



FEASIBILITY STUDY ON THE NETWORK OPERATION OF HINTERLAND HUBS (DRY PORT CONCEPT) TO IMPROVE AND MODERNISE PORTS' CONNECTIONS TO THE HINTERLAND AND TO IMPROVE NETWORKING

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Preface

PROJECT TITLE: InLoC

The InLoC project has been initiated in order to achieve more integrated and sustainable transport and communication links to be able to cope with the significant increase in trade and freight transport volumes in the Baltic Sea Region at the time when the region is facing a major economic restructuring and the recent EU enlargement. Logistics Centre (LC) development will continue to have a major impact on improving transport chains and promoting sustainable transport modes as well as integrating and linking national transport systems and cargo flows. Integration of LC networks is needed because the full potential of LC networks in regional development is not utilised in the BSR. The development of new and existing LCs needs to be supported by integrating various sectors having importance for the development of the operational environments of LCs. The InLoC work package 1 aims at improving the integration of ports, logistics centres and other operators by examining the practical networking possibilities.

TITLE OF THE PUBLICATION:

“Feasibility Study on the Network Operation of Hinterland Hubs (Dry Port Concept) to Improve and Modernise Ports Connections to the Hinterland and to Improve Networking”

AUTHORS OF THE REPORT:

FDT with inputs from Port of Kemi, Port of Turku, Ports of Stockholm, CESEF, Valga County Government, Valka Town Council.



1. Executive Summary

The content of this report focuses on dry ports and the possibilities, which comes along with the dry port concept. After defining the dry port concept and relevant terms for the understanding of this report in chapter 3, the report turns its focus to the advantages and disadvantages that are connected to the dry port. Some of these pros and cons are shown by a number of examples in the chapter regarding dry port examples. The reports last themes show two methods of investigating the possibilities of the dry port concept in a specific region or area. Both of these methods would be good to use as a preliminary investigation of the possible development in a case region. Finally the report encompasses a recommendation chapter, where the experiences are gathered and recommendations for dry port development in the Baltic Sea Region are put forth.



2. Introduction

The dry port concept is based on a seaport directly connected with inland intermodal terminals, where goods in intermodal loading units can be turned in as if directly to the seaport. Between the seaport and the inland terminals, here denoted dry ports, relatively large goods in intermodal loading units can be turned in as if the terminal was positioned directly to the seaport. In such dry ports large goods' flows can shift freight volumes from road to more energy efficient traffic modes that are less harmful to the environment. In addition a dry port can relieve seaport cities from some of the congestion, make goods handling more efficient and facilitate improved logistics solutions for shippers in the port's hinterland.

Physically expanding existing ports or establishing new ports can increase port capacity, but this is in the long run and at considerable costs and endeavours. Other options include adding conventional equipment or improving the productivity by new forms of technology or by information systems. Also the transport services to the ports' hinterland, defined as "the interior region served by the port" are strained by the increasing flows. According to the European Commission the volume of European hinterland transport related to trans-ocean maritime transport will increase by 140% up until 2010.



3. Background, Definitions and Method

The general increase in freight traffic all over Europe creates considerable problems and challenges for the European freight transport sector. Handling this problem demands both traditional solutions i.e. increasing investments in roads, rail network etc. and new types of solutions aiming at a more efficient use of the existing infrastructure. This development needs a support from the transport operators behaviour.

The present chapter will outline the case study background, some central definitions and the structure and method used to demarcate. Firstly some words on the background and relevance for this case study.

3.1 Background

This case study was planned in regards to the need for facilitating transport operators in their practical international networks and multilateral cooperation.

Close co-operation between transport and logistics companies within an organized network creates opportunity to plan international transport and optimise the use of transport equipment and resources. An important feature is the network's facilitation of cooperation nationally and internationally, which hereby creates efficient transport chains and network solutions for optimal cargo flow and distribution.

Another motivation for investigating networks is, that experience shows, that the networks can offer the local/regional productive system the best solutions in terms of



logistics, transport and warehousing activities. This implies to control both the transport cost increase and the industrial productivity competitiveness.

3.2 Definitions

To emphasize the important concepts and to ensure the coherence and transferability of the concepts in the report, the following concepts will be defined.

A Dry Port is a port situated in the hinterland servicing an industrial/ commercial region connected with one or several ports with rail- or road transport and is offering specialized services between the dry port and the overseas destinations. Normally the dry port is container and multimodal oriented and has all logistics services and facilities, which is needed for shipping and forwarding agents in a port.

Figure 3.1: Definition of a dry port

As such a dry port does not necessarily need to be built from scratch. An inland terminal can easily be developed to also encompass dry port facilities. If an inland terminal fulfils the following three conditions it can in theory obtain status as a dry port:

- The terminal should have direct connection to a seaport either by rail or by road
- The terminal should have a high capacity traffic mode
- The terminal should offer the same types of facilities as can be found in a seaport.

In order to obtain these conditions it should for instance be possible to make the customs clearance in the dry port. In this way the goods for overseas travel can be made ready already in the dry port and in this way save time and money, because the ITU can be loaded directly onto the ship. When the capacity of a seaport is increased because of the extra available areas at the dry port, it can also have the positive consequence that larger ships can call the port and in this way increase the productivity.



Logistics Centres as a concept has diverse names and meanings throughout Europe. Some of the used names are: transport centre, freight village, intermodal hub, logistic platform, GüterVerkehrszentren (GVZ), logistic node, intermodal terminal, interporto etc. This report will describe the concept using the term Logistics Centre.

A Logistics Centre is a centre in a defined area within which all activities relating to transport, logistics and the distribution of goods – both for national and international transit, are carried out by various operators on a commercial basis.

The operators can either be owners or tenants of buildings and facilities (warehouses, distribution centres, storage areas, offices, truck services etc.), which have been built there. In order to comply with free competition rules, a Logistics Centre must be open to allow access to all companies involved in the activities set out above.

A Logistics Centre must also be equipped with all the public facilities to carry out the above-mentioned operations. If possible, it should include public services for the staff and equipment of the users. In order to encourage intermodal transport for the handling of goods, a Logistics Centre should preferably be served by a multiplicity of transport modes (road, rail, deep sea, inland waterway, air).

To ensure synergy and commercial cooperation, it is important that a Logistics Centre is managed in a single and neutral legal body (preferably by a Public-Private-Partnership). Finally, a Logistics Centre must comply with European standards and quality performance to provide the framework for commercial and sustainable transport solutions.

Figure 3.2: Definition of Logistics Centres. It should be noted that the above definition of Logistic Centres is of a physical centre. Logistic Centres can also be virtual.

Intermodal Transport is the use of a several transport modes in the transport of cargo. The different types of transport modes that can be used in intermodal transport are:

Boat-Airplane-Train- Truck-Car

Figure 3.3: Definition of intermodal transport



To illustrate an example of the concept of intermodal transport of cargo in the most simple view:

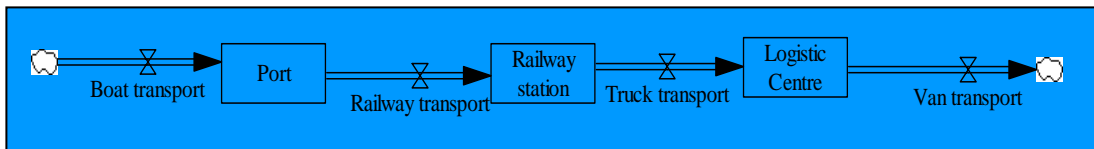


Figure 3.4: Intermodal transport chain combining boat, railway, truck and van.



3.3 Method of working

This report is part of the project InLoC. The objectives of this report are to clarify the aspects of strategic networks. The report will follow the structure of figure 3.5 below:

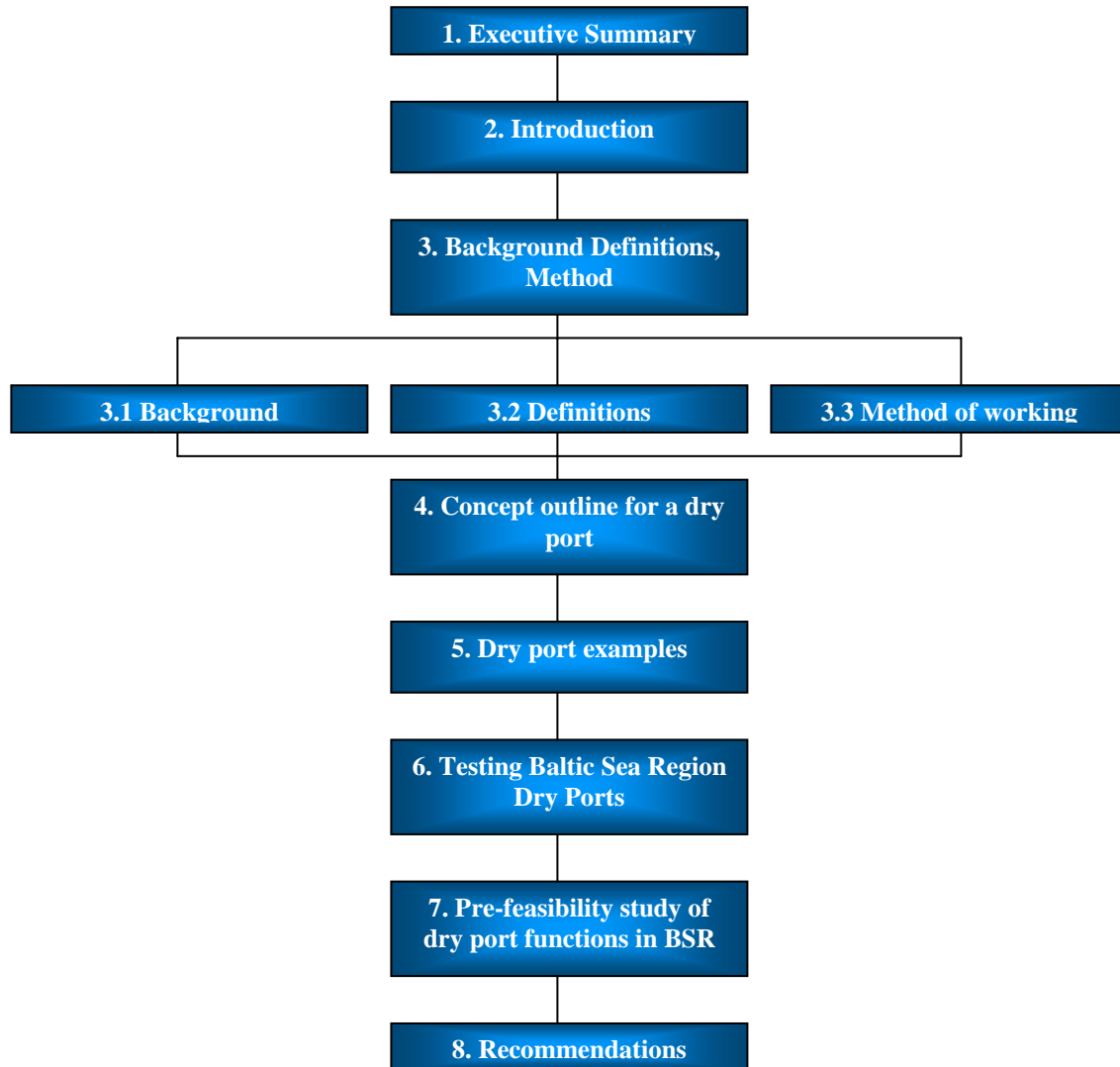


Figure 3.5: The structure of the report

The first section of the report gives a short summary of all the feasibility study. In the second section of the report the introduction is given. The third chapter contains the



background information and definitions of the central concepts to build an understanding of the concepts. In the fourth chapter “Concept outline for a dry port” the functions and advantages of the dry port are described.

In the fifth chapter “Dry Port examples” existing examples of dry ports, which are located in Europe, Asia, Africa, North America and South America are analysed. In this section the main differences between dry port and inland port are also explained. In the sixth chapter an analysis of a Baltic Sea Region dry port will be undertaken, based on the balanced scorecard approach.

Thereafter the seventh chapter will introduce the framework for a feasibility of dry port functions in BSR. Finally conclusion and recommendations based on the analysis follows. In the following the data collection methods used for the analysis will be investigated.

Data Collection Methods

The different methods of data collection may vary in terms of their cost, the quality and depth of information they supply and the level of response they are likely to secure. The first consideration when selecting methods is the kind of information, which is needed. There are two basic approaches: quantitative and qualitative.

Quantitative methods are centred on the quantity of certain responses, for example, the number of people, who answer “yes” to a particular question. They are most appropriate when the potential range of answers you can expect to each question is known in advance, and typical questions involve ticking boxes or filling in numbers.

Quantitative data is also particularly useful for measuring change, as it is relatively easily to ask the same questions again at a later date and to compare the results.



For quantitative information to be reliable (and especially when measuring change), it needs to be based on relatively large number of responses.

Qualitative methods are less focused on numbers and offer the opportunity to explore issues and gain more in-depth information, particularly where the range of possible answers is not known beforehand.

Being less dependent on numbers, qualitative approaches so not require such large numbers of responses for their results to be useful, provided you can be sure that the respondents are sufficiently typical or insightful. On the other hand, they are more demanding in terms of the analysis required to extract the required information. It is possible to combine both approaches in a single data collection exercise.

Questionnaire

The data is either based on general information gathering written contact to the respondent or by interviews with the selected actors.

The questionnaire was send to the Port of Turku, Port of Kemi, Ports of Stockholm, Valka Town Council, Valga City County and several chief executives for Danish Transport Centres and Transport and Logistics companies. The purpose of the questionnaire was to investigate the advantages and/or disadvantages of dry ports, seen from their perspectives, plus to find out which of the dry port functions that are deemed most relevant. The questionnaire was structured upon the quantitative method, as such quantitative data often are easier to analyse, seen from a statistical point of view. In table 3.1 it is possible to see the characteristics of both the quantitative and the qualitative approaches to research.



Table 3.1: Comparison of features of Quantitative and Qualitative approaches to research

Quantitative	Qualitative
Both are systematic in their approach	
Objective	Subjective
Deductive	Inductive
Generalisable	Not generalisable
Numbers	Words

The received data from the questionnaire has been analysed in the statistics programme SPSS. The investigation of the attitude towards the dry port concept among the respondents, has given a good insight in the feasibility of dry ports in the Baltic Sea Region.

Telephone Interviews

The telephone interviews with selected partners have worked as an inspiration to the making of the questionnaire. By taking contact to different transport and logistics companies along with ship operators and other companies within the transport sector, it has been possible to design a questionnaire, which was up to date with the contemporary development within the transport sector. In this way unnecessary questions were sorted out of the questionnaire analysis and the questions were delimited to focus only on aspects, which could be regarded as relevant in the context of investigating the dry port concept.



Dry Port investigation

Academic aspects and contents of the case studies concerning the dry ports were discussed and developed with consideration to the following aspects:

- Themes
- Background/history of networking and changes in process of time
- Benefits and possibilities of networking
- Risks and restrictions of networking
- General examples of networking (co-operation between firms from same/different lines of business, firms from same/different regions)
- Data collection: literature, (current) articles from journals, newspapers and customer magazines, web-sites etc.
- Representation includes pictures and/or graphs



4. Concept outline for a Dry Port

This chapter will present a concept outline for a dry port. The relevance of the dry port will be explained and an example of the functions that can grow from the establishment of a dry port will be drawn. The dry port functions as well as advantages and disadvantages of a dry port will be described. In this chapter the results from the questionnaires, which were sent to the transport operators in the entire Baltic Sea Region, will be investigated.

4.1 Introduction

For historical reasons, most dry ports in Europe are located in city centres, which demands an effective and safe goods transport with a minimum of environmental strain. Simultaneously the ports of Europe demands space and facilities for loading, unloading, storage, terminals, etc. in order to ensure the keeping of high quality and growth with the growing traffic and amount of cargo in question. Traditionally extending the port areas with filling docks and dam new sea areas solves the space problem.

The increasing problem with transporting goods to and from the port through the city has together with the expensive costs of establishing new docks etc. created conditions to establish hinterland terminals or dry ports, which almost can handle all of the port related activities (including customs clearance, track and trace, storage, maintenance, registration etc). According to a research report¹ made by the UN, the potential development of an inland intermodal facility into a dry port can additionally lead to an increased development in the nearby area. By expanding the services available at an

¹ United Nations Economic and Social Council for Asia and the Pacific. Report published the 17th of August 2006. ESCAP



inland multimodal terminal, other services could grow from the dry port and in this way create an added value in the area, which is beneficiary for the region where the dry port is located. Figure 4.1 shows an example of some of the functions that can grow from the establishment of a dry port.

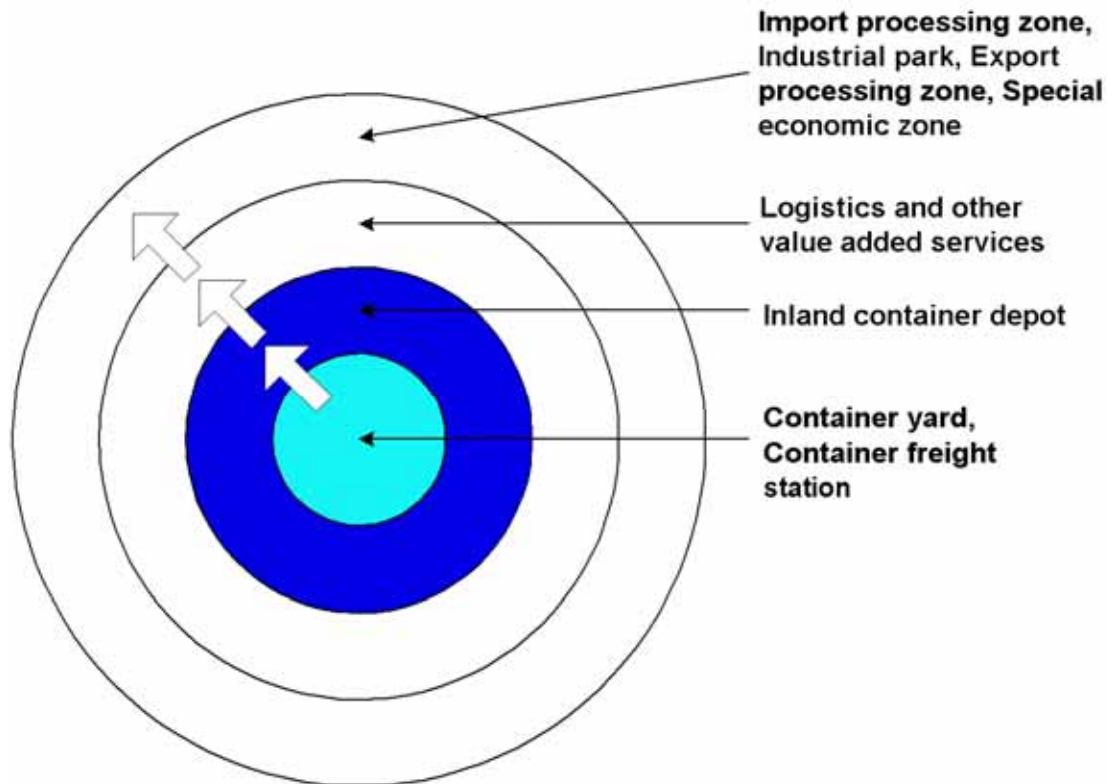


Figure 4.1: Potential expansion of function as a result of the development of an inland multimodal terminal into a dry port or of the establishment of a dry port from scratch. The two inner circles indicate the minimum level of services, which should be available in a dry port. The drawing is based on data made by ESCAP.

Furthermore the development of dry ports is an essential possibility to promote sustainability and effectiveness of goods transport in sea related transport chains. This topic will among others be the focus of the next section.



4.2 Dry Port functions

To ensure an effective Dry Port there are two general objectives:

- Consolidation of maritime goods in intermodal short- and long distance transport flows;
- Collecting and distribution of local, regional and international transports.

To achieve these two objectives it is necessary for the terminal to carry out the following functions:

- Hinterland warehousing;
- Management of container flows to different ports;
- Consolidation of individual container flows;
- Reduction of pre- and end haulage with road transport and expansion of rail transport;
- Offering special- and extra services;
- Reduction of transport costs;
- Increase the firms of ship owners and the port influence to ensure an intensification of the Transport Chains effectiveness.

To achieve these functions it is required to consider the following measures:

- To offer centrally placed areas;
- Offer the choice: Reloading or shunting;
- Offer co-ordination between different operators;
- Organisation of pre- and end haulage;
- Using advanced or existing technology;
- Offer an integrated flow of information on railway-, Dry Port-, road- and
- Maritime related data.



The figure 4.2 shows the results according to the questionnaire survey which was sent to 69 participants, where they have evaluated the importance of the dry port functions according to the scale 1 = not important, 5 = very important.

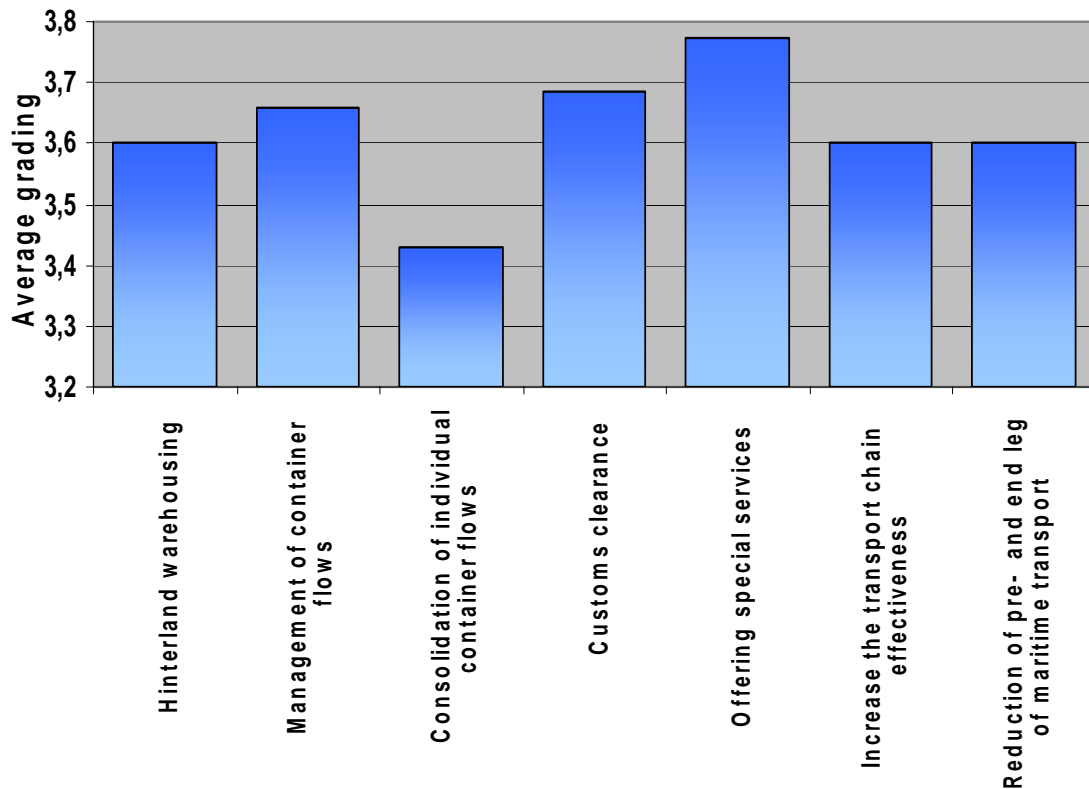


Figure 4.2: Functions of the dry port. The grading 3 should be regarded as the neutral grading.

As it can be seen from the figure above the respondents gave the average grading to the function of offering special services and to customs clearance. By all of these statements it can be concluded that the dry port should offer the same functions as the seaport, in order to have a competitive advantage. In general almost all of the services received a positive response in the investigation.



In general the streams of information are vital for the transport flow in relation to dry ports. There are several solutions to ensure a high flow of information: EDIFACT or Internet based solution. The last mentioned technology will minimize the investment costs and be beneficiary because of the great flexibility and the endless possibilities expansion.

Most dry ports in Europe are located close to city centres. A great effort has been made to ensure effective and safe transport to and from ports with minimal environmental impact, it is not always possible to create optimal conditions for port operations and the city environment as well.

The vision for the dry port is to strengthen and enhance the efficiency of sustainable and environmentally transport of all cargo, by land and by sea. It has the same administrative, customs, and cargo receipt functions as a seaport, and is designed to receive containers, etc., and then to distribute cargo using various means of transport. Containers and combi-units are sent from the port on to the dry port at the transport centre. Standard procedures can be optimised so environmental impact is minimized.

The actual cargo reception takes place in the transport centre with administrative functions, customs handling, etc. Cargos for foreign destinations are collected as they are transferred from the ship and then send directly from the multimodal transport centre. Other cargo is handled and distributed by rail, road or air (depending on which is most appropriate). Cargo to be shipped out can be consolidated in the dry port, registered, handled by customs, etc., and then shipped out directly as maritime cargo. The overall goal for the dry port is to help to improve efficiency and sustainability in complete door-to-door transport chains. The dry port could function as a common multi-modal junction for several ports and transport companies in general.



Collaboration between several ports together with companies handling land transport (road and rail) will help to strengthen collective transport chains and reduce impact of transport on the environment.

The main function of the Dry Port is obviously the transshipment of units between different transportation means, but several others services can be provided at the dry port.

Storage of units is frequently offered. It can for instance be storage of empty containers as well as storage of waiting units. This service is indeed very important for the transport system as some regions naturally receive more containers than they send and vice versa. Dry Ports can thus be connected and used to regulate the imbalance phenomenon. Maintenance of units is also a well-developed service that can be done by sub contractors.

Dry ports offer a customs station destined to handle imports and exports. Therefore, they can become an important storage and distribution centre of goods to the whole country and to the international market as well. They represent a good option for companies that need both promptness and low cost in their commercial transactions.

Several manufacturers and technology companies established in Brazil, rely on imported components, and are therefore increasingly using dry ports (inland customs clearance posts) to cut import costs and better manage the time of delivery and production.

Dry ports imported components are dispatched with greater efficiency. This guarantees deliveries on time and avoids the interruption of production caused by lack of components.



One advantage of the dry ports is that the goods can be warehoused in their facilities and cleared as needed, thus postponing the payment of import duties and local taxes by the importer until the products are needed. The Dry Port has some benefits, such as: the reduction of operating costs and more flexibility in commercial transactions; the financing of ICMS (value-added Tax on Sales and Services), through a longer term for the payment of generated tax.

Talking about the concrete dry ports which are analysed in this project e.g. in Isaka Dry Port in Tanzania, it is almost compulsory and logical to provide the service at the Dry Port.

If the custom clearance is done in the dry port instead of in the seaport, plenty of time can be saved. In connection with this certificate for customs clearance it is important that the dry port receive the authority to supply the T5 permission. In this way the ITU does not have to be re-opened and controlled at the seaport, but can be transshipped to the ship right away.

The Dry Port of São Paulo offers storage, cargo handling through modern equipment and skilled workmanship, cargo consolidation/deconsolidation, yards for storage of up to 5000 vehicles, parking lot for trucks arriving out of Customs' working hours, full infrastructure for clients and users, etc.

The Santo André Dry Port offers services ranging from goods collection to cargo clearance, involving highly specialized equipment and staff, for handling any type of dry cargo in accordance with the importer/exporter's specifications.

Virginia Inland port operated as an intermodal container transfer facility, the Virginia Inland Port (VIP) provides an interface between truck and rail for the transport of ocean-going containers to and from the Port of Virginia. Containers are transported by



INTEGRATING LOGISTICS CENTRE NETWORKS IN THE BALTIC SEA REGION

truck to the VIP for immediate loading upon a rail car or for short-term storage prior to loading. Containers arriving from Hampton Roads terminals are unloaded from the train and dispatched by truck to inland destinations. Land is available to steamship lines for container storage and ancillary services companies.

The Santo André Dry Port offers services ranging from goods collection to cargo clearance, involving highly specialized equipment and staff, for handling any type of dry cargo in accordance with the importer/exporter's specifications.



4.3 Dry Port advantages and disadvantages

Consequently Dry Ports' advantages and disadvantages are those actual inland terminals' advantages and disadvantages.

In the report the following dry port advantages are taken into consideration:

- Reducing total transport expenses;
- Shift from road to rail transport, which is more environmental friendly. ²
- Connecting cargo handling from the port with other types of cargo at one common transport centre;
- Strengthening the ports in transport chains;
- Strengthening multi-modal solutions;
- Reducing the use of expensive, centrally located areas in the port;
- The seaport get a larger hinterland and can therefore obtain a competitive advantage, because the seaport now can store a larger amount of ITU's
- Possibly avoiding traffic bottlenecks, which give less congestion on the roads near the harbour area, due to the fact that a modal change has happened.
- Reducing local environmental problems in the cities;
- Integrating port areas with the cities.
- Especially in Less Developed Countries (LDC's) the development of the hinterland can be beneficiary for an area in form of creation of jobs in the affected area.
- The possibility of speeding up the customs clearance process for goods transferred overseas can be gained by establishing dry ports with the right to conduct customs clearance.

² One train can carry the same amount of goods as approximately 40 trucks



The figure 4.3 shows the results from the questionnaire, where the respondents had to estimate the importance of the dry port advantages according to the scale 1- not relevant and 5- very relevant.

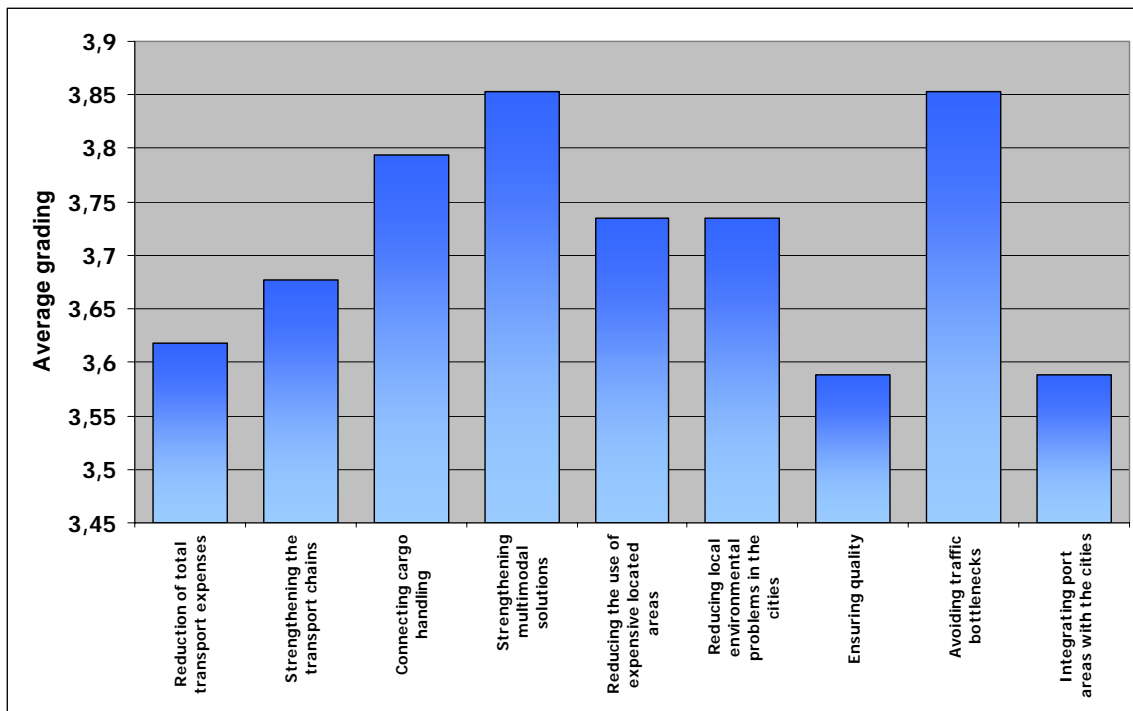


Figure 4.3: Dry port advantages. The grading 3 should be regarded as the neutral grading.

As it can be seen in the figure 4.3 it is the categories of strengthening multi-modal solutions and avoiding traffic bottlenecks that are the most important dry port advantages. This is furthermore emphasised by the fact that the share of road transport is increasing, and therefore will cause increased problems in the future. Developing the concept of dry ports can be a possible solution to minimize the congestion problem caused by heavy vehicles. Also here it can be concluded that the respondents in general have a positive attitude to the possibility of obtaining advantages from developing dry ports.



Normally dry ports are categorised into three different kinds of dry ports according to the distance to the seaport. The following scheme shows the advantages and disadvantages of these three kinds of dry ports.

Table 4.1. Dry Port advantages and disadvantages are defined in the following table.

	Close Dry port	Middle range dry port	Distant dry port
Conditions	<ul style="list-style-type: none"> • Transit activity dominant in the seaport; • There is a need due to the lack of space at the seaport. 	<ul style="list-style-type: none"> • High volume customers; • Rail link between seaport and market. 	<ul style="list-style-type: none"> • Rail link between seaport and market;
Location level	<ul style="list-style-type: none"> • Decongestion of the city access; • Reduction of pollution; • Increased intermodal transportation. 	<ul style="list-style-type: none"> • Region attracts industries; • Reduction of pollution; • Increased intermodal transportation. 	<ul style="list-style-type: none"> • Acquiring new hinterland for the seaport in consideration; • Reduction of pollution; • Increased intermodal transportation.
Infrastructure level	<ul style="list-style-type: none"> • Reduction of road maintenance cost; • Increase of rail maintenance cost; • Reduction of cost for road infrastructure development; • Increase of cost for rail infrastructure development. 	<ul style="list-style-type: none"> • Reduction of road maintenance cost (in case of pay roads, reduction of profits); • Increase of rail maintenance cost. 	<ul style="list-style-type: none"> • Reduction of road maintenance cost (in case of pay roads, reduction of profits); • Increase of rail maintenance cost.
Transport level	<ul style="list-style-type: none"> • Light reduction activity for road carriers from/to seaport; • Reduction of congestion and waiting time for transport operators; • Increase of transit time; • Increase of handlings. 	<ul style="list-style-type: none"> • Reduction activity for road carriers from/to seaport; • Reduction of waiting time for units; • Decrease of transport cost; • Coordination with rail passenger traffic. 	<ul style="list-style-type: none"> • Light reduction activity for road carriers from/to seaport; • Reduction of waiting time for units; • Decrease of transport cost; • Coordination with rail passenger traffic.
Logistical level	<ul style="list-style-type: none"> • Increased inland access and city distribution; • Invitation for the use of intermodal solutions. 	<ul style="list-style-type: none"> • Increased inland access; • Decrease of costs. 	<ul style="list-style-type: none"> • Increased inland access; • Possibility to choose between seaports; • Decrease of costs.
Customers viewpoint	<ul style="list-style-type: none"> • Raise of costs at the beginning; • Decrease of cost in long term? • Reception of units closer to their own geographical location. 	<ul style="list-style-type: none"> • Easy access to seaport; • Decrease of costs; • Slight increase of transit time. 	<ul style="list-style-type: none"> • Easy access to seaport; • Decrease of costs; • Increase of transit time (or decrease depending on the country of interest, on its road infrastructure quality level, and on distance to cover).



5. Dry Port Examples

The objective of the chapter is to give practical examples of dry ports situated all over the world- Europe, Asia, Africa, South America and North America. The elements which will be analysed and categorised in the practical examples are as following:

- a. Background information*
- b. Services of the dry port.*

At the beginning of this chapter an overview of the dry port and its position in the transport chain will be explained. The differences between dry ports and inland ports will be discussed, which will give a better understanding of the presented practical examples.

5.1 Overview

A dry port is a port located in the country in a transport centre (transport junction). It has the same administrative, customs and cargo receipt functions as a seaport, and is designed to receive containers, etc., and then to distribute cargo using various means of transport.

The processing problem with transporting goods to and from the port through the city has together with the expensive costs of establishing new docks etc. created conditions to establish hinterland terminals or dry ports, which almost can handle the port related activities (including customs clearance and registration). The development of dry ports is therefore an essential possibility to promote sustainability and effectiveness of goods transport in sea related transport chains. An example on the change in a traditional “door-to-door” transport chain can be seen on figure 5.1:

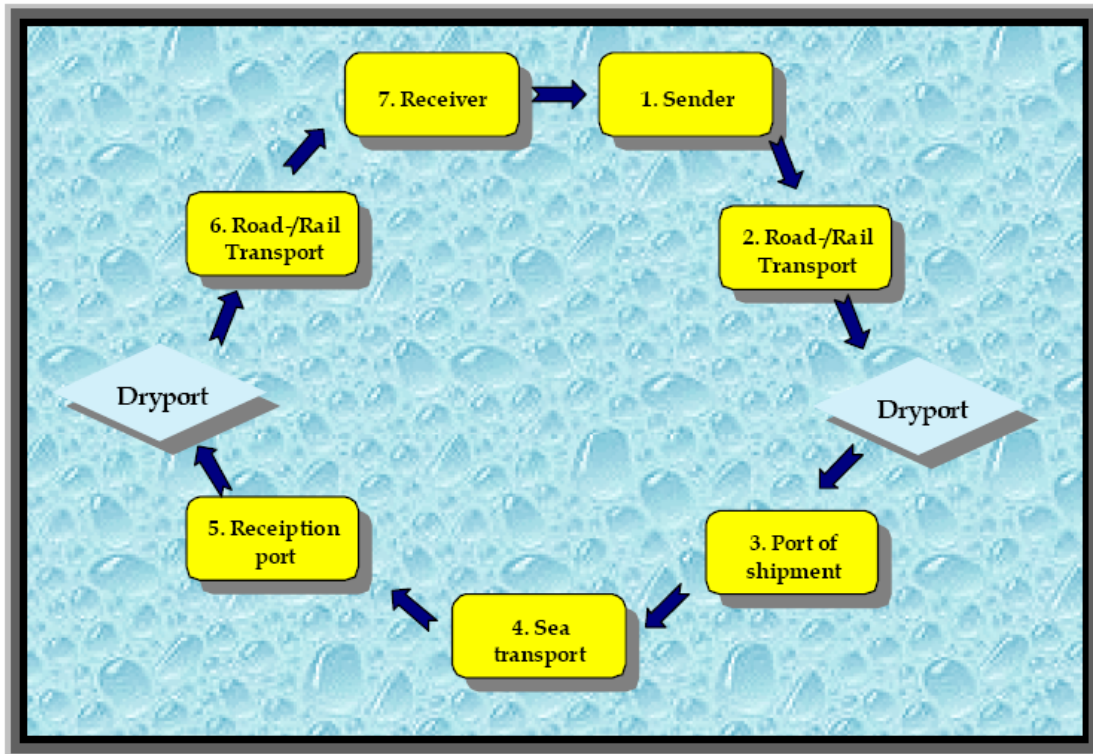


Figure 5.1: Dry Ports in the Transport Chain.

Besides the actual transportation, the transport chain will establish possibilities to value added services, presumed the dry port is integrated in a logistics centre. To add up the value added service there are e.g. customs clearance, store functions, packaging and assembly, process data, exchange of information, etc.

The conception of dry port is used in several connections and with multiple meaning. Dry port integrates value added activities, port related routines and the multimodal transport chain through IT solutions and innovative integrated transport techniques.



5.2 Differences between Inland port and dry port

An Inland Port is located inland, generally far from seaport terminals. They supply regions with an intermodal terminal or a merging point for transportation modes of rail, air and truck routes involved in distributing merchandise that comes from water ports.

Containers are transported by truck to the Inland Port for immediate loading upon a rail car or for short-term storage prior to loading. Containers arriving from sea port terminals are unloaded from the train and dispatched by truck/rail/air to inland destinations. Inland port provides international logistics and distribution services, including freight forwarding, customs brokerages, integrated logistics and information systems.

A dry port is a port situated in the hinterland servicing an industrial/commercial region connected with one or several ports with rail- or road transport and is offering specialized services between the dry port and the transmarine destinations. Normally the dry port is container and multimodal oriented and has all logistics and facilities, which is needed for shipping and forwarding agents in the port.

Different kinds of dry port development

The following five figures will show different kinds of development in regard to harbours and dry ports:

- Classical view
- Hinterland terminal
- Dry port
- Alternative dry port I
- Alternative dry port II

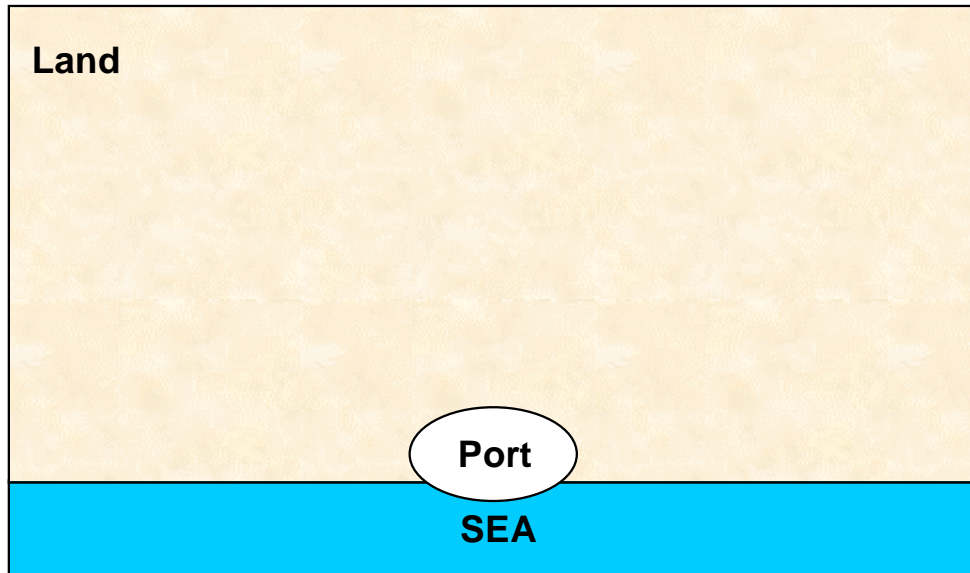


Figure 5.2 : Classical view

The classical port normally provides all the services that should be present in order to make the port function.

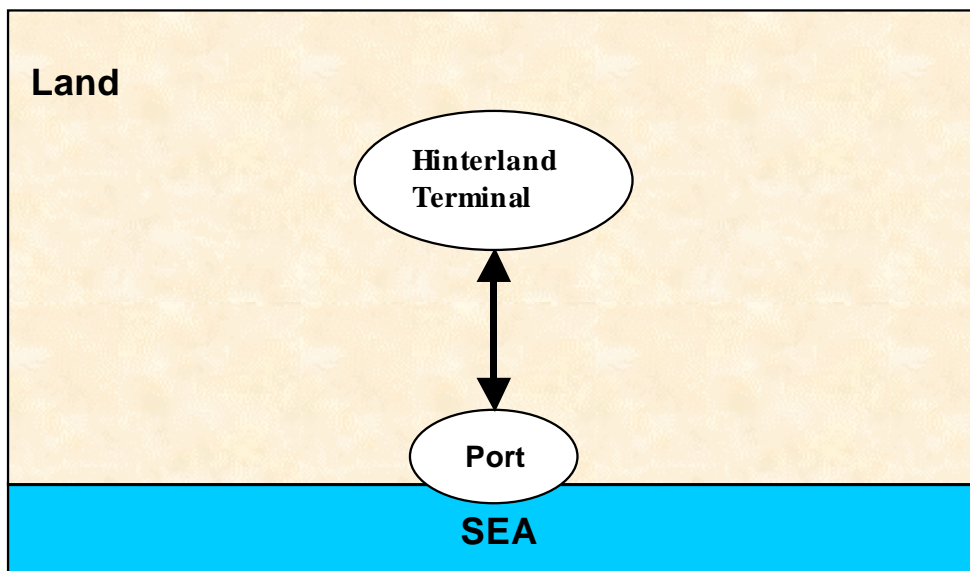


Figure 5.3: The hinterland terminal:

Hinterland terminal functions:

- Extra space;



- Shunting area;
- Long term storage;
- Low land costs;

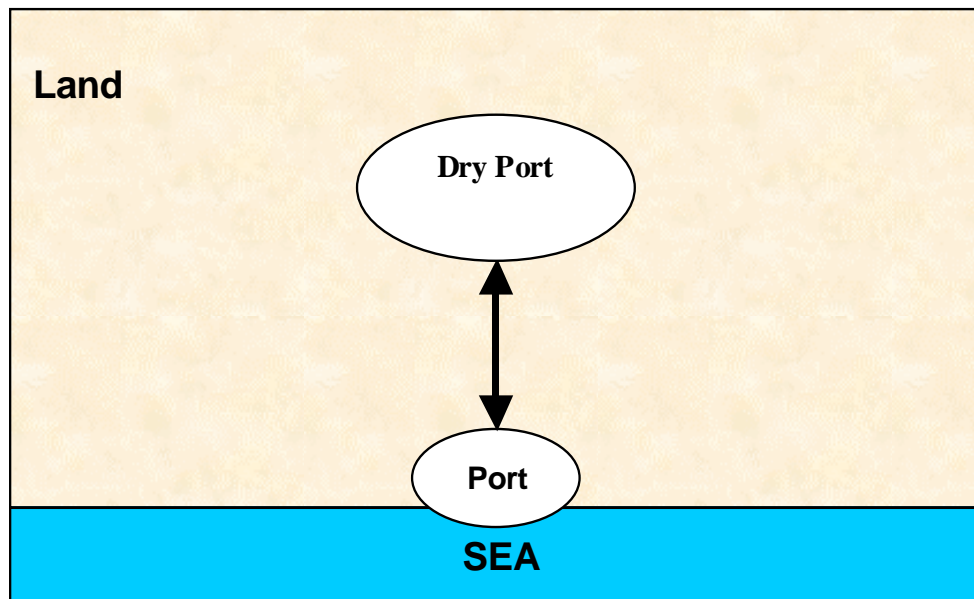


Figure 5.4: The dry port concept

Dry port functions:

- Hinterland terminal functions + Added value services;
- Custom clearance;
- Logistic services.

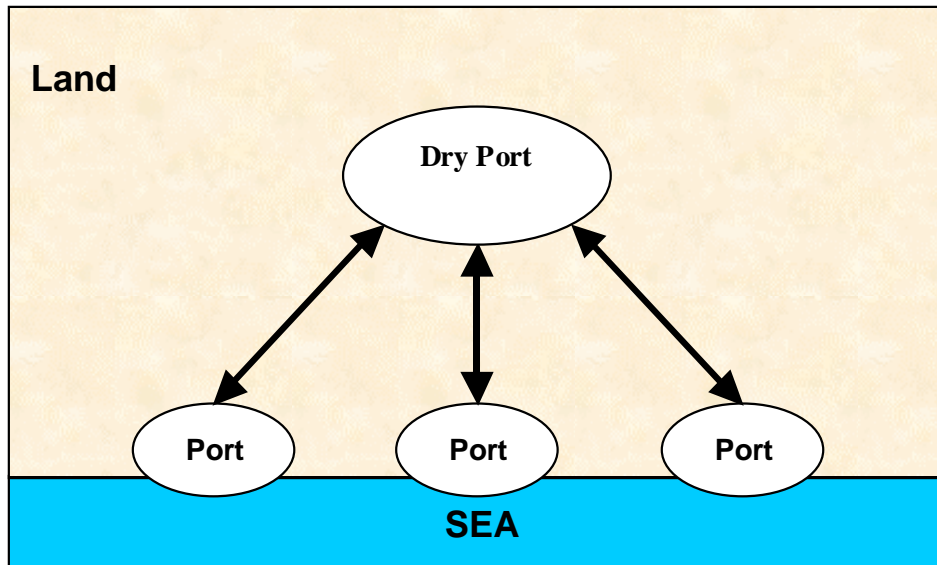


Figure 5.5: Alternative dry port solution where the dry port services three different ports

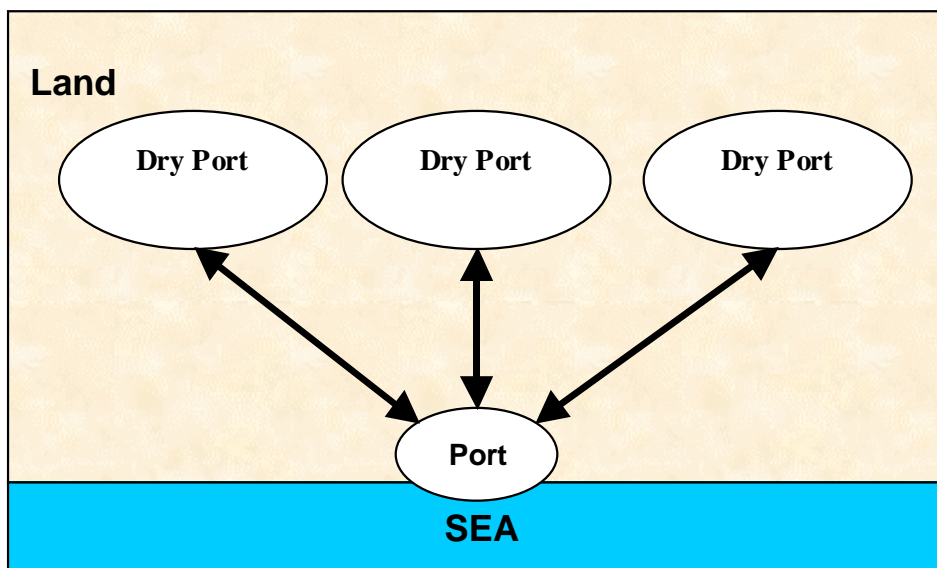


Figure 5.6: Alternative dry port solution where different dry ports are servicing the same port



5.3 Existing Dry ports

5.3.1 Europe

In order to give an insight on the developed network of dry ports from all over the world, the following section will contain some examples of well functioning dry ports, from which back ground knowledge and experience may be gained and may be transferred to the Baltic Sea Region.

5.3.1.1 Dry Port Muizen and Dry Port Mouscron/Lille, Belgium

Background

In Belgium there are two dry ports: Dry port Muizen next to Brussels and dry port Mouscron/Lille next to the French border. Dry Port Muizen has direct connection to Antwerp, Rotterdam, and Dunkerque to quote only seaports that deal with standardized units. Dry port Mouscron/Lille is connected by rail to the same seaports.



Figure 5.7. Dry Port Muizen plan



Services

Dry port Muizen offers the following services:

- Loading/Unloading railway wagons on and from trucks;
- Loading/Unloading railway wagons on and from railway wagons.

Dry port MOUSCRON/LILLE INTERNATIONAL

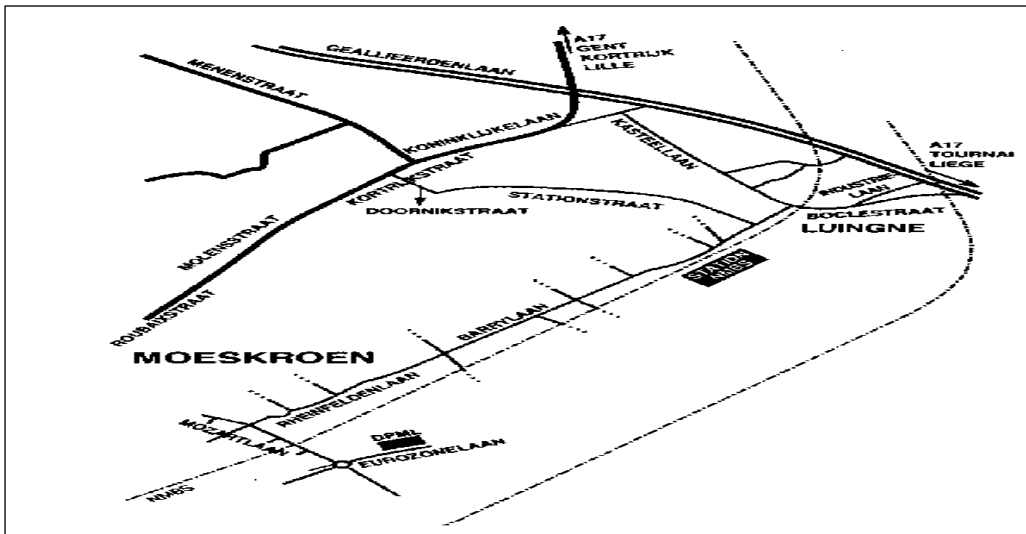


Figure 5.8. Dry port MOUSCRON/LILLE INTERNATIONAL Plan

Services:

Dry Port MOUSCRON/LILLE INTERNATIONAL offers such kind of services:

- Loading/Unloading of containers on railway wagons on/from trucks.



5.3.1.2 Venlo Trade Port



Figure 5.9 Venlo trade port

Background

The Venlo area has emerged as one of the primary logistics centres for the European market of the 21st century. With its central location, its direct infrastructure connections to major European economic centres and its terminal facilities for nearly any type of combined traffic, Venlo presents clear strategic advantages for companies hoping to capitalize on opportunities of the changing European market. A key element of that strategic advantage is Venlo's highly successful Trade Port concept.

Venlo Trade Port has a total area of 800 hectares. The location is of a high flexibility and high-profile. It is combining fully integrated road and rail transshipment facilities with a state-of-the-art telecommunication infrastructure. It is also a high flexibility business park. Venlo Trade Port is located in the southeast Netherlands.



Services

Since development began in the late 1980s, Venlo Trade Port has proven to be both a successful concept and an extremely favourable location for commercial enterprises. One of the first developers was ECT of Rotterdam, a leading global handler of maritime and continental containers.

At the moment plans are being finalized for the development of a Venlo barge terminal on the Maas (Meuse) River, one of Northern Europe's primary waterways. Direct, latest technology connections will soon offer combination road/rail transport from the Venlo harbour to the Venlo Trade Port, initially for bulk goods as well as containers on the long term.

The multi-modal transport facilities at Venlo Trade Port complement those of Rotterdam and Schiphol. Both facilities have a vested interest in further strengthening Venlo's position in the European goods traffic. In fact, to an ever-increasing degree, activities in goods handling are being relocated from Rotterdam to the interior due to growing traffic congestion in the densely populated agglomerations of western Holland. That's one reason why a High-speed Container Shuttle Service now offers direct, daily rail connections between Venlo Trade Port and the Rail Service Centre at the Port of Rotterdam.

5.3.1.3 Dry Port of Coslada

Background

The Puerto Seco, which was finalised in February 2000, is conceived as an extension of a port inland to ensure a fast and efficient transportation of freight containers, taking advantage of the possibilities offered by the transport by train and the direct connection of two logistic centres. The Puerto Seco has been shared proportionally by the main seaports of Spain.



In the central nucleus of Puerto Madrid, Logistic Platform Barajas- Coslada, constituting along with the Centre of Air freight of Barajas, the dry port of Coslada and the railway station of Vicalvaro, the greater logistic complex of the South of Europe. It is the best space for reception, storage and distribution of merchandise, because it concentrates these activities in a specialized zone, most strategic of Spain by location, infrastructure and services. PUERTO Seco de Madrid, the inland intermodal terminal on the outskirts of the Spanish capital, handled 36,953 TEU last year and plans to expand capacity by 16,000 sq m. The terminal is linked by rail to Spain's four leading ports Algeciras, Bilbao, Barcelona and Valencia all of which hold stakes in the facility. Its role is to handle cargo from regular rail services to the capital and help shift freight traffic of increasingly congested roads.

Services

Dry Port of Coslada has a million m² equipped with best infrastructures, architecture and services to give answer to any necessity of the logistic companies, whichever it is its dimension and services and are prepared already to welcome all the activities related to the transport:

- Storage and distribution;
- Management of stock;
- Division and consolidation of loads;
- Customs management;
- Modal interchange;
- Services to the transport.

In the dry port the merchandise coming from the four Spanish marine ports will come together (by highway, railroad and airplane, given the proximity of Barajas) for their distribution. One is an inner port, intersection of the four Spanish ports (Algeciras, Barcelona, Bilbao and Valencia) that is going to harness the railroad to unload the rolled traffic and to reduce the environmental impacts.



Centro Transporte de Coslada is strategically placed for the reception, storage and distribution of goods. It is connected with the railway network (Vicálvaro Station) and it is the axis of the road traffic in the peninsula. Being the common vertex of the Atlantic arc and the Mediterranean triangle (Madrid-Barcelona-Valencia), moreover is interconnected with Barajas Airport, with access to the Northern Barcelona roadway and it is also adjacent to the Dry Port of Madrid.

Coslada consolidates like one of the main centres of distribution of merchandise of the south of Europe with the entrance in operation of the dry port, fundamental element of the Logistic Platform Madrid Port.

5.3.1.4 Dry Port Hoeje-Taastrup



Figure 5.10. Hoeje-Taastrup dry port

Background

Hoeje-Taastrup dry port is located on the outskirts of the Greater Copenhagen area in a traffic junction for railway and road transport with direct access to motorways and a main railway line. The vision for the first Danish dry port project is to strengthen and enhance the efficiency of sustainable and environmentally correct transport of all cargo, by land and by sea.



Services

Containers and combi-units from ships are sent from the port into the dry port at the transport centre. Standard procedures can be optimised so environmental impact is minimized. The actual cargo reception takes place in the transport centre with administrative functions, customs handling, etc. Cargos for foreign destinations are collected as it is transferred from the ship, and then send directly from the multimodal transport centre. Three of the goods sidings at Hoeje-Taastrup are presently only 300 meters long and one siding is 490 meter. But extension up to the length of 600 meters should be possible within the forthcoming years.

Other cargo is handled and distributed by rail, road or air. Cargo to be shipped out can be consolidated in the dry port, registered, handled by customs, etc., and then shipped out directly as maritime cargo.

The overall goal is that a dry port should help to improve efficiency and sustainability in complete door-to-door transport chains. The dry port could function and a common multimodal junction for several ports and transport companies in general. Collaboration between several ports together with companies handling land transport (road and rail) will help to strengthen collective transport chains and reduce the impact of transport on the environment.

5.3.1.5 Port of Lyon Édouard Herriot

Background

The Port of Lyon Édouard Herriot is located at the south entrance of Lyon, the port covers approximately 184 hectares and offers 109 hectares of private and public land for industrial and logistical uses.

The terminal is connected to seaport of Marseille to where there are around 300 kilometres to cover, depending on whether rail or inland waterway is used. The terminal



is connected to the seaport with a barge service that is run by the state owned company “Compagnie Nationale du Rhone”. Marseille has an office at Lyon terminal that provides seaport services. For that reasons, Lyon terminal seems to be a dry port for Marseille.



Figure 5.11 Port of Lyon

Services

There is the only site in Lyon that accommodates all modes of transport: water, rail, road, oil pipeline and river/sea, the Port of Lyon is a conveniently located multimodal hub for all types of goods. Lyon Terminal, the manager of the container and heavy-parcel terminal, has made it the relay port of Marseilles/Fos, thanks to the use of frequent railway and river shuttles.

The development of river/sea traffic now offers direct connections without transshipment from Lyon to the Mediterranean basin. Special customs procedures have been set up for containerised goods.

5.3.1.6 Metrans

Background

METRANS, the German-Czech company for hinterland transport, is the market leader for container transport by rail between the German seaports and the Czech Republic. From the traffic junction in Prague, containerised goods are transported to the major economic



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centres in the Czech Republic, Slovakia and Hungary. METRANS runs four railway terminals situated in Prague, Zlin (Czech Republic), Dunajska Streda (Slovakia) and Győr (Hungary). METRANS' own distribution station network ensures reliable and smooth running transport by rail.

Services

METRANS offers a complete intermodal service from Hamburg and Bremerhaven. The block trains cover the distance between the North German ports and Prague in less than twenty hours. Ranges of additional services are available at all domestic and foreign METRANS terminals. These include terminal services, truck transportation, customs clearance, storage for empty containers, repair facilities and maintenance.



5.3.1.7 Dry Port Dunkerque



Figure 5.12 Dunkerque dry port.

Background

Ranked third largest European port for dry bulk, Dunkerque has consolidated its position with the extension of the western bulk terminal managed by Sea- Bulk. This operator is 60% owned by the Belgian group Sea Invest, one of the major worldwide port operators specialized in the dry bulk and fruit sectors, the remaining share is owned by the Dunkerque Port Authority. Dry Port Dunkerque (DPD) is the new on-dock intermodal terminal in the Port of Dunkirk.



Services

Dry Port Dunkerque boasts 300 m tracks and two 40 tonnes wide span RMGs, which have been relocated from Belgium. The tracks are due to be extended in due course, allowing DPD to hold or (un)-load four 90 TEU trains simultaneously.

Sea Bulk delivers mineral ores and coal to the steel industry and power stations using coal in the North of France, the Lorraine area in the East of France and to the United Kingdom via transshipment. The prospects of future growth in the Lorraine area of France and on the British, German and Belgian markets are huge, and could generate to further extensions.

5.3.1.8 Port of Bilbao



Figure 5.13: Port of Bilbao

Background

During the last years a logistics platform to channel 65% of the load has been implemented at the Port of Bilbao. The operation of this platform, which will prevent lorries from having to return to the Port of Bilbao and will thus reduce their cost, arises from the agreement between the haulage companies.

Services

The Port of Bilbao is equipped with a major logistics platform located in the terminal owned by Renfe in the town of Jándiz in Alava and which will be used to channel 65% of



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the containers arriving at the port, thus lowering the cost of their shipment. This logistics platform, the fruits of an agreement among all the haulage companies operating at the port except for Cecotrans, will be partners with Renfe by way of a percentage, which has yet to be defined, with an investment of around 3 million euros. The company Vitoria Container Depot has been set up to run it, the shareholding of which is still open and may incorporate Cecotrans if it is required. Shareholding will not close until Renfe, the landowner and who has never previously allowed its premises to be used for loads which are not transported exclusively by rail, establishes with what percentage the aforementioned company wishes to enter. The operation of this platform, which prevents lorries from having to return to the Port of Bilbao and thus reduces their cost, arises from the agreement between the haulage companies, who for several months now have been involved in finding a solution via dialogue to ensure the stability and functional nature of the port.



5.3.2 South America

5.3.2.1 The Dry Port São Paulo



Figure 5.14: Sao Paulo dry port

Background

The dry Port Sao Paulo has a convenient entrance and outlet gate for United States, Europe, Africa and Mercosul markets. The dry port is placed inside the Metropolitan area of Sao Paulo and covers an area of 160 hectares. The location makes it the best link for this largest consumer and producer market of the country, due to the short distances to the airports of Guarulhos and Viracopos and the port of Santos.

Services

The main services which the Sao Paulo dry port is offering are as following:

- Storage;
- Cargo handling through modern equipment and skilled workmanship;
- Cargo consolidation/deconsolidation;
- Closed and open warehouses, cold storage and safe for valuable cargo;
- Computerized control of cargo and electronic weighing;
- Yards and gantry cranes for handling containers (full, empty and reefer);
- Parking lot of trucks arriving out of Customs' working hours;
- Assistance on customs procedures and law;



- Assistance on constructing national and international freights as well as logistics projects;
- Full infrastructure for clients and users.

5.3.2.2 The Santo André Dry Port (EADI)

Background

The Santo André Dry Port (EADI) is regarded as one of the best bonded warehouses in Brazil. Located in the so-called ABC district of greater São Paulo, with easy access to the main routes out of São Paulo, it has a total area of 92,000m² and two enclosed warehouses comprising a total covered area of 32,000 m² with 13m head-room.

Services

The Santo André Dry Port offers services ranging from goods collection to cargo clearance, involving highly specialised equipment and staff, for handling any type of dry cargo in accordance with the importer/exporter's specifications.

The Santo André Dry Port (EADI) began operations in 1998 and is dedicated to import / export cargo logistics for various customs regimes.



5.3.3 North America

5.3.3.1 Virginia Inland port



Figure 5.15: Virginia Inland port

Background

The Virginia Inland Port (VIP), just west of Washington, D.C. in Warren County, Virginia, is 220 miles inland and effectively brings the benefits of the Port of Virginia 220 miles closer to U.S. markets. Five-day-a-week rail service between the VIP and the marine terminals in Hampton Roads allows direct access to the trade routes of 75 international shipping lines.

The facility contains 17,820 feet of on-site rail serviced by one of the largest railroads in the U.S., Norfolk Southern. Its ideal location provides excellent roads to and from markets in Pennsylvania, Northern Virginia, West Virginia, Maryland, Washington, D.C. and Eastern Ohio.



Services

Virginia Inland port operated as an intermodal container transfer facility, the Virginia Inland Port (VIP) provides an interface between truck and rail for the transport of ocean-going containers to and from the Port of Virginia. Containers are transported by truck to the VIP for immediate loading upon a rail car or for short-term storage prior to loading. Containers arriving from Hampton Roads terminals are unloaded from the train and dispatched by truck to inland destinations. Land is available to steamship lines for container storage and ancillary services companies.

At all three waterfront Marine Terminals and Virginia Inland Port, the following services are available.

The Cargo Division is responsible for loading and unloading of trucks and railcars of breakbulk cargo and the stuffing and stripping of containers at the Container Freight Station. Additionally, the division coordinates warehouse storage and cargo fumigation.

The Container Division is responsible for the documentation on containers entering and exiting the terminal via ship, truck or rail. The Yard Division is responsible for planning, coordinating and accomplishing the Container Yard activities. The Division allocates yard stowage space, mounts and stacks containers, and coordinates the vessel load and discharge with the ship line and/or stevedore. The Rail Division is responsible for the loading and unloading of intermodal containers at the on dock rail facility. The Vessel Operations Division is responsible for the assignment of vessel berth and cranes. This Division is the initial point of contact with the ship line and/or the stevedore during vessel operations. The M.I.S. Coordinator-Cargo is responsible for the coordination of break bulk operational requirements with the Information Systems Division Programmers. The M.I.S. Coordinator-Container is responsible for the coordination of container operational requirements with the Information Systems Division Programmers. The equipment training assistant is responsible for the training of equipment operators of dock side cranes, rubber tire gantry cranes, straddle carriers and other heavy equipment.



Additional Port Services:

- Ship Lines Providing Regular Service From Hampton Roads;
- Inducement;
- Ship Offices & Agents;
- Feeder Service;
- Freight Forwarders & Customs Brokers;
- Bagging & Transfer;
- Stevedores;
- Ship & Cargo Brokers;
- Shipbuilding, Ship Repair, and Dry-docks;
- Export Management & Packing;
- Warehousing;
- International Divisions, Banks & Financial Institutions;
- Consular Offices in Virginia;
- Terminal Designations.

The Port of Virginia consists of four general cargo terminals and a cruise terminal- Newport News Marine Terminal, Norfolk International Terminals, Portsmouth Marine Terminal and the Virginia Inland Port in Warren County, Virginia as well as the Newport News Cruise Terminal. All facilities are operated by Virginia International Terminals, Inc., a non-stock, non-profit operating affiliate of the Virginia Port Authority.



5.3.3.2 Inland Port San Antonio

Background

Inland port San Antonio promotes all of the transportation, distribution, logistics facilities, and services that make up this community's unique capacity to serve international trade. San Antonio's unique position midway between the East and West coasts of the United States and its close proximity to Mexico makes it a strategic location for transshipment, distribution, logistics and international trade processing activities.

Services

Among the key physical resources which make up the Inland port San Antonio include intermodal facilities at Kelly USA, the air cargo capabilities at San Antonio International Airport, and two major transcontinental railroads, Union Pacific and BNSF, together with their yards and intermodal assets.

San Antonio is at the crossroads of major railroads and interstate highways directly connected to the Mexican transportation system. Because of this combination of ideal location and excellent infrastructure, more than 50 percent of the total goods flowing between the U.S. and Mexico travel through San Antonio before reaching their final destination.



5.3.4 Asia

5.3.4.1 Cambodia Cwt Dry Port

Background

Cambodia-CWT Dry Port is a joint venture between CWT, its subsidiary Camsin Corporation Pte Ltd ("Camsin") and PAS.

Services

PAS has many other services for serving its customers besides navigation sector, handling, transport and cargo storage. PAS has established another branch, namely Cambodia CWT Dry Port, which is located next to the capital city of Phnom Penh and close to highway N° 4 and the railroad, which is an ideal advantage in transporting cargoes from PAS to Cambodia CWT Dry Port and vice versa as well as to produce convenient conditions to customers in storage, transport, handling and cargoes distribution in market places throughout the Kingdom of Cambodia. Cambodia CWT Dry Port has 19 hectares of land area including yard, warehouses, administrative building and a number of machineries to meet its customers' requirements. Located near Phnom Penh City, the Cambodia-CWT Dry Port provides inland dry port services including container freight station and transportation services.

5.3.4.2 Moghalpura Dry Port Lahore

Background

Lahore Dry Port was the first dry port established in Pakistan, constructed and managed by Pakistan Railways since 1973. At present, there are six dry ports running under the management of Pakistan Railways:

- Lahore dry port;
- Karachi dry port;
- Quetta dry port;
- Peshawar dry port;



- Multan dry port;
- Rawalpindi dry port.

Lahore dry port was established in 1973. Originally, dry port Moghalpura Lahore was declared as land customs station and the goods imported into and exported from this port were mainly for India and Pakistan. In other words it was land customs station for commercial goods imported from India and exported to India. Subsequently with development of trade and industry and as a result of closure of trade with India after 1965 war and in view of difficulties faced by the local traders of Punjab, the Land Customs Station of Moghalpura Lahore was designated as dry-dock i.e. inland port for importation and exportation of goods brought through the sea routes and it was a port created with transshipment facilities. Initially transshipment was carried out only by railway but subsequently this facility was extended to National Logistic cell of Pakistan Army and further to private bonded carriers. The custodian of the imported and exported goods is Pakistan Railways.

Services

Goods are imported into the country and transported from Karachi to Lahore through Railway Wagons or by road. Garments, woollen carpets, leather products, sports goods are major export items of dry port. As per Government's policy to encourage the exports, the Customs Export Station also process the rebate claims. The rebate claims are sanctioned after verification and the files are sent to Chief Accounts Officer for issuance of cheques of rebate amounts in favour of the exporters.



5.3.5 Africa

5.3.5.1 Isaka Dry Port³



Figure 5.16: Isaka dry port

Background

Isaka Dry Port is an inland container terminal, which acquired the dry Port status in 1999. The conversion of Isaka into a Dry Port means that all the customs documentation may be done at Isaka instead of Dar es Salaam Port. Isaka was a Railway station until the late 1980s when it started to grow into an active commercial centre due to increased traffic on the highway to Rwanda. Since 1999 Isaka is directly handling import and export traffic. The main features at Isaka are as following:

- An inland dry port facility;
- Isaka Railway station including passenger and goods terminals.

³ <http://www.tretz.com/isaka.htm>



Figure 5.17: Isaka dry port

Isaka dry port provides a convenient interface for traffic to Rwanda and North Eastern Democratic Republic of Congo. Isaka is one of the key transport link to/from Rwanda located on the TRC line between Mwanza and Tabora. The Isaka container terminal is managed and operated by TRC. TRC has a capacity to handle 1.8 million metric tons per annum. Isaka dry port which is located in Shinyanga region, handles cargo destined for Rwanda, Burundi and the Democratic Republic of Congo.

Services

Isaka Dry Port ensures assured security and safety of cargo, faster and convenient customs clearance, preferential wagon allocation, faster transit time, low transport costs, reduced demurrage charges and overall efficiency and cost effectiveness.

Isaka Dry Port handles both containerised and general dry cargo. They also have two transit sheds with storage capacity of 7,000 mt each and can handle 42583 mt of loose cargo per annum. Two railway sidings with a capacity for 22 wagons at a time serve the yards.



5.3.5.2 The Tiger Dry Port

Background

The Tiger dry port is situated at the Smith Co. Industrial Business Centre in the heart of Matsapha, Swaziland's major industrial estate.

Services

With a railway siding on the premises a customs bonded warehouse and a soon to be operational customs office the dry port is an asset to local and international business men by providing first class import and export facilities, with abundant storage space that is kept under 24 hour constant security.

Incorporating the help of a state of the art super stacker the only one of it's kind in Switzerland, loading and off loading of containers from trucks and railway trucks has never been easier or quicker.



6. Testing Baltic Sea Region Dry Ports

In this chapter a discussion on Testing Baltic Sea Region Dry Ports will be executed. The aim of this chapter is to present the sustainable balanced scorecard for dry ports which was published in 1996 by Kaplan and Norton. In this chapter an example of how a balanced scorecard could look like will be showed also the examples for each of the evaluation criteria, integrated into the sustainable balanced scorecard of a dry port, will be investigated.

6.1 Introduction

Using a balanced scorecard approach, the dry ports vision and strategy is translated into actions. These are related to the four perspectives:

- **Dry ports productivity:**

The dry ports productivity is related to performance results.

- **Dry ports attractiveness:**

The dry ports attractiveness is related to the stakeholders' perception.

- **Dry ports efficiency:**

The dry ports efficiency is related to the operation of business processes.

- **Dry ports potential:**

The dry ports potential is related to the know how of individuals and organisations.

Therewith, further performance orientated development measures are compiled and a balancing between various perspectives is obtained.



During the study the following questions are discussed having in mind the selected evaluation criteria:

- Which indicator(s) related to the specified dry ports perspective can be used for visualisation and measurement?
- Which measure(s) also beyond dry ports realisation can further improve the indicator level?
- Which indicator level is obtained before and after realizing these measures (in relation to the situation before dry ports)?
- Which implications result for the other dry ports perspectives?

By this, the multi-criteria analysis covers amongst others the following key characteristics.

The motivation for a multi criteria analysis based on a sustainable balanced scorecard approach multi-criteria can be summarised as follows:

- Quality of transport infrastructure is responsible for regional and national welfare,
- EU focus on sustainability of dry ports networks and transport systems, from feasibility to viability,
- Due to increased competition development and qualification options are essential,
- Increased view on sustainability impact assessment,



6.2 Sustainable Balanced Scorecard for dry ports

A sustainable balanced scorecard approach is developed and used as strategic planning tool for dry ports. This approach is described in this chapter. The Balanced Scorecard, published in 1996 by Kaplan and Norton (see Kaplan, R.S.; Norton, D.P.: the Balanced Scorecard: Translating Strategy in Action, Boston, 1996) helps to translate strategy into action. The scorecard is therefore regarded as a possible way to implement a strategy of developing the dry port concept in the Baltic Sea Region. For this approach the tool requirements are:

- Company oriented approach,
- Performance driven tool,
- Focus on innovative and value added development,
- Balancing between perspectives,
- Causality implies results.

Besides these tool requirements it is important, that the sustainable balanced scorecard translates the dry ports vision and strategy into sustainability orientated factors concerning ports productivity, ports attractiveness, ports efficiency and ports potential.

By this, it goes beyond a benefit analysis for optional locations, evaluating offer of land, positioning, traffic connections and security of planning. Additional measures are identified, ensuring not only feasibility but also viability. An example of a general balanced scorecard is shown on Figure 6.1.

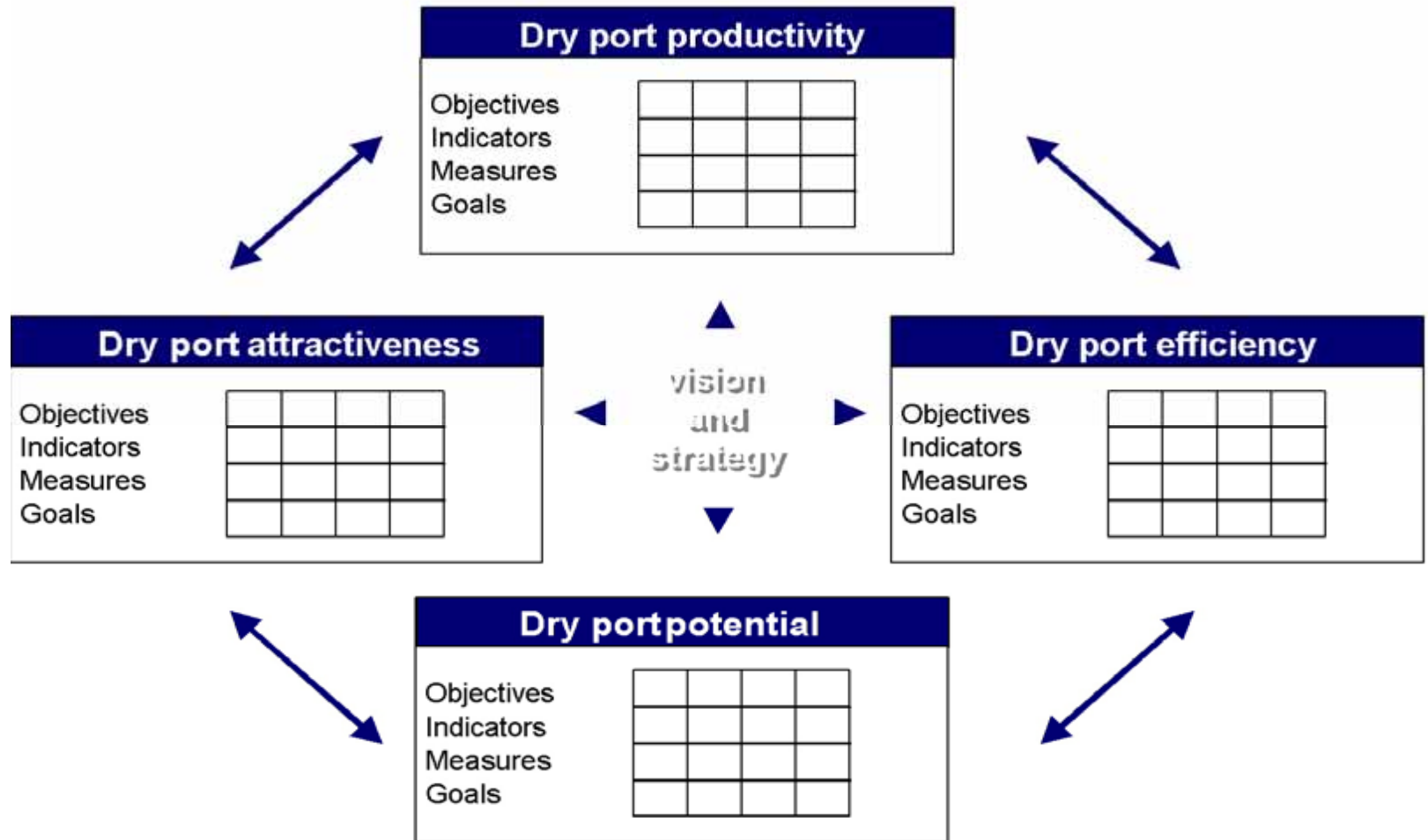


Figure 6.1: An example of how a balanced scorecard could look like.



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For the sustainable balanced scorecard the following vision and strategy is assumed. Strengthening regional and national development and welfare by dry ports, by this, the following objectives are taken into account:

- improving transport-related infrastructure,
- improving economic infrastructure and services,
- increasing foreign direct investment,
- improving financial and economic situation,
- improving sustainable development.



6.3 Examples of the Dry port balanced scorecard

On the following pages examples are given for each evaluation criteria, integrated into the sustainable balanced scorecard of a dry port. The defined indicators and measures should be regarded as examples of how the dry port can develop its status within each of the four perspectives of productivity, attractiveness, efficiency and potential.

<u>Competitive strength</u>		
Dry port productivity	Indicators	Returns profit to the companies at the dry port.
	Measures:	Infrastructure, subsidies, services
Dry port attractiveness	Indicators	Number of customers, investors
	Measures:	Infrastructure, marketing, European platforms
Dry port efficiency	Indicators	Cooperation level
	Measures:	Development agency, eLogistics
Dry port potential	Indicators	Capacity loading, all relevant harbour facilities available
	Measures:	Area management, training programs, dry port development groups



<u>Economic environment</u>		
Dry port productivity:	Indicators	Tax receipts
	Measures:	Establishment policy, creation of corridors, intermodal supply chains
Dry port attractiveness	Indicators	Number of business and commercial relations
	Measures:	Creation of business relations, marketing, communication of capabilities, cooperation with other institutions and companies.
Dry port efficiency:	Indicators	Number of decision levels
	Measures:	Creation of business processes and administrative processes, eGovernment
Dry port potential:	Indicators	Working group activities
	Measures:	Implementation of working groups, public private partnership, logistics council
<u>Labour market effects</u>		
Dry port productivity	Indicators	Jobs, development of the region in general
	Measures:	Job exchange, spin offs, multipliers
Dry port attractiveness:	Indicators	Wage levels
	Measures:	Organisational development, staff development
Dry port efficiency:	Indicators	Hits jobs exchange
	Measures:	Job firms, exchange of employees
Dry port potential:	Indicators	Training jobs, courses
	Measures:	Create cooperation business education, dry port development groups



<u>Ecological impacts</u>		
Dry port productivity	Indicators	Emission reduction levels
	Measures:	Strategic environmental program, waste management concepts
Dry port attractiveness:	Indicators	Intensity of communication activities
	Measures:	Ecological reporting, green sponsoring, less congestion in inner city areas
Dry port efficiency:	Indicators	Number of information points
	Measures:	Environmental information systems
Dry port potential:	Indicators	Annual improvement rate
	Measures:	Environmental management and audit scheme, green training courses.
<u>Social and human resources development</u>		
Dry port productivity	Indicators	Number of sick persons, expenses for social sponsoring
	Measures:	Strategic social program
Dry port attractiveness:	Indicators	Intensity of social activities
	Measures:	Social reporting, participating in Agenda 21 activities
Dry port efficiency:	Indicators	Number of contact persons, existence of a supporting business process
	Measures:	Social information systems
Dry port potential:	Indicators	Training jobs, courses
	Measures:	Qualification programs, participating in dry port development groups

Figure 6.2: A dry port score card in its fully version

The scheme on figure 6.2 is one approach to how the possibilities of the dry port can be analysed. Another approach how to investigate the possibilities of the dry port concept in the Baltic Sea Region is a feasibility study. The preliminary investigation for such is shown in the next chapter.



7. Pre-feasibility study of Dry Port Functions in the BSR

This chapter is based on the pre-feasibility study of dry port functions in the Baltic Sea Region. Here the focus points, on which the dry port concept feasibility study would be focused, are discovered. The important steps in the feasibility study are extracted and shortly explained. In the second section of this chapter the analysis of the possibility of introducing the dry port concept is made, based on the results of the questionnaire which was sent to the transport operators in the Baltic Sea Region.

7.1 Introduction

In 1990 the British professor Anthony Beresford and the Indian professors RD Dubey published a handbook with the title “Management and Operation of Dry Ports”. In this they stated some different aspects, which should be considered before initiating the dry port concept in an area. These aspects concerning the area to develop into a dry port encompasses:

- The type of facilities that costumers will require
- The initial volume of goods
- Estimated volumes for a ten year horizon

Regarding the first mentioned point, the questionnaire analysis send out in connection with WP1, has shown that the customers especially focuses their demand on the availability of special services at the dry port and the possibility to perform the customs clearance already at the dry port area. But in general it can also be concluded that the dry port should supply almost all the services, which are available at the seaport areas in order to fulfil the needs of the customers.



Regarding the second and the third point, such analysis can be conducted by analysing the present structure and then project how the future estimated volumes of goods would be based on the results of the former years.

Regarding the location factor Beresford and Dubey list the following factors to take into consideration:

- Traffic flows between centres of production, consumption and the ports.
- Transport infrastructure in the vicinity of the site.
- Modes of transport available and network capacities.
- Existing auxiliary transport related services in the vicinity of the site.
- Possible reduction in tonne-km by road transport with the introduction of the dry port.
- The actual functions of the dry port, such as road haulage, stuffed and empty container storage, shunting customs clearance etc.
- Scope for future site expansion.

Before starting the process of initiating more dry ports in the Baltic Sea Region it would therefore be a good idea to follow some of these advices, and in this way build the development of the dry ports on well-proven ideas for how to handle this phase of the development. A dry port might as well be an already established transport centre, which by offering facilities like custom clearance, warehousing and other harbour related issues, can be regarded as a dry port.

7.2 Content of the feasibility study

One of the ideas behind conducting a feasibility study is based on the approach that the market is not always in its optimum, like many neoclassical economists would believe it is. It will therefore often be possible to find better and more effective solutions than the present. This is also applicable within the goods transport area.



The feasibility study of the dry port concept should focus on the following:

- Figure out the best solution under the existing market design/conditions. – *Is it possible to create added value by developing the dry port in a given area?*
- Localise the technically potential “best alternatives” and thus also take technological development possibilities into consideration.
- Localise institutional and economical conditions that are hindering the development and implementation of the dry port concept.
- Design Public Regulation Measures that removes the innovation obstacles under pt. 2. This could encompass: tax structure, possible subsidies to dry ports, technological assistance, introduction of ICT, etc.

The feasibility study of the dry port would therefore include a few preliminary steps in order to be structured in the most comprehensive way. In table 7.1 below are shown three important steps for the feasibility study.

Table 7.1: Important steps in a feasibility study

Step I	Step II	Step III
What should be studied? (Alternatives) For whom should it be studied? Why should it be studied? Which time horizon should be used?	How should it be studied? (The Diamond E analysis)	Implementation of the feasibility study

The first step is to figure out what should be studied. In general there will always be two or more alternatives, which should be analysed. In this case it would for instance be the development of the dry port concept versus a continuously development of goods handling areas at the harbour front.



For whom it should be studied is also an important issue. Here there are three opportunities. 1) A feasibility study for a specific firm normally referred to as business economic feasibility study. 2) A feasibility study for the society in general, usually referred to as a socio economic feasibility study and 3) A feasibility study for other organisations.

Regarding the development of the dry port concept it could be an idea to conduct both a business economic and a socio economic feasibility study and in this way consider more aspects in the analysis.

The why question is focusing on which problems the dry port development should solve. This would in this regard be issue like, congestion, environmental and spatial problems, etc. See section 4.4 for more related issues to consider.

Regarding time plan it is often a good idea to deal with both long-term and short-term effects of the project. In this way more expected effects would be taken into consideration.

Step II in the feasibility study is to make the Diamond-E analysis. The purpose of this analysis is to identify, which consequences of a project the feasibility mainly should focus on. On figure 7.1 is shown the diamond E model.

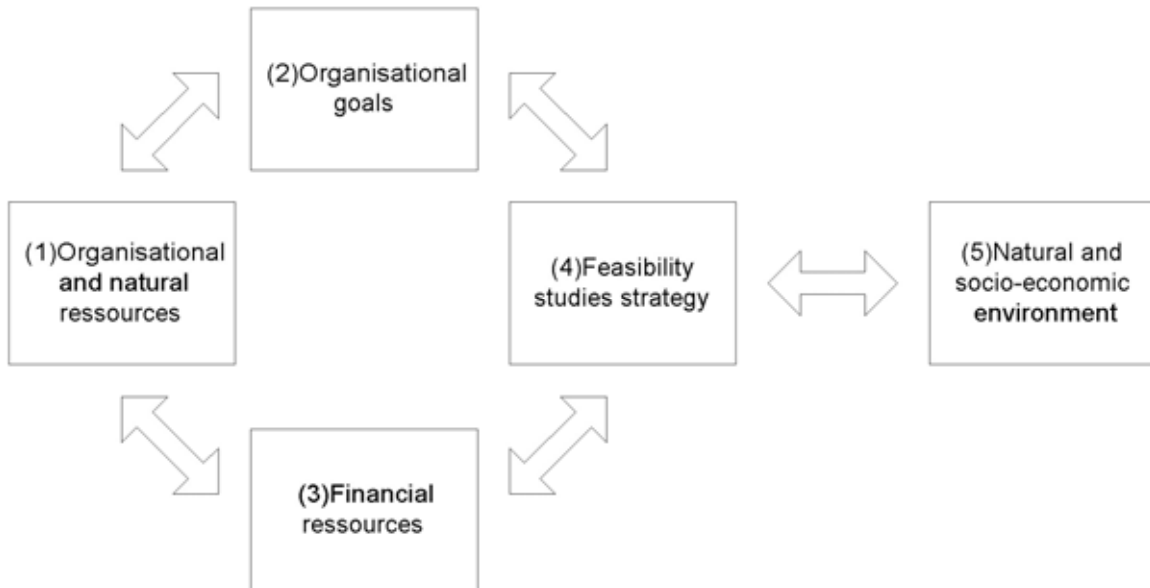


Figure 7.1: The Diamond-E-analysis-model

Organisational and natural resources

In order for the dry port to function, it is important that workers with good skills and knowledge are available. Here it should be stated that people with a working knowledge of at a logistics centre, also would be able to work at a dry port, because similar qualifications and skills are required.

Organisational goals

A feasibility study must naturally focus on the goals that the project investor has stated. If these goals encompass demands for transport work minimization, effective transport chains, job creation, environmental sustainability, etc. Then the feasibility study should naturally focus on the effects within these areas. The goal could as well be to create an added value within a short-term period; if that is the case then the focus should be this.

Financial resources

Before designing a feasibility study, a preliminary profile of the financial opportunities and problems in the case region should be analysed. As stated earlier a part of this could



be to analyse the amount of goods at present stage, but also to make an estimate of the future amount of goods passing through the region. In this way it is figured out whether there could be or already are a need for developing a new concept.

Feasibility study strategy

All of the above mentioned steps will in inter-relationship make sure that a strategy for the completion of the feasibility study will be made. Each feasibility study needs to be tailored to the specific case. In this way each study will be unique.

Natural and socio-economic external environment

A complete feasibility study must furthermore relate to the external socio-economic and environmental impacts that can be expected by the development of the dry port concept. Therefore it will be a good idea to investigate which demands regarding air pollution of small particles from diesel driven vehicles and green house gas emissions that possible will evolve in the international community. In this way the standards on these areas can be integrated in the planning.

These five steps will to a certain degree ensure that the feasibility is structured in a way where there will be a red thread in the planning of a possible new structure. After this the last step will be to implement the feasibility study.

During the feasibility study it would, seen from a macro economic perspective, be a good idea to make an estimation of the benefits of job creation in connection with the implementation of the dry port. Furthermore it would be a good idea to estimate the benefits with regard to environmental issues. In many cases a dry port would most likely, reduce the number of kilometres travelled by heavy vehicles and in this way create an environmental benefit for the area where it is introduced.



7.3 Analysis of the possibility of introducing the dry port concept

The attitude towards the dry port concept was also investigated in connection with the questionnaire analysis conducted under WP1. In this the respondents should assess whether it would be interesting for them to use hinterland terminals for their maritime transport. The answer to this question can to a certain extent indicate whether it at all would be a good idea to investigate the feasibility of the dry port concept in the Baltic Sea region further. Figure 7.2 shows how the respondents, which at the same time can be regarded as possible users of the dry port, distributed the answers to this question.

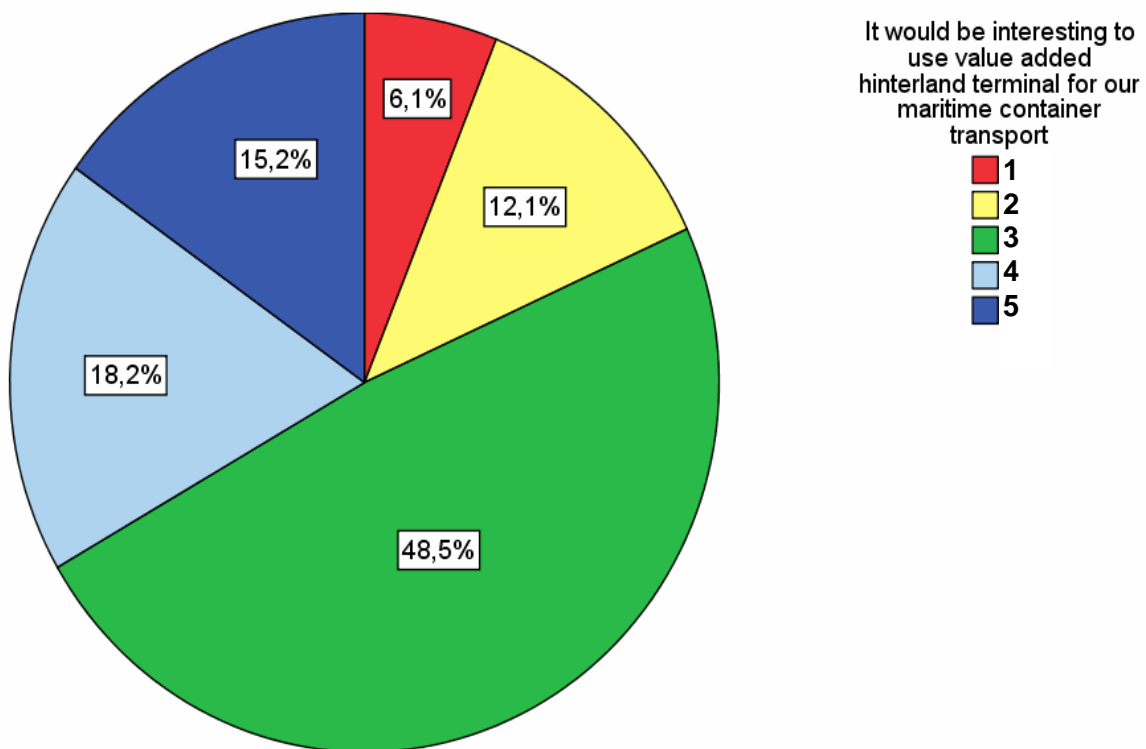


Figure 7.2: The attitude towards the dry port concept among the respondents in the Baltic Sea Region according to the scale 1 = not important, 5 = very important.

The study has shown that there is a positive attitude towards the dry port concept in the Baltic Sea Region. As it can be seen approximately 18.2% is negative about the concept



(the red and the yellow colours indicate that the respondents either strongly disagree or just disagree to the posed statement). Approximately 48,5% of the respondents are neutral towards the question and finally are 33% positive of the idea. In common this shows that there is a basis present in the Baltic Sea Region, for developing the concept of dry ports. Furthermore this shows that only a very small percentage is against the idea of introducing the concept of dry ports. But what might be most noteworthy is that a very large part of the respondent does not have a stance when it comes to the question of whether the dry port concept is a good idea.

This stage of the feasibility study therefore shows that the possibilities for developing the dry port concept in the Baltic Sea Region are present, but further investigations are necessary in order to analyse whether it would be a concept that would create added value to the Baltic Sea Region.

Before developing the dry port concept in a specific region, further analysis with regards to the above-mentioned aspects, with regard to the specific case region, have to be conducted. This could, depending on the size of the dry port facilities, be an Environmental Impact Assessment, which has to be conducted before the dry port development goes into its initiating phase.



8. Recommendations

With the present urban development, the harbour fronts in many harbour cities experience a development where the old industries are moving out and instead are replaced by office and residential areas. The harbour areas as they were known 20 years ago is in many cities therefore are not structured in the same way as they were in the past. The possibilities of expanding the harbour areas for industry purpose within the city boundaries is therefore not present in many cities in Europe. Furthermore the amount of traffic to and from the cities is increasing each year, what causes congestion especially in the morning and evening peak hours, and to some extent the traffic flow will decrease to a level where something has to be done in the affected cities, in order to keep the possibilities of competing with other harbours that are not located directly in the city centres or has developed other measures which makes them capable of avoiding congestion. This calls for a need for a new way of planning with concern to the handling of goods at the harbour fronts. It is here that the dry port concept supplies a possible solution to these issues. Of course the dry port in it self cannot solve all the problems related to traffic congestion and high renting prices, but it can supply better conditions for the transport of goods to and from the harbour, by moving a large amount of the working load to a dry port area outside the central city areas.

Concerning the dry port concept it is very important that the concept is developed only in regions where investigation has shown that there is a competitive advantage of developing the concept. This means that the dry port should contribute to added value, for instance by making a more efficient transport connection between site of production and site of destination in form of time reductions or by reducing the transport cost for the overall transport chain.



Developing the dry port concept could be a strategy for fulfilling some of the issues in the EU strategy for freight transport logistics. Here it is among others mentioned that the goals for the goods transport sector are:

- Promoting the sustainability of logistics and multimodal solutions.
- Addressing terminal efficiency
- Launching an exercise to identify “bottlenecks” for logistics

These are of course only some of the goals, but it is recommendable that the national transport policies try to fulfil these goals to the widest possible extent.

Three possible methods of analysing the potential of dry ports in a region are given in this report. (Interviews, Balanced Scorecard and Feasibility Study). Both the balanced scorecard and the feasibility study are methods for analysing the possibilities of developing the dry port concept in the Baltic Sea Region. Whether to use none, one or both of them is up to the project investor, but the more analysis there has been conducted in the preliminary phase, the better is the foundation for an eventual implementation. Furthermore interview analysis and questionnaire analysis have been conducted in order to investigate the attitude to the dry port concept.

All in all this has supplied the background for setting up a framework for the investigation of possible dry port developments in the Baltic Sea Region. A possible approach for how to manage the dry port development in the Baltic Sea Region could therefore be the one shown in table 7.2:



Table 7.2 five steps to undertake

	Five steps to undertake during the development of the dry port concept
Step 1:	Perform if possible a socio-economic feasibility study and a business economic feasibility study in order to investigate whether there is something to gain both for the society in general and for the investors.
Step 2:	Make an ex ante balanced scorecard concerning: attractiveness, productivity, efficiency and potential of a possible dry port.
Step 3:	Make interviews with possible interested parts. Such interviews have been performed during the making of this report and have showed that the possible users of a dry port especially would like to have functions like special services and custom clearance available at the dry port area.
Step 4:	Analysis of the possibilities of getting the needed permissions to load the goods to sealed containers or other transport units already at the dry port area.
Step 5:	Make preferably the dry port as a Public Private partnership. See the report " <i>Case study on financial and legal aspects of ports and logistics centre networks</i> " for further details.

By following this framework it should be possible to gather enough information of whether dry ports are a suitable solution within the development of the transport sector in the Baltic Sea Region.