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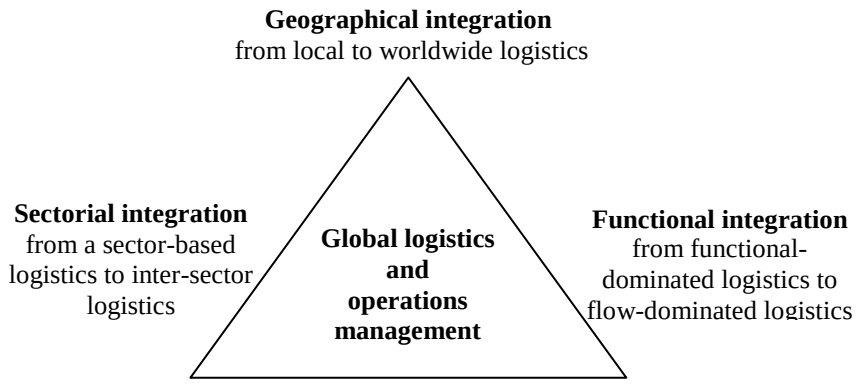
REPORT

Requirements Analysis of Information Integration of Small and Medium Size Ports with Port Communities using Web Portals: A Swedish Port Perspective



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Abstract
Information Technology has opened new ways for firms to both create and manage competitive advantages within their respective industries. Ports and the business of maritime shipping are no exception to the use of such tools. This paper investigates methods for interconnecting ports with their partners and assesses such port community systems in the context of a case study in Sweden. Based upon data collected on ports in Sweden, a framework for implementing a port-portal along with a well-defined methodology is outlined.

Keywords: Ports, portals, networking, information sharing, system development,

1. Introduction

Information technology (IT) in logistics is, when correctly implemented, contributing to cost-efficiency, quality and agility of the distribution chain (Closs et al., 2005, Nilsson, 2005, Stefansson, 1998, Stefansson, 2004, Tilanus, 1997). Ports worldwide being no exception to this, are intensively investing in advanced IT systems to improve capacity and operations – a strong determinant of competitive advantage between ports. A commonly implemented IT tool to achieve integration of an operator with its partners, is a Web Portal (Linthicum, 2004). The term Port portals systems (PPS) is applied in this paper for web portal implementations in ports. With PPS costs estimated by a study conducted by Cargo Systems (Jeffery, 1999) to be at $300,000 or much more for interactive service, will small and medium size ports invest in such technology?

The aim of this paper is to study how can small and medium size ports, such as the ones located in Sweden, can use IT tools e.g., Port portals systems, for information connectivity with actors in the logistics setup. By investigating how web-hosted portals can be introduced and implemented to ports, ports can identify some interesting solutions for their customers and trade partners by sharing information. PPS offer advantages such as minimizing telecommunication and communication costs. In addition, the administration costs can be reduced if information is automated to provide port customers with availability information and schedules, manage bookings, financial transactions. According to Cargo Systems (Jeffery, 1999) ports handling over 50,000 TEU (twenty-foot equivalent units) per year would require IT systems. The emergence of the Internet offers some possibilities for small and medium ports, not reserved for just the big main ports, e.g. Antwerp, Hamburg and Rotterdam. We propose a framework which considers smaller ports.

In Northern Europe, geographical integration has been occurring at a rapid pace since January 1, 2003 with the abolition of customs duties between European Economic Community (EEC) members and ten new member states in the Baltic and Eastern Europe. The elimination of physical borders has many firms rethinking logistics; physical flow structures and distribution activities. The emergence of new markets and new competitors is changing the way companies have traditionally done business. The view taken in this paper is that the formations of port clusters or port communities are developing or will develop under a geographical integration framework (c.f. framework illustrated in Figure 1). Firms motivate the clustering or development of a community and actors need to tackle the many perplexing questions of change so as to better compete (Bowersox et al., 2000, Stefansson, 2006).

Nearly 95 per cent of the Swedish foreign trade is transported through a Swedish port and in general, Swedish ports have increased their income by nearly 80 per cent over the last ten years. (Transportgruppen, 2003). Ports are seen as also important information centers with opportunities of becoming major Internet access points for the entire trade and transport community. This activity allows ports to play a dynamic role as 'nodal points' in various product- and transport chains. Modern ports are no longer passive points of interface between sea and land transport, used by ships and cargoes as the natural point of intermodal interchange (Nyqvist, 2007). They have become logistic centers acting as 'nodal points' in a global transport system. The emergence of a global transport system leads to new challenges as complexity grows when transportation distance and complexity of logistics setups increase (Stefansson, 2004, Waidringer, 2001). Growing international trade confronts ports with a new competitive environment in which applied IT is necessary to achieve cost-efficiency (Nyqvist, 2007, Tilanus, 1997). The hypothesis taken is; if ports use PPSs in integration or sharing of information and physical flows then this benefits all partners that are cooperating in the port community.

A significant demand of communication is one factor that characterizes the shipping business and it is therefore in great need of IT. The driving forces for the use of EDI (Electronic Data Interchange) have

been argued in many reports and projects such as those supported by the European Union; INFOLOG and COST-330 (European Commission, 1995). EDI communication has become widely spread 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. According to Stefansson (2002) smaller companies run the risk of being totally excluded from the logistics supply chain if they do not implement EDI. However there are disadvantages identified in using EDI, such as the high entrance costs and the lack of operability between different information systems (Jui-Lin Lu and Hwang, 2001).

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 (Alshawi, 2001, Hultkrantz and Lumsden, 2001, Power, 2005, Stefansson, 1998). 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. Often observed is that many ports 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 (Edifacttransport Ab, 1999).
Boyson and Verbraek (2003) suggest that a portal can help to standardize communication and that it can become a trusted party between different actors. Future actors, i.e. new companies with connections to the shipping business in the city of Karlshamn, Sweden, could create a greater demand for information sharing and might possibly create a need for a web-hosted portal.
In conducting the research on the development of IT for ports, the following questions were identified and studied:

- Is there a need for PPSs in the Port Industry?
    - Is their interest from the Port industry for PPSs linking them with their partners?
    - Which port actors would be interested to participate in such information exchange collaboration?

- What properties or features should be implemented in a PPS in order to support the activities associated with the Port?

    - What types of information should be shared between actors and ports?

How would a web-hosted portal be implemented to support the communication flow between Ports and their customers?

2. Methodology

The approach for this research is twofold; firstly, to support the analysis of the primary data, relevant literature on logistics and information science has been reviewed and secondly empirical data has been collected from a case study. Case studies focus on holistic situations in real life settings, and tend to have set boundaries of interest, such as an organization, a particular industry, or a particular type of operation (Ellram, 1996).
The case study is based upon structured interviews, which is complemented by a questionnaire to achieve the full picture of how Swedish ports view PPSs. This method also contributes to the validity of the results from the interviews (Silverman, 2006). The questionnaire was developed and sent to ports chosen from a list found in the Swedish Ports' and Stevedores´ Association Handbook (Swedish ports' and Stevedores Association, 2003). The response rate of the questionnaire was good, in that 14 were collected from the 30 that were sent.

The case study is conducted to a conceptualization of a suitable PPS functioning in a small to medium size port, such as the one located in the city of Karlshamn, Sweden. The application of the methods, models, and routines would assist in defining the port-portal systems and what its expectations are. According to Yin (Yin, 1994 p. 3), case study allows an investigation to retain the holistic and meaningful characteristic of real-life events, such as individual life cycles, organizational and managerial processes, neighborhood change, international relations, and the maturation of industries.

The results of the empirical study were analyzed using the framework described in the next section.

3. Methods for collecting systems requirements

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

- 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 organization 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.

Firstly, ports are viewed as a 'nodal' point for global logistics and can be integrated into three category types of integration listed in (Dornier, 1998) as the following:

- Geographical Integration: Refers that geographic boundaries are losing their importance. Ports can now view their networks from a higher abstraction such as a regional or even global level. More and more, ports have to compete against other ports or port clusters that are hundreds of kilometers away.
- Functional Integration: The responsibilities of logistics are expanded to cover research development, marketing in the design and management of the flow
- Sectorial Integration: In traditional port systems, suppliers, distributors, port users, and customers seek to optimize their own logistics. This activity sub-optimizes the entire system and causes

bottlenecks and additional costs. Through cooperating outside the traditional corporate/ port boundaries, all actors in the system will try to optimize the supply chain from a holistic view.

FIGURE 1 HERE

From the illustration in Figure 1, a port is assumed to be taking steps on being an active node in the logistics chain. The use of IT such as web-hosted portals can assist ports in linking all three integration types. The web-hosted portal can help ports expand and strengthening their customer base in the hinterland from a geographical integration view. From a functional perspective, the marketing efforts of ship lines, shippers and forwarders located at the port can combine their efforts in marketing the competitiveness of the port. Finally, a web-hosted portal can strengthen the links within the sectorial integration type through transparency of the activities in the Port.

4. Life cycle model approach

In developing a new information system, Andersen (Andersen, 1994) argues that is important to have a comprehensive view of the situation and apply methods and techniques that describe the development tasks in more detail. The general view must take into account the fundamental features and involved parties in order to get the users to be an active party in the development work. Further, Andersen (Andersen, 1994) suggests that the life cycle model is useful for demonstrating the different phases in the development of an IS. The model is divided into nine phases from 0 to 8. Each phase is divided into four main areas where problem, tasks, data for decision making and participants of each phase are defined. See Figure 2 below for more details.

FIGURE 2 HERE

The system development task is according to Andersen (Andersen, 1994) initialized by the system design phase, and contains an activity analysis: In the activity the analysis the main reasons for introducing PPS are identified. This is achieved by defining the activities occurring in the organization and influences that they might have on a PPS. To achieve the objectives in system development, Andersen (Andersen, 1994) points to the importance to delimit the extensive task. Since the organization's main problem is not yet known in the phase of analysis of changes, the scope of a requirements analysis needs to be carried out with a very broad perspective. If the results from the phase analysis of changes show that the organization is in need of a PPS, 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. The outcome from the activity analysis assists to get more defined requirements in this problem area. Port staff and employees from the 'port community' 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).

5. Empirical study

The port of Karlshamn is acting as a hub for logistics, transport, and shipping services. The port's objective is to develop into a regional cargo terminal in which cargo can be handled with maximum efficiency between ships, trains 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 (Sandevärn, 2007)

Currently, the port of Karlshamn is organized through many informal contacts and at various levels. The proposed PPS could assist in developing a more formal network for the port logistics community around the port of Karlshamn to communicate and organize business. The need for such a tool is so that information is available to all in order to coordinate the flow of cargo. Often the information or the physical cargo is not handled accordingly and this may cause problems (Holweg et al., 2005, Kärkkäinen and Holmström, 2002, Nyqvist, 2007).

From a geographical integration, it is quite natural to cluster firms that are located in or around the port of Karlshamn. The region of Blekinge, Sweden may be included into a geographical integrating with the competing/complementing ports of Karlskrona and Solvesborg when taken into account.

The functional integration of firms and persons involved in maritime shipping and trade would help in such matters as simulating the flow of cargo in Blekinge along the E22 motor way, which is main transport artery in the region. Other possibilities could be the effective management of the flow of cargo within the region to the port and vice- versa. Finally, a unified cluster that would seek to promote the port, the region, could enhance marketing and the industries and firms that are located there.

The sectorial integration would allow the individual actors, port users, transport operators and the port to limit the sub-optimization that occurs when attempting to optimize their own logistics operations, changing their perspective without the full picture. The field of consumer goods can be seen as one successful example of sectorial integration. The results of cooperation between the various port community actors could be:

1. Optimization of flows of goods
2. Efficient new product launches
3. An adequate fit between range and demand
4. Effective coordination of promotions and negotiations

6. Execution of the Analysis

The analysis is carried out in three different steps. In the first step (the activity analysis) an analysis over Port activities and needs was performed together with the literature study and questionnaire. The second step, the information system analysis, 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 port community organization. The result from the information system analysis is the specification of requirements. The last step provides recommendations on how to improve customer relationships by conceptualizing a technical solution for the port of Karlshamn.

7. Important needs of changes within the port of Karlshamn

The stated aims or desired situation were found in the *analysis of changes*, discussed between the staff and the authors in order to find solutions. Before the analysis of changes, many ports had already discussed a way to handle information in a more efficient way. The result of the analysis of changes indicated that Swedish ports, e.g. port of Karlshamn are in need of an IS system that could improve their customer relationships.

Andersen (1994) suggests delimiting the system development to support a special function in the organization. Comparing the current situation with the desirable situation, as suggested by Andersen, indicates needs of changes in different areas of the organization. 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 PPS can help in handling information in a more efficient way by:

- Improving internal communication, i.e. make it more visible for port customers working with clearance to track what has been done with a specific vessel.
- Reducing all repeated work caused by re-typing of data.
- Spend less time searching information concerning certain cargoes, shippers, carriers, and vessels, etc.
- Improving external communication by providing information in a faster and more efficient way to interested parties.
- Real-time measurement of tides, waves, and weather can help in docking and terminal operations as well as in short-term planning.
- Utilization of technology to distribute and display data

8. IS Analysis in Developing a Port System

When the functionality of the IS is established and delimitations are made, Andersen (1994) suggests elaborating a more detailed description of the IS; "Specification of requirements" This is carried out in the phase of information system analysis, where great consideration is taken to specific user needs. The model for specifying requirements was based on Andersen's model (1994, p. 45).

Purpose of the system

- Improve external communication, i.e. make it more visible for Port customers and carriers to communicate electronically the current status of cargoes, equipment, vessels.
- Reduce all re-typing of data and redundant information caused by using different systems that are not integrated.
- Spend less time searching information concerning cargo, rules, guidelines, carriers, vessels.
- Improve customer service by providing information in real time.
- Easy access for customers without too many commands and windows to navigate.

Short description of the information handling system

- Involved parties:
  All port partners working with the port and other interested parties involved in the maritime shipping business.
- Information exchange between the system and the users:

The information in the system must only be self-managed by port partners that are sharing their information to others in the community in order to ensure that only quality information enters the system. Interested parties will only be able to read information in the system adapted to their individual authority.

Organizational and personnel prerequisites

- Port actors working with ports must have access to the Internet.
- Port actors must be trained to work with computers

Service minded staff, aware of the impact and importance of the PPS.

- Functions of the information handling system
- Store information
  - Port actors store all information connected to arriving and departing cargo, carriers, vehicles, and vessels via a centrally located database off the web-portal.
  - Interested parties must not be able to store information in the system.
- Retrieve information
  - Port actors, 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 interested parties need to be notified.

General attributes of the information handling system

- Availability
  - The system must be available outside the office, since the port actors are outside the port and need to update or retrieve information.
  - Only limited data can be accessed by parties involved in the shipping business through login and levels of hierarchy. Depending on what party accessing the system the content will be adapted.
- 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. Port organizations 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.

The concept described in Figure 3 is not a technical solution and should instead be seen as a more general description of the IS concept's functionality.

FIGURE 3 HERE

Based on the IS Analysis, the PPS concept will contain both an internal and external interface based on web technologies. Ports, such as port of Karlshamn will work with the internal interface and the port customers will work with the external interface. Both the internal and external interface will be connected to a common database where all information will be stored electronically. When, for example 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. To increase the interaction through the portal, the customers will have the opportunity to ask questions through the portal.

The concept is described in Figure 4 with detail showing how the information flow can be carried out after the analysis of changes connected to the organization:

FIGURE 4 HERE

9. Discussion on the proposed web-hosted PPS

In this section, the developed web-hosted portal concept is reviewed with data collected from the questionnaire and interviews using a SWOT analysis (Kotler, 2001). The analysis is described in Figure 5,

FIGURE 5 HERE

Strengths

By introducing the system such as proposed in this paper, port of Karlshamn is likely to improve its 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.

Weaknesses

The prospects of other actors using the portal to connect with their existing systems were not identified and are an issue for further investigation. However, the information generated and stored on the web-hosted database could be used for other actors in the port community. Though web-portals are different then a web-page, it would take some convincing to make the port decision makers to understand what a portal could do.

Threats

As the port of Karlshamn has a well functioning internal communication system, the integration with the Internet Portal 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.

The literature study showed that use of EDI communication is common among parties within the shipping business to manage the communication between different actors in the logistic chain. For smaller ports, especially in Sweden, 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. Ports like port of Karlshamn would benefit more by introducing a web-hosted portal instead of an EDI solution

Opportunities

Reducing the redundant manual typing of data and improving operations can be realized. Mistakes of data typing could be avoided by the introduction of the web-hosted portal since update activities would take less time and thereby more tasks could be handled.

10. Conclusion and Future work

The port business is a very interesting industry due to the sheer complexity and the multiple numbers of actors engaged in the transporting of goods. By carrying out multiple methods such as questionnaires, interviews and developing a conceptual case study with ports in Sweden, the results in this paper attempted to answer the two main questions that were presented. The first question dealt with if there is a need for PPSs in the Swedish Port Industry? The questionnaire and complementary interviews revealed

that there is a strong interest in portals and using IT and IS to link ports with their partners. In analyzing the port actors that would be interested to participate in such information exchange collaboration, only the ports were contacted. It would be beneficial to contact shippers and other port actors on their views of what a proper portal should be. The second question was; what properties or features should be implemented in a PPS in order to support the activities associated with the Port? The analysis coupled with interviews contributed with types of information that should be shared between actors and ports. In defining how a web-hosted portal could be implemented to support the communication flow between Ports and their customers, the methodology presented lead to the conceptual PPS for small and medium .sized ports

The literature on information requirements in the logistics setup is rather sparse. Due to the lack of published research in the development of PPSs and port business related to IT, the contribution of this research may assist in the body of knowledge in studying the processes or methodology used to establish PPS.

For future work, a more thorough qualitative study should be conducted to get all the involved parties' opinions on the new system, more of the port's customers and port community members must be interviewed. This may cause the system to look different with other demands on security and functionality than is described. To make the developed concept more valid in a broader perspective, a quantitative study or a multiple case study is needed in order to see if the concept can be generalized and introduced among other enterprises in the port business.

Finally, this study should be seen as the first of the 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 realization and implementation steps. To get an understanding of what a portal solution could look like, existing examples, such as Portnet in Singapore, could be examined. It is also possible to develop a prototype, in order to gain feedback from the involved parties.

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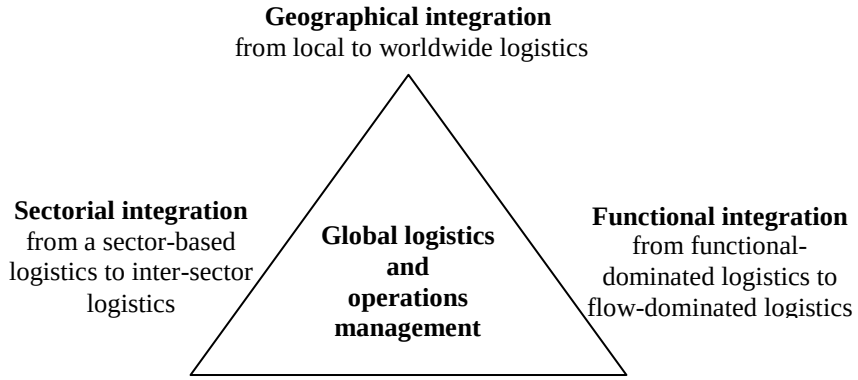

Figure 1 The 3-poles of global logistics and operations management

Port Portal System Development for Swedish Ports

	Analysis of changes	System design				Realisation	Implementation	Administration and operation	Termination
		Analysis		Design					
Problem area	0	1 Activity analysis	2 Information system analysis	3 Conceptualising technical solutions	4 Design of equipment-adapted technical solutions	5	6	7	8
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 techical 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 2 Life cycle model. Andersen, p. 41, 1994

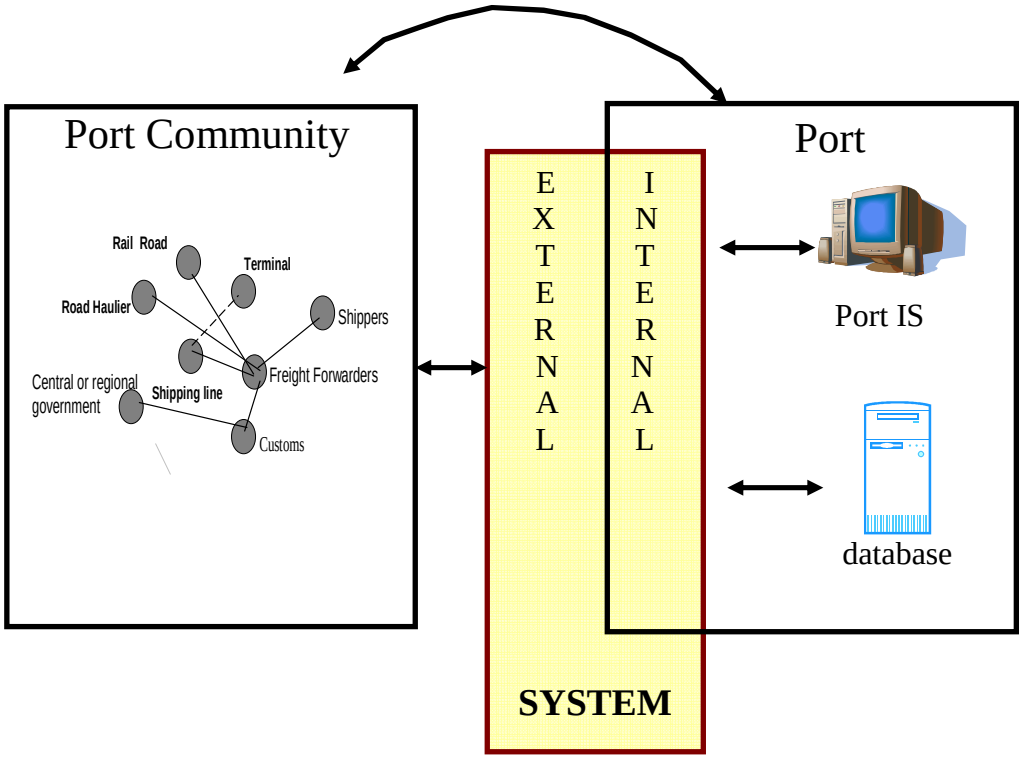

Figure 3 General web portal concept description

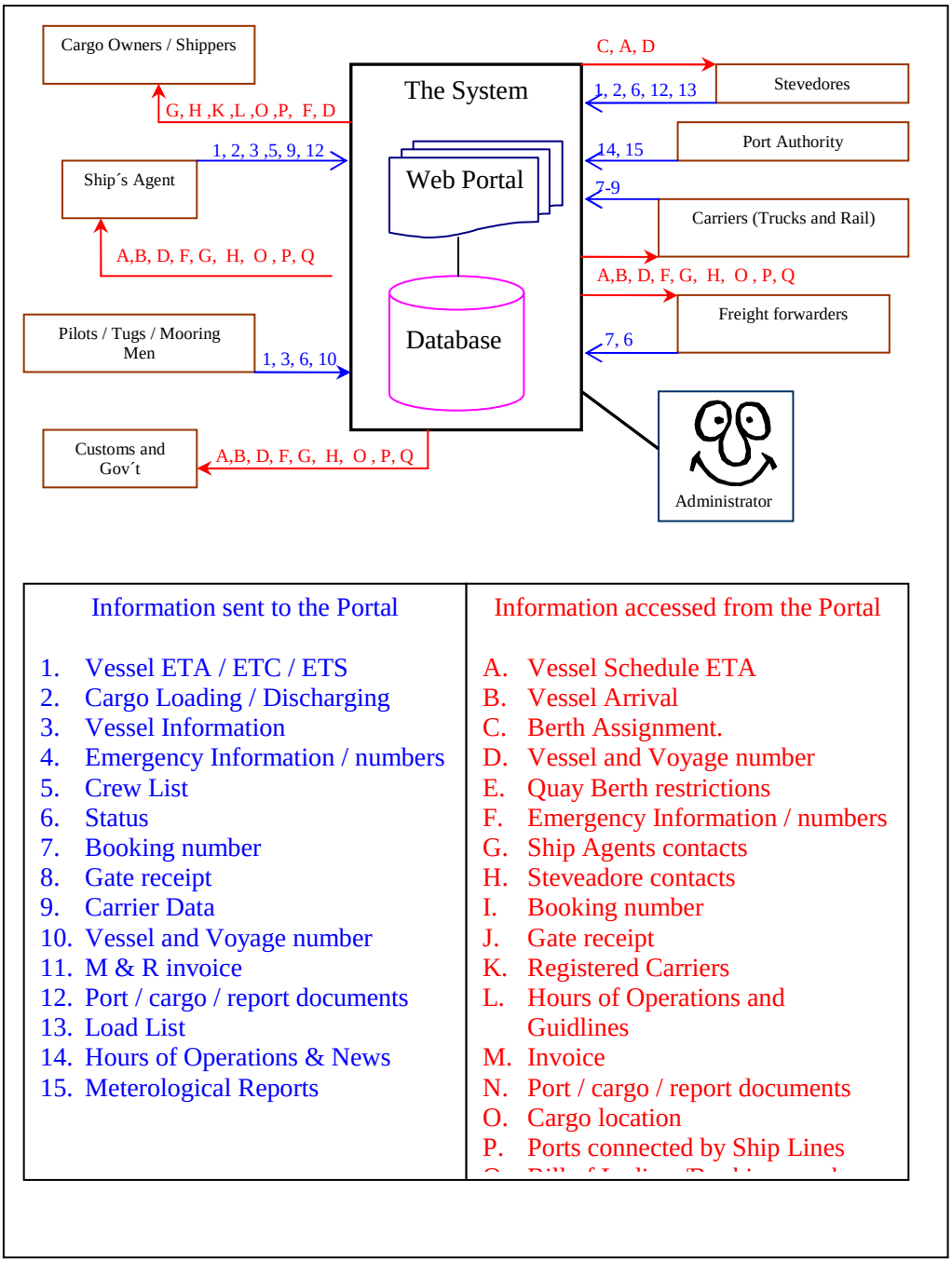

Figure 4 Detailed web portal concept description

Strengths	Weaknesses
• Not very expensive	• Little experience • No knowledge of its uses? • Everyone seems to have a web pa links- is that a portal? • Can it work with other systems, e. SAP® or ERP (Enterprise Resource

• Good means of developing closer integration with other partners • Reduce costs in Administration and documentation.	Planning) systems, etc.?
Opportunities • Real time information • Lower transaction cost for all in pc community • Improve customer service	**Threats** • Commercially sensitive Data • Little or no interest from other act port community • Lack of integration or standards • Requires IT expertise

Figure 5 SWOT Analysis for implementing Web-hosted PPS

Partners of East West TC

AAK
Aerotech Telub
Baltic State Fishing Fleet Academy
Blekinge Institute of Technology
Coordinating Council on Transsiberian Transportation
County Administrative Board of Blekinge
DFDS Tor Line
DFDS Lisco
EC Gruppen
Esbjerg Business Center
IKEA Sweden
ITS Sweden
Kaliningrad Branch of North West Academy
Kaliningrad Oblast
Kaliningrad State University
Karlshamns Expressbyrå
Klaipeda County Coordination
Klaipeda County Governors Administration
Klaipeda State Seaport Authority
Klaipeda University
Klaipedos Smelte
Lithuanian Road Administration
Municipality of Baltijsk
Municipality of Karlshamn
Municipality of Karlskrona
Municipality of Klaipeda
Municipality of Sölvesborgs
Municipality of Ronneby
Port of Esbjerg
Port of Karlshamn
Railion
Railog
Region Blekinge
Region Skåne
Region Sealand
SC Lithuanian Rail Administration
South West Business Development
Swedish National Maritime Administration
Swedish National Rail Administration
Swedish Road Administration Skåne
Swedish Road Administration South East
University of Southern Denmark
Vilnius Gediminas Technical University
Vinnova