; what relevance they have to this study and their advantages respectively their disadvantages.

3.3.1 Interviews

There are several different types of interviews. Two main aspects must be taken into consideration when dealing with interviews, level of standardisation and structure. The level of standardisation indicates how predetermined the questions are and in what order they come. The concept "structure" involves in what way the questions can be answered (Davidsson & Patel, 1994, p. 60-61).

Further, Davidsson and Patel (1994) state that in comparison with other techniques, interviews are likely to be more focused on the target, thus giving a higher response

quality if the right person is interviewed. When the interviewer asks resulting questions, influences and stimulates the interviewee, a higher understanding for the investigated area can be reached.

Based upon the arguments mentioned above, only face-to-face interviews were used in the qualitative research. In the initial phase the interviews held a low standardized and structured level because of lack of knowledge in ship broking among the authors. After gaining more knowledge in the area of ship broking, the level of standard and structure increased in the interviews.

As the authors' intentions were to gain a deeper knowledge among the processes in which the shipbroker is involved, interviews were considered to be the most reliable data collection technique. The disadvantages with interviews are that it can be hard to get a hold of the right people to interview and the interviewer might affect the interviewed person or group (Davidsson & Patel, 1994, p. 63).

3.3.2 Journal

Journals can be used in different ways to collect information. One way that they can be used is to find out when, where and how activities are performed. On the other hand they can be used to investigate the individual's perspective on his/her own existence (Davidsson & Patel, 1994, p. 57). Trying to catch these two, an employee at Gillis Shipping AB was asked to document the connections and information flows between the shipbroker and its customers in order to help the authors with the lack of knowledge in the area (Information flow to/from Gillis Shipping AB in Appendix 7 & 8).

The advantage of a journal is the direct answer on processes in the business that the authors do not possess. To collect data is often very time consuming, but by using a journal the data collection can be made more efficient. A disadvantage might be that the person writing the journal can feel too directed by the people assigning the journal writing.

3.3.3 Literature review

According to Patel and Davidsson (1994) it is important to choose literature that gives a complete picture of the problem area and to use material that represents different angles to the problem (p. 55). If this is not considered, the risk to create a false image becomes greater. It is also important to remember that when literature from different angles/areas is used it might affect the trustworthiness and the quality of the research. To handle this, the authors need to be critical to the literature sources.

To get a more relevant understanding of the problem area, recent scientific papers and published books on system development, system requirements and logistics have been used to find valid facts and theories.

Wiedersheim-Paul and Eriksson (1991) mention a major advantage with literature studies (p. 76). It is less time-consuming to acquaint oneself with previously documented results (secondary data) than to do own research (primary data). The main

disadvantage in this research is to find relevant literature to this quite narrow subject area. Since many different areas affect the subject it is difficult to find literature that has a connection to the specific situation.

3.3.4 Observations

Observations are considered to be very usable when course of events are studied in a natural environment in real time. One factor that makes them usable is that the object of the study does not need to remember and convey information of how a task is carried through. This technique is also relatively independent on how willing the individuals are to cooperate in contradiction to e.g. surveys and interviews. Disadvantages with observations are that it is difficult to judge whether the observed course of events are a representative behaviour or not. Another aspect is that it is hard to catch all different courses of events; is it possible to presume that all aspects are covered by the observation (Davidsson & Patel, 1994, p. 74-75)?

Since the aim was to catch activities around information exchange, the authors decided to use an unstructured observation, which according to Davidsson and Patel (1994) is to prefer when as much information as possible within a defined problem area is to be collected (p. 81). The observations were performed in an open way during a normal workday, where the observed individuals knew that they were observed.

3.4 A critique on the data collection methods

To be critical to the used collection techniques is very important since it might affect the outcome of the thesis (Davidsson & Patel, 1994, p. 55).

3.4.1 Interview

The intention with the study was to do a multiple case study by contacting and interviewing several companies in the ship broking business. Performing a multiple case study would perhaps lead to a more valid result. The choice of what companies to contact was simple since the aim and scope was fairly narrow and determined. Due to the lack of personnel and time among the questioned shipbrokers in Karlshamn, only one ship broking company accepted the interview request in the beginning of the thesis period. At the end of the research two more companies communicated their interest to participate in the interviews. By that time the authors agreed that sufficient data was already collected in order to answer the research questions and no further interviews were carried out.

It was not that obvious what actors in the shipbroker's sphere that needed to be contacted. In this case the authors put their trust in the shipbroker's judgment of interesting actors. A possible way to determine what actors to contact could have been to do this before the meetings with the shipbroker, but it would have been almost impossible to know who share most information with the shipbroker.

3.4.2 Journal

To keep a journal can be very time-consuming for the active employee, why it is possible that the collected data can be hastily documented and give a false picture of the activities. It is also possible that the employee writing the journal was too directed by the authors and thus documented the information from the authors' perspective instead of from the employee's own point of view (Davidsson & Patel, 2003, p. 66-67).

3.4.3 Literature

As the ship broking business is a quite narrow and conservative branch, mentioned in section 1.3, a large amount of written literature in the subject area does not exist. To form a complete picture of the problem area general literature dealing with IT related to logistic activities have been used. The literature study can be questioned since the literature has not been collected from many different sources, but a great effort on finding more literature sources was carried out.

3.4.4 Observations

To get a general understanding on how the ship broking business works the authors have participated in Gillis shipping AB's daily work, making sure that they have covered as many information activities as possible involved.

As an unstructured observation was carried out, no observation scheme was prepared and written. Only specific keywords were noted as suggested in Patel and Davidsson (1994, p. 81). It might have been more efficient to collect the data in a previously made observation scheme. It can possibly have been easier to draw conclusions and find important connections if the data was documented and categorised in a formal way.

Since the observation was carried out in an open way, this might have affected the ways the observed individuals handled the information activities.

3.5 Reliability and validity

Patel & Davidsson (2003) state the importance to estimate the reliability and validity for each and every study (p. 98). Validity describes the correspondence between what is to be investigated and what is currently being investigated (Patel & Davidsson, 2003, p. 99). A qualitative research carried out in this thesis, studies abstract conceptions and different peoples' opinions. It is therefore hard to guarantee, that the tools used, have answered the questions in a proper way. In this thesis the question regarding the validity is whether the interview questions and the theoretical framework have fulfilled their functions.

The greatest uncertainty regarding the validity, are the few interviewees in the case study. Most likely they are too few to represent all the conceivable requirements and the authors need to be careful with the result gained from the research.

According to Patel & Davidsson (2003) reliability is how well instruments can stand against random influences by different kinds (p. 100). The result gained from interviews has always an uncertainty which can be caused by several factors. An example that can affect the reliability is the interviewer's ability to interpret and reproduce the interviewee's answer in a correct way which can be insufficient. To reach high reliability, the interviewer needs to be trained performing interviews and the questions need to be formed in a way that the answers cannot be misinterpreted (Patel & Davidsson, 2003, p. 101). The authors have minor experience interviewing people, but in order to improve the quality and avoid misunderstandings from the interviews attendant questions have been asked.

4 Empiricism

In this chapter a background to the ship broking business is given and the material from the literature and the case study is presented in order to answer the research questions. Initially a general background describes the state of the art in the ship broking business in Karlshamn. Hereafter the material collected from the literature study is described, followed by the material gathered from the case study, of which a significant amount is derived from interviews, observations and journals which can be found in their entirety in the appendix.

4.1 Background

A short background on the ship broking business in general, Gillis Shipping AB – the ship broking company used in the case study and a description of a possible future in the Port of Karlshamn is given.

4.1.1 The ship broking business

The shipping business is one of the oldest and most traditional businesses in global competition. Over the years, a need of specialisation has evolved and created the branch of shipbrokers in order to make the supply chain more effective. The shipbroker serves as the contact between two parties: the ship owner and the owner of the goods (The Swedish Shipbrokers' Association).

4.1.2 Gillis Shipping AB

Gillis Shipping AB is a medium large shipbroker located in Karlshamn with Sweden's 8th largest port (The Swedish Shipbrokers' Association). The company was founded through a merge of three independent shipping agents in 1980 and has become a well-established shipbroker with five employees. The means of communication have not changed dramatically since the establishment in 1980. Information is conveyed through telephone, fax, telex and e-mail, but the company has no internal or external electronic IS and handles all communication manually.

The position as a shipbroker is very sensitive when it comes to handling information since they work as a mediator or third party between separate actors in the logistic chain. All actors depend on the information they receive from the mediating party at the same time, as the shipbroker is dependent on information received from its actors. A successful shipbroker takes care of the customer relations and values safety/security and confidence as essential (The Swedish Shipbrokers' Association). Gillis Shipping AB's policy is to be Resourceful, Reliable, Trustworthy and Discreet, thus serving their customers in the best possible way (Gillis Shipping AB, 2003).

4.1.3 Potential future situation in the Port of Karlshamn

Today the port has a cargo turnover of 5 million tons per year, which makes Karlshamn the 8th largest port in Sweden and the largest in southeast Sweden. It is strategically located in the centre of southeastern Sweden's industrial area, and forms a hub for the

thriving trade routes between Scandinavia, the Baltic countries and Eastern Europe (Port of Karlshamn, 2003).

Activities concerning shipping and transportation have a very long history in Karlshamn. A new generation of employees in the shipping business interested in “new” means of shipping and transportation is now entering the labour market in Karlshamn. With this new generation comes fresh knowledge in IT and ideas of how IT could be applied to the current shipping business (Port of Karlshamn, 2003).

Karlshamn’s objective is to develop into a regional cargo terminal in which cargo can be handled with maximum efficiency between ships, railways and trucks. As new markets in Eastern Europe, Russia and the Baltic countries open up, the Port of Karlshamn has a great potential to become the natural transport centre for this new possibility of importing and exporting goods (Port of Karlshamn, 2003).

4.2 Literature study

From the previously described background, a discussion is held regarding existing threats and opportunities of introducing a web-hosted portal in the ship broking business.

4.2.1 Threats and opportunities for a web-hosted portal

Threats

Companies that already have systems in good working order to handle information internally might face problems when it comes to integrate Internet with the internal system, something that is of great importance in order to provide information in an efficient way (Edifact, 1999, p.72).

Opportunities

There are significant possibilities to automate and simplify administration, sale and even marketing with IT. History shows that small companies can gain strategic advantages to grow bigger by introducing IT as a tool into the organisation. Many small companies within the logistic chain are working with few actors who generate the complete turnover. With services that use electronic interfaces it is possible to handle a greater amount of customers per employee. IT also brings possibilities to work with customers outside the home-based geographical area and by use of a well-designed web-hosted portal the customers are given the opportunity to handle their own information need. Companies connected to a supplementary net can provide services needed to handle the physical activities involved in the logistic chain (Edifact, 1999, p.15).

4.2.2 IT-related issues

Lack of standards

A significant need of communication is one factor that characterizes the shipping business and it is therefore in great need of IT. EDI communication has become usual among parties within the shipping business to manage the communication between different actors in the logistic chain. In spite of this many companies still experience a significant lack of standards regarding techniques to co-ordinate their information flow with other logistic parties. Significant trade creates customer-adapted solutions since customers use several different IT-solutions. This adapting of IT-solutions with each other results in lot of work (Edifact, 1999, p.25).

Internet

According to Edifact (1999) Internet has been called “the last step in computerization”, which can be discussed, but it sure indicates how great the expectations from Internet are (p.60).

Many companies look at the Internet as an efficient tool to reach new customer segments and to improve customer relationships. Customers demand more information and by providing an updated web-hosted portal that can be developed further to support customers needs, companies might improve their customer relationships. Edifact (1999) claims that Internet is one of the greatest possibilities to create broader and deeper dialogues with the customers. Providing a web-hosted portal, customers do not need to call for phone numbers nor stand in phone queues (p.60).

To create a more efficient dialogue it is of great importance that customers can ask questions via the portal as well as they are to be answered via the portal. The Edifact (1999) investigation shows that many companies have difficulties handling these types of web-hosted portals since they have lack of personnel and no routines to handle the dialogue between the company and its customers. The increased amount of information that dialogues between the company and its customers create can easily be solved though and should not be seen as a problem (p.61).

Techniques for improving customer relationships

With a well-designed portal solution one can easily automate a great deal of the previously mentioned dialogue with the customers. Routine errands like phone calls from the customers can easily be solved over the portal as the Edifact (1999) survey indicates; customers do find it easier to find information via the Internet than to give the company a phone call. Dependent on how sensitive the information is, the access can easily be individualised on a need-to-know basis by use of passwords (p.61).

Web-hosted portals have been seen as a good solution in order to provide important customers and partners with access to certain information. A company in the logistic chain can thereby make their services accessible for a defined customer category (Edifact, 1999, p. 68 & 69).

To get access to the information, all the customer needs is a connection to the Internet, a web browser and a password. One possibility with a web-hosted portal is to build solutions that the customer apprehend as an individual site, adapted to their needs from a standardised concept. The probability that the same information will be used over

again is significant according to the Edifact (1999) survey, which will contribute to handle information more efficiently and repeated work will be avoided both from the customers' and the shipbroker's perspective (p. 68 & 69).

4.3 Case study

Within this section, the qualitative empirical data will be presented. These data have been collected through interviews and inquiries with Gillis Shipping AB, Mörrums Bruk and the stevedores in the Port of Karlshamn. The situations described below have been put together from the material found in the appendices 2-4.

4.3.1 Current situation at Gillis Shipping AB

Internal information handling

All information is stored as paper sheets in document folders where each folder represents one arriving vessel. For every arrival at the port a new document folder is created which results in repeated work for the employees and redundant information. The document folders make it difficult for all the employees to know what the current situation is with a specific vessel. In order to keep track of what to do the employees use post-it notes that cover the desks in the office.

By the time when clients request information concerning a specific vessel it is in most cases no problem for the person that handles the specific vessel to find the requested information. In some cases when the responsible shipbroker is unavailable, it can be very time consuming for other employees who must traverse the document folders in order to find the requested information.

External information handling

Customer update is considered very time consuming since the shipbroker first needs to register the information in the document folder followed by updating each client. As a result of customer needs or desires, the update is performed by several means; phone, fax or e-mail. Due to this every update needs to be adapted individually. An example of poor service from Gillis Shipping AB is when the shipbrokers not have been able to update all the clients depending on lack of time or external circumstances this may cause the clients to contact Gillis Shipping AB and request information.

4.3.2 Desired situation at Gillis Shipping AB

Internal information handling

The employees should easily be able to track what has been done and what needs to be done with specific vessels. Redundant information and repeated work with vessels arriving more than once should be avoided by filling in all the needed data only once. It is desired that information is stored in such a way that document folders not will be needed and post-it notes will be eliminated.

External information handling

Customer update should be managed more efficiently and become more rapid. When updates are necessary it should be possible to send information to involved and

interested parties just once. Customers should not have to phone Gillis Shipping in order to receive information; it should be on Gillis initiative to update the customers. In those cases when customers want specific information one need to find a way of how they can retrieve this information in an easy way. As some customers do not have the possibility to send or receive e-mail it is desired to automatically convert faxes from the fax machine to e-mail.

4.3.3 Customers information needs and desires

Mörrums Bruk

Planning the logistic activities is an important issue for Mörrums Bruk therefore a constant providing of trustworthy information is significant when conditions in the logistic chain change. In order to handle the activities, questions need to be asked to Gillis and answered in a relative short time of notice. There is no need today to render updates to Gillis since not much information is sent to Gillis but receiving information in a more effective way is desirable. Mörrums Bruk is not ready to change the routines for this purpose and prefers updates by e-mail, but if a new system that clearly shows what information has been updated would prove to be effective, the routines could be changed.

Stevedores at the Port of Karlshamn

Whenever relevant information has been updated the stevedores want to be alerted by e-mail. It can be conceivable that Gillis provides a system where it is easy to find relevant information on specific vessels. Due to lack of time there is no possibility for the stevedores to change the information themselves in a system provided by Gillis, e-mail and phone are tools that are wished to be used for this purpose.

5 Analysis and results

This chapter describes how the analysis is performed by presenting the analysis process. To get a general view of the material, the analysis is divided into different areas. The main issues that will be discussed are connected to the activity analysis, information system analysis and the conceptual technical solution presented in the theoretical framework. Every issue will be analysed and discussed from the data collected from interviews and the literature study. The focus will be kept on the theoretical framework.

5.1 Analysis process

The analysis is carried out in three different steps. In the first step (the activity analysis) an analysis over Gills Shipping AB's activities and needs was performed together with the literature study.

In the second step, the information system analysis, the same sources as in the first step are used as well as the result gained from the interviews with customers to Gillis Shipping AB. Consideration has been taken to what previous research indicates as important concerning techniques for improving customer relationships as well as how to develop them to fit the organisation. The result from the information system analysis is the specification of requirements.

In the third and last step the authors give recommendations on how to improve customer relationships by conceptualising a technical solution based upon the two previous steps and the authors' own discussions.

5.2 Most important needs of changes within Gillis Shipping AB

The wishes in the desired situation found in the analysis of changes were discussed between the employees and the authors in order to find solutions. Before the analysis of changes employees had already discussed a way to handle information in a more efficient way. By combining the employees' knowledge in ship broking and the authors' knowledge in computer science more alternatives were developed. The result of the analysis of changes indicated that Gillis Shipping was in need of an internal electronic IS and a system that could improve their customer relationship.

Andersen (1994) suggests delimiting the system development to support a special function in the organisation (p. 98). Comparing the current situation with the desirable situation, as suggested in Andersen's Y-model (1994), indicates needs of changes in different areas of the organisation (see appendices 3 & 4) (p. 58-59). By looking closer at the results of the analysis of changes, a system that supports both internal and external communication will be demanded in order to keep the customers updated in an efficient way. The following analysis will therefore proceed with focus on both a system that supports both internal and external communication.

The IS can help the employees to handle information in a more efficient way by:

- Improving internal communication, i.e. make it more visible for employees working with clearance to track what has been done with a specific vessel.

- Reducing all repeated work caused by using the document folder for every arriving vessel.
- Spending less time searching information concerning a certain vessel.
- Improving external communication by providing information in a faster and more efficient way to interested parties.

5.3 Developed web portal concept

When the functionality of the IS is established and delimitations are made, Andersen (1994) suggests elaborating a more detailed description of the IS found in appendix 5, "Specification of requirements" (p. 44). This is carried out in the phase of information system analysis, where great consideration is taken to specific user needs.

The concept described below in Figure 7 is not a technical solution and should instead be seen as a more general description of the concept's functionality.

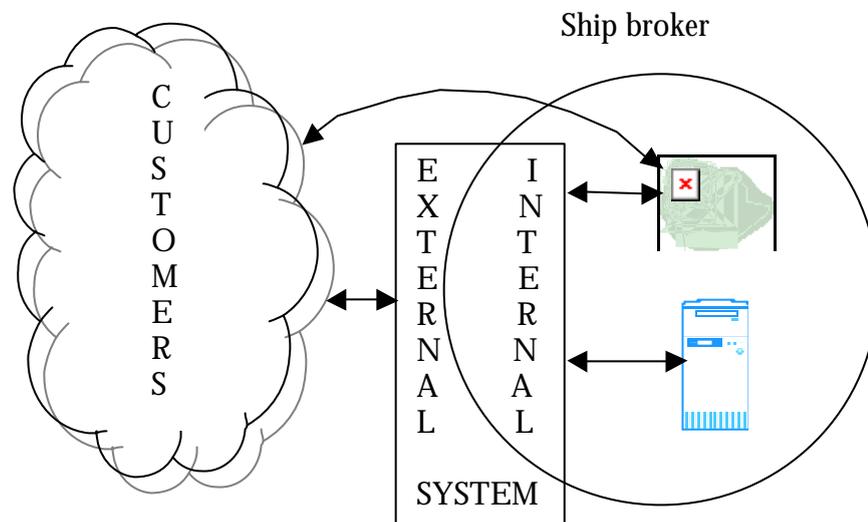


Figure 7 General web portal concept description

Based on the discussion in 5.2, the concept will contain both an internal and external interface based on web technologies. Gillis Shipping AB will work against the internal interface and the customers will work against the external interface. Both the internal and external interface will be connected to a common database where all information will be stored electronically.

When a shipping agent receives information concerning a specific vessel, the agent immediately updates the information in the database through the internal interface. It will be of great importance that the information is automatically updated since the success of the portal will be based on its trustworthiness.

When the information in the database is updated an e-mail will automatically be generated to concerned parties, which will inform them that the portal information has been updated. The customers can also choose to have the information sent to them directly instead of accessing the portal to retrieve the information. It will be clearly visible to the customers which information has been updated on the portal.

Based on the information from Gillis Shipping AB (personal conversation, March 26, 2003), one of few dients that will not be a part of this new system will be the Swedish customs. The interaction between Gillis Shipping AB and the customs will be carried out through the customs recently introduced system.

Since the system will be accessed over the Internet and customers may have slow Internet connections especially the vessels, the external interface's web pages must not contain objects that take time to load.

The new system will be available 24 hours a day since both the employees at Gillis Shipping AB and the customers are in need of information and may need to update or retrieve information from the database. Since the system will be available 24 hours a day the system must be protected by the use of firewall and backup systems.

The portal information access will be restricted to a need-to-know basis i.e. a customer will only have access to information that concerns them. Only Gillis Shipping AB will have the authority to update information on the portal. To increase the interaction through the portal, the customers will have the opportunity to ask questions through the portal.

The concept would solve the following problems discovered during the analysis of changes connected to the organisation:

Internal communication

Since all information is stored at one location in a central database, it is easy for the employees to find out what has been done with a specific vessel without having to ask the person connected to that vessel.

Reduce repeated work

The frustrating time spent on preparing a clearance can be reduced since much of the information needed is already stored in a centralised system and can be retrieved and used for the new clearance. A consequence of storing the information electronically is that the amount of paper used for a single clearance is reduced.

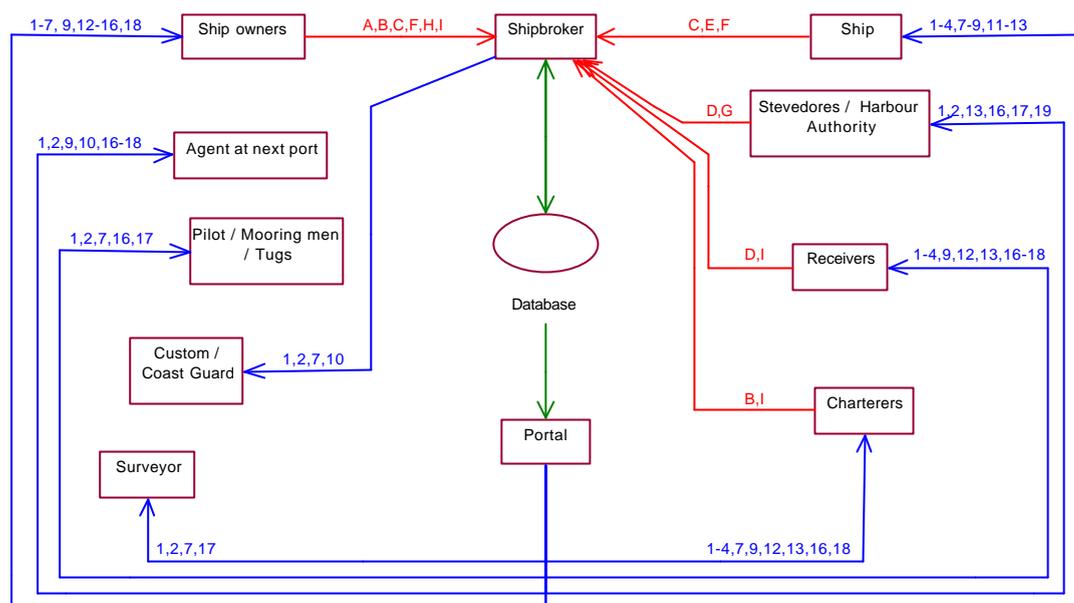
Reduce the time spent on searching information

Since all the information is stored in a structured way in a common database, the time spent on searching information can be limited compared to the time searching for information in the archives with document folders today.

External communication

The customer service is improved since the parties are automatically informed by an e-mail, that an update has been done. Gillis Shipping AB will not have to send an e-mail to interested parties every time something has happened since this will be done automatically nor the customers need to call in purpose to retrieve updated information.

The Figure 8, seen on next page describes the concept more in detail and shows how the information flow can be carried out after introducing the concept.



Information sent from the shipbroker

1. Information about the shipbroker (contact persons etc.)
2. ETA / ETC / ETS
3. Berthing info, reasons for delay
4. Loading / discharging prospects
5. Proforma D / A
6. Final D / A
7. Information about berth / restrictions etc.
8. Emergency info / numbers
9. Weather / Wind / Water level
10. Crew list
11. Receivers of NoR
12. In / outturn quantity
13. SoF / Time Sheet
14. ETA next port
15. Bunker status
16. Draft on arrival / departure
17. Ship's particulars (load, beam, hatches, holds, thrusters)
18. Port / cargo / report documents

Information sent to the shipbroker

- A. Ship information
- B. Load information
- C. ETA
- D. Quay-berth / unloading and loading prospects
- E. Draught / ballast time etc. at arrival
- F. Other requested service
- G. Other expedited traffic
- H. Travel instructions
- I. Load handling instructions

Figure 8 Detailed web portal concept description

5.4 Literature study reflections

In this section, the developed web-hosted portal concept is compared with the literature study in section 4.2.

Threats

As Gillis Shipping AB does not have a well functioning internal communication system, the integration with the Internet will probably not cause any major problems. Since no existing system has to be taken into consideration when integrating with the Internet, the integration process should be carried out relatively fast.

Opportunities

The stress that is experienced at times when many vessels are at port or arriving could be avoided by the introduction of the web-hosted portal since update activities would take less time and thereby more vessels per employee could be handled.

By providing a portal solution like a supplementary net, Gillis Shipping AB could service their customers' needs to handle the physical activities involved in the logistic chain more efficiently (Edifact, 1999, p.15).

The literature study showed that use of EDI communication has become usual among parties within the shipping business to manage the communication between different actors in the logistic chain. For smaller companies it might be the high entrance cost that has an impact why so few use it. If they can use Internet for sending electronic information the lack of operability between different information systems is not a problem and due to this Gillis Shipping AB and others would benefit more by introducing a web-hosted portal instead of an EDI solution.

Internet

By introducing the concept on the Internet, Gillis Shipping AB would probably improve their customer relationships, since the information will be available 24 hours a day and no program installations or other standard adaptations must be made among the customers.

The question service at the portal, where customers can ask questions directly to Gillis Shipping AB without having to look for telephone numbers or e-mail addresses, can also contribute to more efficient customer information collaboration.

6 Conclusions

In this chapter reflections are given over the work done, what experiences the study has given and suggestions for further work.

6.1 Reflections

Gillis Shipping AB – a “general” shipbroker?

Since the ship broking business was a completely new subject area for the authors of this thesis and the fact that only one shipbroker was subject for the interviews, it is difficult to answer the question whether Gillis Shipping AB is a representative shipbroker or not. One fact that indicates that the chosen shipbroker is representative though, is, as previously mentioned, that the ship broking business is considered conservative and reluctant to changes. A factor that speaks against Gillis Shipping AB as a representative shipbroker is that the average age among the employees dealing with clearance is relatively low. It is the authors' point of view that the shorter time an employee spent working with a specific task, the employee is more open for influences and changes.

By carrying out a multiple case study or a quantitative study among other shipbrokers, the authors could probably have reached a more valid result that could be generalised for all micro-enterprises in the ship broking business. The result in this research can be seen as valid for micro-enterprises with similar organisational structure and activities.

The importance of solving internal communication problems

As the shipbroker's task is to be the spider in the web and communicate information, the external communication must be well organised and well functioning. An organisation this dependent on customer relations must have an internal system that supports the external system.

During the analysis of changes it was discovered that Gillis Shipping AB was in need of an improved internal communication system in order to handle their external relations. Therefore one information system was conceptualised handling both internal and external communication.

6.2 Evaluation of the research questions and the result

Because of the non-existent previous research in the ship broking business related to IT, the authors found quite many sub-areas suitable for research. The initiative to the problem background (1.1) was formed by the authors' interest in the area of computer science with influences from the academic supervisor and personnel at a ship broking company.

The developed concept is not to consider as a revolutionary result within computer science, but the process getting there by use of established methods from system development theories can be seen as relevant to the field of computer science.

What possibly can be questioned with the thesis is how relevant the specific research is and if they contribute to the central research question. In the chapter where the authors

looked at current web-hosted portal solutions, it was hard to find relevant portals that dealt with ship broking activities.

As soon as the problem background in section 1.1 was established, the framework with research questions was formed. The intention with the questions was that they should form a main red thread that would run through the entire thesis. Due to the interviews' informal character, the framework came to good use in order to guarantee the relevance of the material.

The research is based on interviews with a few actors in the logistic chain and an overall literature study. It is therefore unlikely that a study like this can lead to absolute "correct" answers and must thereby be interpreted in consideration to this. The result given in this thesis can be supported though, with arguments based on previous research and experiences from the field.

6.3 Aim fulfilment

With help from the results, gained from some of the research questions, the authors have defined the needs for a web-hosted portal among shipbrokers and interested parties in the logistic chain. To mediate information is one of the shipbroker's most important services and therefore the shipbroker's needs as well as the interested parties' needs have been carefully examined in order to find what communication needs to be supported with a web-hosted portal.

The discussion held in 2.5.3 pointed out that a portal solution could mean a threat to a shipbroker's needs of resourcefulness, trustworthiness and discretion. By analysing the result gained from the interviews, the demand for improving the customer relationships was quite significant but did this mean that a shipbroker's needs of resourcefulness, trustworthiness and discretion would be threatened by introducing a portal? By careful use of established system development theories, the authors have tried to conceptualise a possible solution based upon involved parties' needs, threats and opportunities in order to introduce a web-hosted portal in a micro-enterprise within the ship broking business without threatening their business.

Due to the short time period, the aim was only to conceptualise a system that could improve the customer relationships and it is the authors' opinion that this aim has been reached. Thanks to established theories in system development, a web-hosted portal can hopefully be developed from this thesis.

The aim of this study was to investigate if a micro-enterprise in the ship broking business would improve their customer relationships by providing a web-hosted portal to interested parties. Interviews showed that an IS supporting the internal communication within Gillis Shipping could be individually accessed by customers over the Internet, thus improving the customer relationships.

6.4 Experiences and reflections

Choice of study object

To choose a study object for a thesis can be difficult in two aspects: to find an interested organisation and to know if the chosen organisation has the time. There are currently five ship broking companies in Karlshamn. Gillis Shipping AB was contacted first and was positive and interested to assist the authors of the thesis. Gillis Shipping AB was particularly interesting since no electronic IS existed in the organisation.

Working process

The working process was, as described earlier in section 3.2, iterative. The experiences of the iterative process were positive, but it could perhaps been made more efficient by being better prepared for the customer meetings. More time could have been spent on gaining branch knowledge before visiting the interviewees, which could have reduced the time spent on informing the authors on branch and organisational matters.

The intention with this study was to first perform a qualitative study followed by a quantitative study, which should give the qualitative result more reliability. The quantitative study was thought to be performed among other ship broking companies in Karlshamn. Due to the low interest among the shipbrokers the authors decided to only perform a qualitative study.

In order to obtain the requirements of a new IS, i.e. the web-hosted portal, customers to Gillis Shipping AB needed to be interviewed. Due to long distances and lack of time among the authors, only two of Gillis Shipping AB's customers with whom a lot of information is shared, was interviewed, namely one charterer and the stevedores in Karlshamn.

In the theoretical framework in section 2.4 the Theory W is described as a theory on how to make all parties become winners. In chapter 5 where the web-hosted portal concept is developed, it was found that no contradictory requirements existed between Gillis Shipping AB and their customers, Mörrums Bruk and the stevedores in Karlshamn. As no contradictory requirements existed, Theory W was not used in order to solve conflicts and find alternative solutions, but the theory was constantly taken into consideration. The Theory W would probably be more usable if more actors' win-conditions were taken into consideration when conceptualising a web-hosted portal.

6.5 Continued work

More thorough qualitative study

To get all the involved parties' opinions on the new system, more of the shipbroker's customers, e.g. the ship owners must be interviewed. This may cause the system to look different with other demands on security and functionality than is described in section 5.3.

Quantitative study

To make the developed concept more valid in a broader perspective, a quantitative study or a multiple case study are needed in order to see if the concept can be generalised and introduced among other micro-enterprises in the ship broking business.

Implement the web-hosted portal concept

This study should be seen as the first four steps in the life cycle model described in the theoretical framework. The next step is the design of an equipment-adapted technical solution followed by the realisation and implementation steps. To get an understanding of how a portal solution could look like, following existing examples could be examined; Portnet (Portnet, 2003), Port of Rotterdam (Port of Rotterdam, 2003) and APL (APL, 2003). It could also be possible to develop a prototype, which the involved parties could test and give reactions to.

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Appendix 1 – Questionnaire, Gillis Shipping AB

Current situation

Opening questions

1. What position do you represent?

Shipping agent.

2. Do you experience that your organisation has been influenced by IT?

- Computers have simplified the work with fill-in forms. If something is typed wrong, it is easy to change.
- Now the ship information is stored in a computerized database.
- IT has made it easier to send information to an entire group of receivers.
- IT has generated more paper.

Customer relations

3. In what way is the customer updates done today, i.e. what tools are used to update the customers. E.g. telephone, fax, e-mail, telex etc.?

- With telephone, fax and e-mail to the greatest extent.
- Telex via e-mail by means of Telia Mericom.
- Stockholm Radio is used in a few isolated cases to contact ships.

4. What information causes a customer update?

- New arrival times.
- Ship's departure from port.

5. Who takes the update initiative, you or your customers?

- Both the shipbroker and our customers.
- If everything goes as planned, the shipbroker updates the customers.
- At some occasions the shipbroker needs to wait for a third party to leave information, which causes the customers to contact the shipbroker.

6. How much time is spent on updating the customers with new information?

- A greater deal of the time is spent on this, as this is what a shipbroker's profession is all about.
- Depending on how circumstances change over time the information update to customers changes proportionately.

7. Do you feel any pressure from your customers regarding to supply them with information?

- Yes, the customers demand information. The pressure is fairly great.
- The more valuable load, the more pressure.

8. What customer categories demand information and what information do they demand?

Receivers

1. Owners
2. Receivers/Shippers
3. Charterers
4. Stevedores / Harbour Authority
5. Pilot / Mooring men / Tugs
6. Surveyor
7. Custom / Coastguard
8. Master
9. Agent at next port

Information

Info about us (Contact persons, full style)	1, 2, 3, 4, 5, 6, 7, 8, 9
ETA / ETC / ETS	1, 2, 3, 4, 5, 6, 7, 8, 9
Berthing info / reasons for delay	1, 2, 3, 8
Loading/Discharging Prospects	1, 2, 3, 8
Pro forma D/A	1, 3
Final D/A	1
Info about Berth / Restrictions etc	1, 3, 5, 6, 7, 8
Emergency info / numbers	8
Weather/Wind/Water level	1, 2, 3, 8, 9
Crew list	7, 9
Receivers of NoR	8
In-/Outturn Quantity	1, 2, 3, 8
SoF/Time Sheet	1, 2, 3, 4, 8
ETA next Port	1, 9
Bunker status	1
Draft on arrival/departure	1, 2, 3, 4, 5, 9
Ship's particulars (load, beam, hatches, holds, thrusters)	2, 4, 5, 6, 9
Port/Cargo/Report documents	1, 2, 3, (9)

9. What type of information does the shipbroker need from its customers?

Senders of information

1. Owners
2. Receivers / Shippers
3. Charterers
4. Stevedores/Harbour Authority
5. Master

Information

Ship information	1
Load information	1, 3
ETA	1, 5
Quay-berth, loading / discharging prospects	2, 4

Draught / ballast time etc. at arrival	5
Other requested service	1, 5
Other expected traffic	4
Travel instructions	1
Load handling instructions	1, 2, 3

10. Is there information that cannot be conveyed via computer?

- No, but the current technology used among customers together with Gillis Shipping AB is an obstacle. E.g. much information is conveyed via fax today.

11. What information is stored electronically respectively non-electronically?

- All information is stored non-electronically in document folders plus that some information is stored electronically such as a ship's arrival number, ETA and ETD etc.

12. What information can / cannot be made available to the customers?

- All information can be made available if the information is access controlled in a way so that all customers cannot access all information.

Work related questions

13. What is made with the information that you, the shipbroker receive from the customers?

- The information is sifted and forwarded to concerned parties.

14. Who handles what? Are all parts run by all employees or what division exist?

- Clearance: 3 + 1 employees.
- Chartering: 1 employee.
- Invoicing: 1 employee.
- One employee is responsible for one vessel. During the time Gillis Shipping AB is responsible for a certain vessel, the responsible employee for that specific vessel changes.

15. How does your working site look today? Does everyone have access to the Internet?

- Everyone is online except the invoicing part of security reasons.

16. What efforts are made today to take care of customer relations?

- Good service with continuous information update.
- Constant search for new customers.
- The Internet is an excellent tool to reach out to new customers.

17. Are some working operations done twice?

- Yes. The same information for each vessel is stored over and over again in the document folders. This is done manually.
- It is hard to keep a check on what other employees have done.
- All employees check the same mail.

18. Are all promised tasks carried out?

- Yes. This is of highest importance.
- Sometimes some tasks are delayed, which causes the customers to take contact with Gillis Shipping AB and collect the information they need.
- The policy at Gillis Shipping AB is to never reject new customers.

19. How do you react on stress?

- The risk to make errors is greater when there is too little to do.
- Customer updates are sometimes delayed.
- Positive stress is seen as constructive.

Desired future situation

Customer relations

20. In what way does Gillis Shipping AB want to update their customers in the future? With what tools?

- Automatic generated mails when information is updated.
- Fax messages converted to mail.

21. Do you see an increasing need of information from customers in the future?

- No. Constant need of information.
- A possible demand that information reaches the receiving party faster than today.

22. How much time are you willing to spend on forwarding new information to your customers?

- It has to take the time it takes.
- A simplified information update is desired.

23. Do you think that the number of potential customers in Karlshamn will increase in the near future?

- Yes.
- Expansion in Eastern Europe.
- Better communications to Gothenburg.
- The Öresund Region. Cargo transported to Karlshamn via the Öresund Bridge to e.g. Germany.

Type of information

24. Do you think that a web portal could improve your customer relations through an improved information flow?

- Yes, if a user-friendly system exists.
- There exists an interest for IT on the working site.

Way of working

25. In what way do you think that your ways of working / internal communication could be improved with a web portal?

- Much of the work done twice could be prevented.

26. Do you think that your ways of working could be changed as a consequence of new demands from future customers and if that is the case, how?

- The demand to use IT constantly increases.

27. What do you think that your working site will look like in the future?

- Approximately the same information flow.
- Built out data communications, both internally and externally.
- Fewer field visits.
- A more mobile office, perhaps by means of Personal Digital Assistants (PDA).

Appendix 2 – Questionnaire, Mörrums Bruk (MB) and Stevedores (ST)

Current situation

Opening questions

1. What position do you represent?

MB: Transport leader at Mörrums Bruk, Södra Cell.

ST: Planner of the stevedores' operational part at the Port of Karlshamn.

2. What is your relationship with Gillis Shipping AB?

MB: Gillis Shipping AB is the only shipbroker used by Södra Cell. This is preferable since it implies the same routines.

ST: Gillis Shipping AB must provide incoming ships and the load they carry.

3. In what way do you communicate with Gillis Shipping AB, i.e. what tools are used to maintain contact, e.g. telephone, fax, e-mail, telex etc?

MB: Telephone and e-mail.

ST: In most cases with e-mail, but also with telephone and fax. More and more e-mails.

4. How often are you in contact with Gillis Shipping AB?

MB: Daily, how often is dependent on the quantity of vessels in traffic.

ST: Dependent on how much traffic it is, but at least one time for each arrival.

5. How much time is spent on informing Gillis Shipping AB?

MB: There is no backward information flow of significance to Gillis Shipping AB. Sometimes, e.g. in case of bad weather, it is necessary to seek information by calling Gillis Shipping AB.

ST: Impossible to say.

Type of information

6. What information do you provide Gillis Shipping AB with?

MB: A preliminary list of the next month's expected vessels / deliveries is sent every month to Gillis Shipping AB.

ST: Information regarding discharging, loading and how long time before the work is finished.

7. What information does Gillis Shipping AB provide you with?

MB: List of arriving vessels and when they are expected to arrive.

ST: Expected vessels, a so-called vessel announcement. If a new vessel, which not previously has been in Karlshamn, arrives, more information regarding the vessel's technical data is demanded. Technical information can be made accessible if the vessel's IMO-number is provided.

8. Do you provide Gillis Shipping AB with information that cannot be conveyed via computers?

MB: No, all information can be conveyed via computers.

ST: No.

9. Is there information provided to Gillis Shipping AB that contains sensitive data?

MB: Yes. Load volumes.

ST: Yes. Price compositions and since there are five shipbrokers in total in Karlshamn other information such as price composition can be sensitive as well.

10. Is there information today that cannot be conveyed to Gillis Shipping AB or information that you would like to be provided with but the time factor is critical?

MB: No.

ST: No.

Work related questions

11. What does your working site look like today? Does everyone have access to the Internet?

MB: As it is today three employees have contact with Gillis Shipping AB and they have all Internet access.

ST: Everyone has Internet access.

12. How do you experience information decline and does it affect your business?

MB: Yes, it affects the business in the way that the planning in advance is impaired.

ST: There is no decline of significance. It is more an exception than a rule.

Desired future situation

13. What type of information would you like to receive from Gillis Shipping AB if this was possible?

MB: There is no lack of information in the present situation.

ST: Not answered.

14. In what way would you like to receive information from Gillis Shipping AB? Pull / Push?

MB: Good as it is today, e-mail is a fine solution. The push-technique could create too much information. If a pull-technique, where one would seek all information oneself, was introduced, some routines would be lost. It could be possible to change these routines but this would demand more planning.

ST: First seek information oneself, and if no information is found, then contact Gillis Shipping AB.

15. In what way would you like to give information to Gillis Shipping AB?

MB: Not answered.

ST: Depending on the situation. In the office e-mail is preferred, but out on the vessels telephone is to prefer.

16. Do you see an increase in information needs in the near future?

MB: The need of information will be constant in the future.

ST: Yes, if there is an increase in traffic quantity. It will get more important to receive information regarding arrival times the higher vessel frequency it is as there are limited quantities of quay-berths.

17. Do you think a web portal could be the solution to improve your customer relationship with Gillis Shipping AB?

MB: Possibly, a combination of existing routines and a portal could create a suitable mixture.

ST: If such a service existed it would certainly be used.

• What information is important that you yourself can change on such a portal?

MB: It is desired to ask questions via the web portal.

ST: There is no such interest, as no time exists.

• Is there an interest to update the portal yourself or just receive information from it?

MB: Both solutions, but to receive information is preferred.

ST: Just to receive information.

- **Would you like to search for new information on the portal or would it be more interesting to be contacted as soon as new information is available?**

MB: A combination. It should be clearly visible what information has been updated most recently and when it was done. It would also be great if a mail was sent regarding the information update.

ST: Interest of being contacted.

- **Do you think your ways of working would change if you had the possibility to update information via a web portal? Positive / Negative?**

MB:

– *Negative effect:*

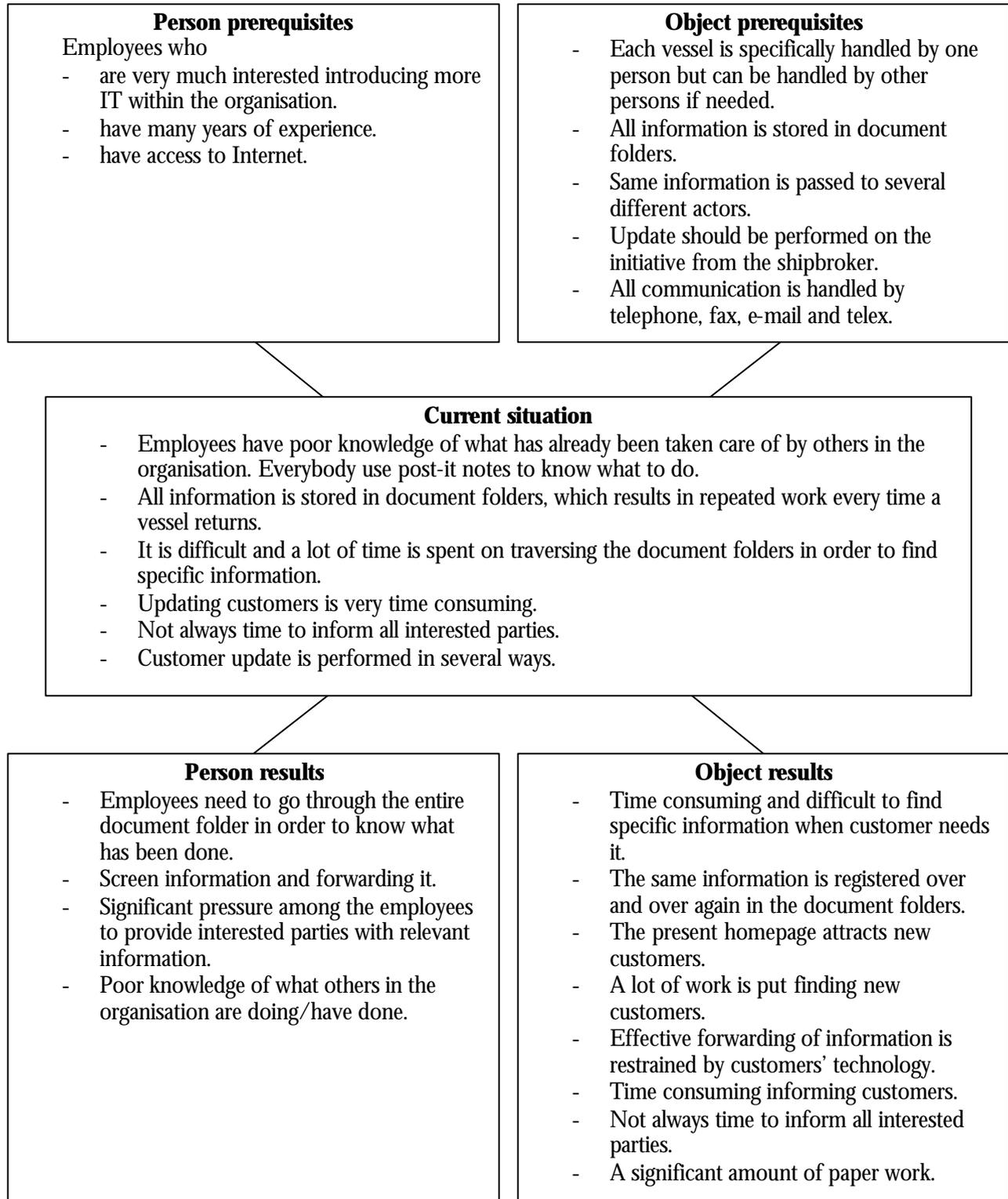
If the information was not updated continuously, this would imply extra work.

– *Positive effect:*

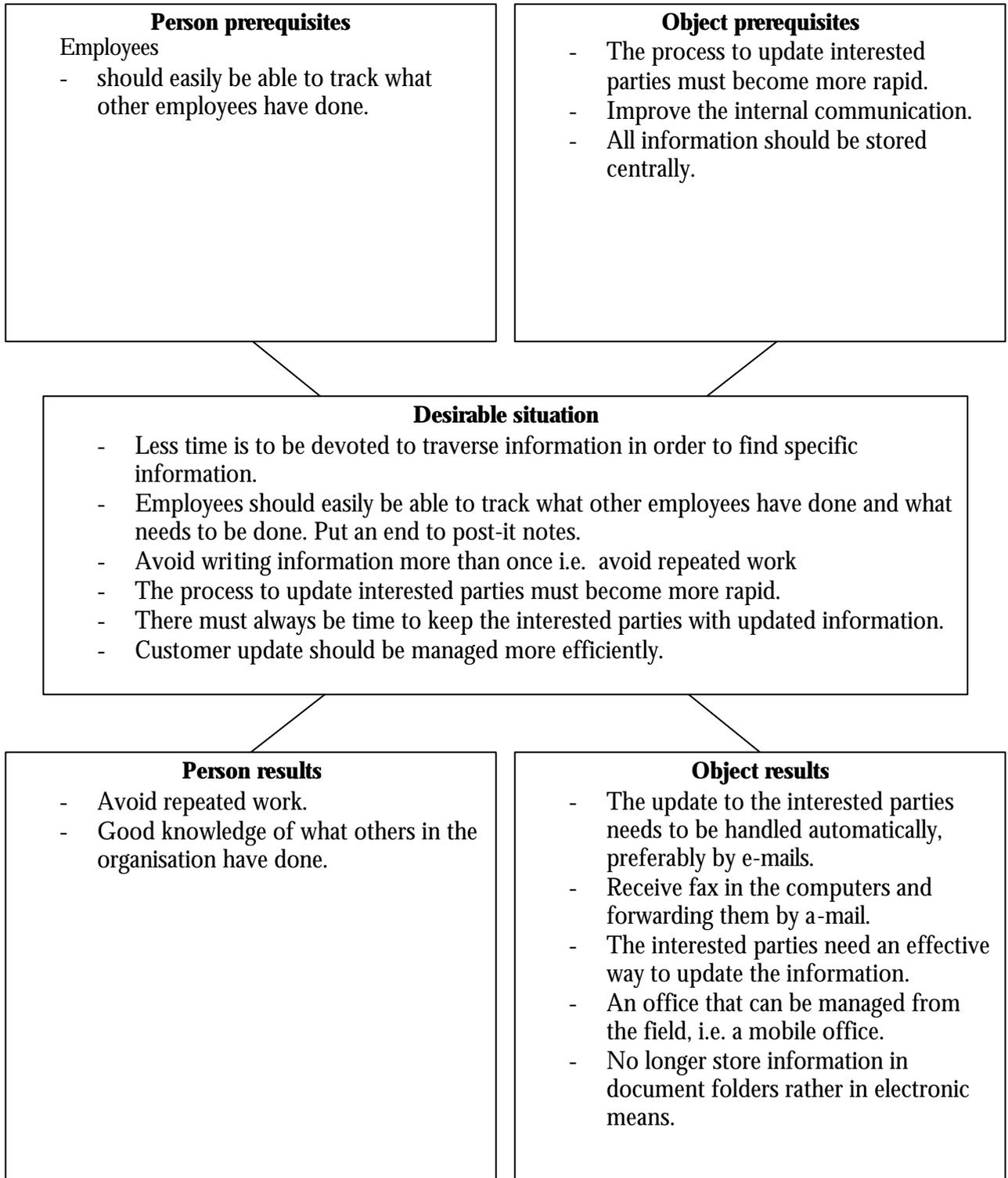
To collect information whenever this is needed without contacting Gillis Shipping AB:

ST: Not answered.

Appendix 3 – X-model: Current situation at Gillis Shipping AB



Appendix 4 – X-model: Desired situation at Gillis Shipping AB



Appendix 5 – Specification of requirements

The model for specifying requirements was based on Andersen's model (1994, p. 45).

Purpose of the system

- Improve internal communication, i.e. make it more visible for employees working with clearance to see the current status with a specific vessel.
- Reduce all repeated work and redundant information caused by using one document folder for every single clearance.
- Spend less time searching information concerning a certain vessel.
- Improve customer service by providing information in a faster and more effective way.

Short description of the information handling system

- Involved parties:
All employees working with ship broking and other interested parties involved in ship broking activities.
- Information exchange between the system and the users:
The information in the system must only be changed by employees within the ship broking organisation in order to control what information is being put into the system. Interested parties will only be able to read information in the system adapted to their individual authority.

Organisational and personal prerequisites

- Employees working with ship broking must have access to a common Local Area Network (LAN) at work and Internet access at home.
- Employees must be used to work with computers and it also demands everybody's best will to be service minded to the interested parties involved.

Functions of the information handling system

- Store information
 - Employees, store all information connected to arriving and departing vessels centrally.
 - Interested parties, must not be able to store information in the system.
- Retrieve information
 - Employees, retrieve all or specific information connected to a certain vessel from a central place.
 - Interested parties, easy retrieving restricted information according to a need-to-know basis and their authority. It should be absolute clear which information has been updated.
- Automatic alert
 - Every time information is being updated in the system, the involved parties need to be notified.
- Question
 - Interested parties should be able to ask questions over the system.

General attributes of the information handling system

- Availability
 - The system must be available outside the office, since the employees sometimes work from home and need to update or retrieve information.
 - Only limited data can be accessed by parties involved in the ship broking business. Depending on what party accessing the system the content will be adapted.
- Usability
 - Since every vessel has a lot of information connected to it, it is essential that the system needs to be easy to use and it should not contain too many complex features.
- Security
 - As the system is online over the Internet 24 hours a day, it is of high importance to have a high security to avoid intrusion attempts, i.e., firewall and virus protection. Gillis Shipping AB's organisation will be highly dependent on the information handling system, which requires a constant backup of the database. One need to be extra careful handling out right passwords to interested parties to assure that right information is accessed.
- Quality
 - The information that is stored in the database must be validated and each kind of data must be structured and defined to a certain format. Information must be up to date all time in order to be trustworthy.
- Development possibilities
 - New customers and other changed prerequisites may require new kind of data, which makes it important that the system can be updated easily.

Manual functions

All information that is stored through the information handling system must be done manually. The person that receives information is obliged to store this information in the system as soon as possible to avoid loss of information and duplication of work. Perhaps this information handling as well as the backup routine must be part of a policy or something similar.

Documentation

- System documentation
 - It is always important to document the system features, especially if the system is dynamic and might be changed in the future. The system must be well documented when it comes to chosen techniques, programming languages and general solutions.
- User documentation
 - The users are the persons who will use the system as a tool in their day-to-day work. As problems or questions regarding the system can arise, it is necessary to create a user manual with detailed information of the features in a non-technical and easy to understand fashion.
- Maintenance documentation
 - It is important to have maintenance routines documented when a failure occurs in order to know what course of actions need to be taken in order to recover from a failure as fast as possible and to restore lost information from the backup system.

Appendix 6 – Information flow from Gillis Shipping AB

Receivers of information

Owners
Receivers / Shippers
Charterers
Stevedores/Harbour Authority
Pilot / Mooring men / Tugs
Surveyor
Custom / Coastguard
Master
Agent at next port

Type of information

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
■	■	■	■	■	■	■	■	■			■	■	■	■	■	■	■	■
■	■	■	■					■			■	■			■	■	■	■
■	■	■	■			■		■			■	■			■	■	■	■
■	■										■	■			■	■		■
■	■					■									■	■		
■	■					■									■	■		
■	■					■			■									
■	■	■	■			■	■	■		■	■	■						
■	■							■	■						■	■	■	■

Type of information

- 1 Info abt us
- 2 ETA / ETC / ETS
- 3 Berthing Info / Reasons for delay
- 4 Loading / Discharging prospects
- 5 Pro forma D / A
- 6 Final D/A
- 7 Info abt Berth/Restrictions etc
- 8 Emergency info/numbers
- 9 Weather/Wind/Water level
- 10 Crew list
- 11 Receivers of NoR
- 12 In-/Outtum quantity
- 13 SoF/Time sheet
- 14 Eta next port
- 15 Bunkerstatus
- 16 Draft on arrival/departure
- 17 Ship's particulars
- 18 Port/Cargo/Report documents
- 19 IMO-number

Appendix 7 – Information flow to Gillis Shipping AB

Senders of information

Owners
 Receivers / Shippers
 Charterers
 Stevedores/Harbour Authority
 Master

Type of information

A	B	C	D	E	F	G	H	I

Type of information

Ship information
 Load information
 ETA
 Quay-berth, loading / discharging prospects
 Draught / ballast time etc. at arrival
 Other requested service
 Other expected traffic
 Travel instructions
 Load handling instructions