C-4: Analysis of Horizontal, Organisational and Administrative Issues in Relation to MoS and SSS

C-4a: Periphery issues
C-4b: Investigation of integration bottlenecks
C-4c: Overcoming the economic crisis
C-4d: New intermodal solutions - combining containers and RO/RO

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Summary: This report is an umbrella report for the findings of the four WP C-4 reports. Introductions to the logic behind the four reports are briefly given, after which the report contents is compared with the latest policy development and needs concerning an enhanced Motorways of the Sea focus in Europe. Finally the full version of all reports are included in this umbrella report.

Indexing terms: Sea transport, Peripherality, ConRo ships, Port Information Systems, Economic Crises, Motorways of the Sea.

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Work carried out by:
FDT – Association of Danish Transport and Logistics Centres
Rogaland County Council
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Preface

The StratMoS project is a part of the North Sea Interreg IVB programme. The StratMoS project is in progress from January 2008 to September 2011 and has partners from Norway, Belgium, Denmark, Germany, United Kingdom and The Netherlands. Furthermore StratMoS partners remain in cooperation with partners from North-west Russia. This present Work Package C report has been developed and written by FDT- Association of Danish Transport and Logistics Centres with support from WPC partners.

The report consists of 4 chapters and 5 attachments.

Aalborg – 29th of November, 2010

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Kristiansand Workshop Report

1 Introduction

Motorways of the Sea (MoS) and Short Sea Shipping (SSS) concepts are associated with great value to all their stakeholders, but are still restricted by various administrative and organizational issues and bottlenecks, which impede smooth and seamless operations on sea as well as in the ports. It is the major focus of this report to select, analyse and give recommendations for some of these fields, thus increasing the potential efficiency of MoS and SSS.

This report is an “umbrella” for four stand alone reports which explains how they were developed, connected, and what the methodological approach behind them is.

Each of the four part reports focuses on different areas. Some of them relate to transport policy; some are conducted as a study or research, while some aim at providing benefits for selected industries. Thus all four report writers have been given free hands to follow their own method of working. At the different StratMoS meetings the content of each individual report has been discussed, but not its structure or approach, meaning that all the reports have their separate value and should be regarded independently.

This final WP C-4 report is based on data from all the involved partners, and will sum up the findings of the contributions in order to give a clear indication of what some of the organizational and administrative issues of MoS and SSS are, and how they can be addressed.

2 Methodology

The work on StratMoS WP C-4 was initiated during the Workshop in Copenhagen in March 2010. It was agreed that this activity C-4 should have a slightly different approach, compared to the other WP C activities and reports previously finalised (C-1, C-2, C-3 and C-5).

During the workshop FDT presented five topic areas under which the partners were required to take ownership, thus being involved in at least two of the topics. Initial topics as an outcome of Brainstorming for WP C-4 are presented in the Figure 1 and described below.

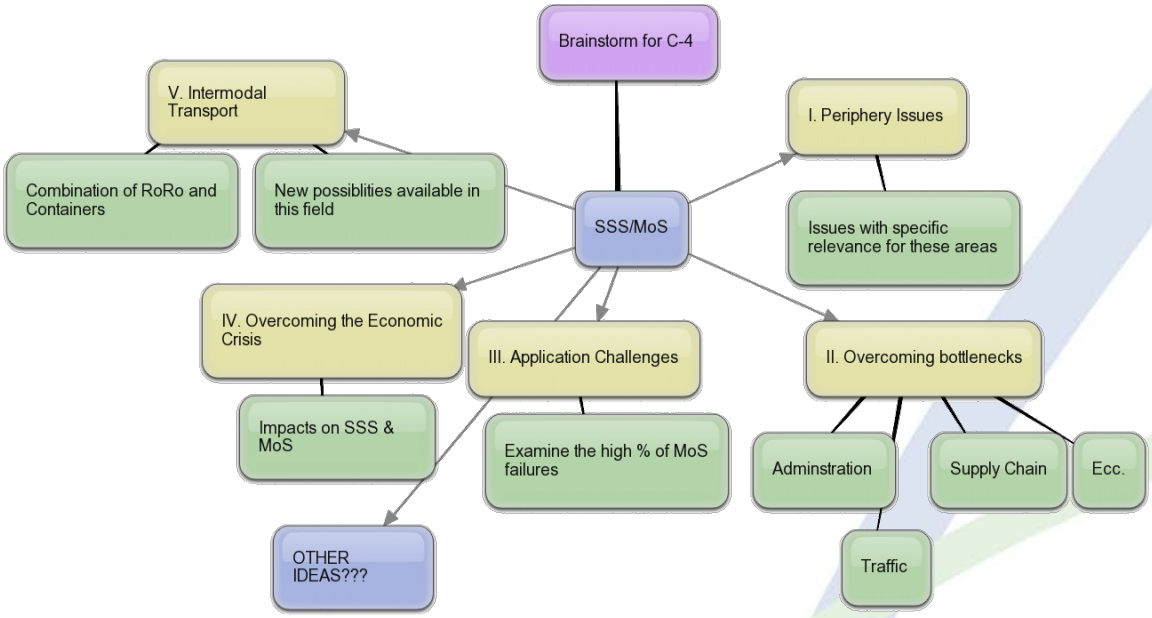

Figure 1: Initial C-4 topics (Brainstorming outcomes)

Periphery issues:

- Report focusing on the opportunities for EU financing schemes in peripheral areas of the North Sea Region.
- Sometimes the EU funding mechanisms are not suited for supporting transports in peripheral regions, due to many different reasons. Is this a problem or it is a fact that the people living in the peripheral areas have to accept?

Overcoming bottlenecks:

- The first three WP C reports have shown that there are vast opportunities in cooperation both between ports and with companies in the port hinterland, so why are companies within the transport industry so reluctant to share ideas and cooperate on e.g. shared intermodal solutions?

Application challenges

- Partners within the StratMoS project have several times submitted applications for EU funding (Marco Polo II). Each time the applications were rejected. What are the applicants' experiences with the application process and where would they like to see improvements in the help they can get when applying?

Overcoming economic crisis

- Report on how new ideas and concrete concepts, e.g. small accumulated improvements in efficiency and reduction of transport cost on a total transport chain, can lead to better competition, thus utilising that the crises situation opens up for new ways of logistics thinking.

New intermodal solutions combining containers and Ro/Ro

- Report investigating the possibilities for using Con/Ro ships in the North Sea region. The report could focus on a market analysis of Con/Ro possibilities in a number of countries around the North Sea. Could Con/Ro be a solution with higher chance of success than pure container routes and RO/RO routes?

After the workshop in Copenhagen those areas were reduced to four and the content of some of them was modified. For each of the activities a Lead Partner was chosen. Thereafter it was the responsibility of the Lead Partners of the topics to structure and undertake the analyses, with support and commitment from the other partners under each of the topics. The final Four WP C-4 topics, which we determined by the partners are:

- **C-4a: Periphery issues**
- **C-4b: Investigation of integration bottleneck**
- **C-4c: Overcoming the economic crisis**
- **C-4d: New intermodal solutions combining containers and RO/RO**

The outcomes are four stand alone reports (25-30 pages each) under the general title of ***"Analysis of organizational and administration issues in relation to MoS and SSS."***

3 Reports Summaries

This chapter contains the overview of main objectives and findings from the part reports. Each summary is supplemented by Lead Partner contact information and a list of partners participating in each specific task.

Each of the reports have primarily been written by the institution in charge of the report, but the other partners have, where applicable, helped with the making of the reports by commenting them, and by giving inputs, at different meetings and workshops.

Further details about each of the different part-reports, than the ones described in this contemporary report, can be achieved by contacting the specific StratMoS partner.

3.1 Periphery issues

Made by: **Rogaland County Council**

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4001 Stavanger
Norway

Other partners participating in this task:

- Aberdeen City
- Vest Agder
- Hordaland
- Aberdeenshire Council
- Troms County
- Napier University

3.1.1. Abstract

The aims of StratMoS sub work-package C-4a are to better understand the potential benefits of improved accessibility to peripheral areas and to propose criteria for peripheral oriented MoS TEN-T projects.
According to current TEN-T guidelines (Article 12a), the Motorways of the Seas (MoS) funding instrument should be awarded to infrastructure projects which aim to:

1. Reduce road congestion and/or
2. Improve access to peripheral and island regions and States.

The formulation 'and/or' implies that these objectives are equally important to the Commission. However, despite the opportunity to submit a peripheral based application under previous and current MoS calls, no such applications have been submitted to date. In practice there is a bias towards MoS funded projects promoting modal shift, and the Commission therefore has no experience with evaluating this kind of application. StratMoS sub work package C-4a has explored the rationale behind improving accessibility to peripheral areas, and some of the reasons for the apparent lack of peripheral based MoS applications.
In addition to being one of the key objectives of the Motorways of the Seas (MoS) funding instrument, improving accessibility to peripheral areas is linked to the Commission's overarching aims of territorial and socio-economic cohesion. Economic, social and territorial cohesion are formally adopted EU objectives stipulated by the Lisbon Treaty (Article 158), and are furthermore reflected in EU's inclusive growth strategy set out in Europe 2020.

The WP C-4a report discusses some of the factors which might be limiting peripheral based MoS projects, followed by a discussion of possible initiatives to encourage and facilitate peripheral based applications. It is argued that there is a need for a more strategic view of peripheral areas and call for a targeted funding mechanism. The need to reinforce the strategic position of peripheral areas on the TEN-T network is also reflected in the Annual Activity Report 2009-2010 for Priority Project 21 on MoS, which emphasizes the importance of islands as logistics platforms of Europe and calls for a dedicated aid system which is better suited to islands and ultra-peripheral regions.

The short term recommendations from this report are that future MoS TEN-T calls (from 2011 onwards) should be amended to better facilitate peripheral based applications. To this end, one of the main outputs from WP C-4a is a proposed set of criteria for peripheral based MoS TEN-T applications. The criteria put forward at this stage should not be regarded as absolute, but rather as criteria which could be considered to promote peripheral based MoS applications. The number of criteria is fairly large and would require scrutiny before they were adopted or applied. The long term recommendation is that greater coordination of the MoS TEN-T and Marco Polo funding instruments could contribute to strengthening territorial cohesion and accessibility of peripheral areas.

3.2 Investigation of integration bottleneck

Made by: **FDT - Association of Danish Transport and Logistics Centres**

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Other partners participating in this task:

- Rogaland County
- Flemish Ministry
- Port of Hamburg Marketing
- Norwegian Coastal Administration
- Port of Amsterdam

3.2.1. Abstract

The research focus

Presently the largest European ports are operating advanced information systems, which creates great competences and efficiency benefits when managing the transport and logistics flows in the given port and towards the hinterland of the port. In spite of this, the interoperability between different ports and different information systems used in the ports is almost absent, which is limiting the possibilities for integrating new joint services and creating economies of scale. The majority of the small ports have no electronic data transmission in general, and that creates a lack of integration between the smaller and larger ports. Generally for each port call, shipping companies have to provide the same data repeatedly and often manually, which results in repetitiveness, errors and ineffective information transactions (E-Maritime.com, 2010). Such problems within the information sharing system between the port and hinterland connection as well as communication within and between the ports could be addressed as an integration bottleneck. This bottleneck is linked to the problems, which exist within the port and hinterland operation on different levels, and requires special attention. Hence the major objective of the report is focusing on the investigation of the integration bottleneck.

This bottleneck is defined as a main problem concerning integration of all the modes of transport in the logistic chain. The major concern about this bottleneck is hidden in the low exchange of information or documents with some of the participants of the transport chain, as well as lack of systematic and up-to-date information on origin/destination cargo flows in the door to door transport chain. This topic creates an opportunity to investigate whether selected North Sea Region ports want to cooperate and create a common information sharing systems, which will contribute to the port cooperation activities and will strengthen relationship bonds between the ports and authorities. Therefore the objective of the research could be expressed as following:

Investigate what factors can foster development of the information sharing systems on the regional and international level and how comparison of already existing systems in the NSR can determine those factors.

Research methods

To answer this question we have investigated the different practices applied by ports within the information sharing systems, their advantages and disadvantages, as well as opportunities for cooperation on the regional and international level. Based on the objectives and goals of the report the data collection methods for this research include *secondary data analysis, brainstorming,* as well as *interview* conduction. By reason of the large number of ports located around the North Sea Region, this report has only focused on a selected number of ports. Ports have been selected based on consultations with members of StratMoS from each of the countries – Norway, Germany, Denmark, Belgium, and Netherlands. The ports chosen are based on the presumption that they represent an important port, which could prove vital in developing a stronger cooperation network in the North Sea Region and which have the capacity and ability to create viable information sharing alternatives**.**

The results/findings of the research

Bringing up the general conclusion of the analysis several statements could be addressed, however the major concern could be expressed regarding the legal structure and type of ownership of the systems. While looking at the structure description of each system a majority of them have the same background for the establishment: *more efficient flow of information and security of the port operation*. The same is concerning the major users as well as the services provided within the system. There are quite a few differences within the functional, business as well as the legal structure of the systems. The business structure of the systems varied from the private to public, as well as to the mixed ownership of both during the discussion. This factor makes it hard to generalize and create one single conclusion. What is more, there was quite a big difference within the legal structure of the system operation. Some of the ports are working under the specifically issued regulations, which make the use of the system mandatory, when the rest is operating on a voluntary basis. Concerning the advantages and disadvantages of the

system, a great variety of both has been discovered. Future investigation of the drawbacks of the systems could be seen as potential step within the development. Moreover, the cooperation questions have been discussed throughout the analysis. It could be clearly seen that all the ports are willing to cooperate and share the information on a certain level. However, some major obstacles that prevent this cooperation have been also discovered throughout the analysis.

Recommendations

Answering the question on *what factors can foster development of the information sharing systems on the regional and international level* several ideas were generated after the implementation of the analysis. A good and potential point that should follow up by the practical results in the short period could be determined by the framework created by the e-maritime initiative and the latest results of the research project MARNIS. Another angle for potential cooperation and improvement of the system integration could be evaluated from the legal perspective. After the preliminary review of the analysed sections of the report, the emphasis should be put on the legal issues concerning the information system operations. The legal structure of the systems might be the one to foster the regional and international cooperation through future coordinated EU policy initiatives.

3.3 Overcoming the economic crisis

Made by: **TUHH** - Technical University Hamburg-Harburg

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3.3.1. Abstract

The study contains a literature review on the consequences of the 2008/2009 economic crisis in seaports and their reactions. Especially a strong focus on long-term strategies and environmental management were mentioned in most of the publications as a necessary and/or actual strategy. According to several authors, seaports have to work on their public image and improve transparency and accountability in finance and performance measures. In the second part the study analyses the performance of 67 North Sea ports during the economic crisis. A cluster analysis identified six different clusters regarding the development of turnover rates development from the second quarter in 2008 to the latest available dataset in the third quarter of 2009. Even if in October 2010 - at the time of writing - indications are good that the crisis is overcome, this study only had data available until the third quarter of 2009. The possible ending of the crisis is thus not discussed; the survey refers only to the time of the crisis.

Two of the six clusters showed a good or stable growth performance, two a decreasing trend and two a strong downturn in turnover during the crisis. The continental cargo flows, the trading partners within Europe and the cargo types of the different clusters were identified as the main factors relating to performance.

A connection between the location of the port and its performance could not be found.
The comparison of incoming cargo flows indicated that connections to Asia were associated with a positive development, while connections to North and South America had a negative one. Outgoing flows showed also a positive Asia-effect but no other dependencies could be found. For both directions and all clusters Europe was always the most important trading partner. A weak link could be found between a positive performance and a higher share of outgoing cargo volumes relative to total turnover.

The examination of the trading partners within Europe showed that incoming cargo flows from Russia,

Denmark and France had a higher share in better performing clusters and the Netherlands and Belgium in the weaker performing clusters. For outgoing cargo flows no specific observation could be made because all clusters showed a high variance in destination countries. The comparison of the different cargo types per cluster brought to light that ports mostly handling liquid bulk showed a better performance in the crisis than ports handling mostly dry bulk. A higher share of incoming and outgoing container cargo was also associated with a positive performance. Ro-Ro shares were found equally in differently performing clusters so that no clear association could be identified.

Even if the method only detects some general reactions and tendencies of a group of seaports in the crisis, the approach has the potential to be developed further and to be applied on any set of seaports in the future. A more specific application would also mean an adjustment of categorizations and driving factors to be analyzed.

3.4 New intermodal solutions combining containers and RO/RO

Made by: **Hafen Hamburg Marketing e.V.**

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3.4.1. Abstract

This study highlights the theoretical possibility of introducing ConRo services as a new mode for short sea traffic from North Sea ports to the Baltic Sea regions.

ConRo is the combined transport of container and RoRo cargo with a new ship class, called ConRo Vessel. Transport by ConRo vessels offer a better profitability as simple RoRo transports. The potential RoRo cargo volume for North Sea ports in the Baltic Sea regions was estimated up to 30 mill. t per year. As container volumes already exist and transports are executed, they were not included in this study. On basis on a fictive route between Hamburg and Helsinki, the profitability of ConRo services was calculated in comparison to existing RoRo services between Travemünde and Helsinki within the Baltic Sea region.

The result of this example shows that both - the profitability as well as the sustainability - is higher with ConRo services. ConRo services could be an interesting option for the North Sea ports to enter or open new RoRo markets also within the North Sea. ConRo ships can operate in existing or potential new short sea connections more efficient than normal RoRo ships. A strengthening of short sea traffic by more efficient means of transportation is in accordance with the European policy to shift traffic from road to sea.

4 Reflections on reports

All reports briefly described in the previous sections and presented in full scale in the forthcoming chapters, reflect some of the most important trends in MoS shipping seen from both political and business angles.

The problems addressed and analysed by the WP C-4 partners are to a strong degree in line with the most critical topics which are mentioned in the **"Annual Activity Report 2009-2010 for PP21"** by TEN-T MoS Coordinator Luis Valente De Oliveira and which needs to be addressed during the years to come. The overview of recommendations provided in the Annual Activity report on MoS and how they to some extent are addressed by the WP C-4 reports is presented below.

The first group of recommendations for European MoS support priorities reflected:

- Better articulation and coordination of the different funding frameworks;
- Update of the TEN-T guidelines, "integrating the lessons of the new practical experiences and benchmarking";
- Improved hinterland connections, "development of the missing links and value added links in the door to door transport chain integrating sea legs".

The same challenges can be found in the WP C-4a report on peripheral issues. Thus, WP C partners hope that the findings and solutions from this report can influence the political situation, thus ending up with EU and national funding schemes focusing more on peripheral regions and the development opportunities here. Therefore the findings should be widely disseminated on political level to inform about the current funding obstacles in receiving funding as peripheral region. A first step in this direction is taken by presenting the WP C-4a report for the North Sea Motorways of the Sea Task Force, who among other are in charge of the calls for proposals for TEN-T Motorways of the Sea and therefore has a high impact on the final decision on who should receive TEN-T MoS funding.

The second group of recommendations from the MoS Coordinator concerned:

- Deployment and wider use of integrated and intelligent infrastructure services and information systems for increased safety, security, control and ease of tracking and tracing.

Those needs were investigated and assessed within WP C-4b report. They were called an integration bottleneck and analysed on local, national and international levels. Important conclusions and valuable recommendations of this report are expected to stimulate cooperation on various levels and boost information exchange.

The third group of recommendations intends to:

- “Promote activities and launch studies to better understand how to help the sector”;
- “Identify “trade patterns within the internal European market”;
- “Develop geo-strategic studies addressing the maritime connections of Europe with its main trade partners in the world”.

These issues were partially included in the WP C-4c report on the overcoming of the economic crisis. The clustering method applied in this report aimed at understanding which ports suffered the least from the crisis and thus have the best opportunities to overcome it.

Finally, the forth group of recommendations suggests looking at:

- Technological development in ships and equipment “with reduced emissions, increased safety and environmental friendliness”.

Thus, the research and industry should work together on developing new solutions. One example of practical approach taken in WP C-4 is ConRo ships described in the WP-C4d report. Their detailed cost-benefit analysis and overall advantages are presented as a real and feasible solution for the shipping industry.

In overall the topics addressed in the four reports have enhanced the integration between Work Package C and the different StratMoS demonstration projects, thus focusing on the transnationality in the working methods and how to address important aspects with influence on seamless intermodal transport.

Periphery Issues

Report on StratMoS WP C-4a

Rogaland County

The Interreg IVB North Sea Region Programme

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1 BACKGROUND TO THIS PAPER

This paper has been prepared as part of the StratMoS project, which is funded by the EU and the Norwegian government through the Interreg IV B North Sea Region Programme. The core aim of StratMoS is to promote and facilitate shift of cargo from road to seabased intermodal transport, and to improve accessibility within the North Sea Region by supporting the implementation of Motorway of the Sea (MoS) and related transport networks in an integrated logistical chain. The current paper has been prepared under StratMoS sub work-package C-4a, which aims to better understand the potential benefits of improved accessibility to peripheral areas and to propose criteria for peripheral oriented MoS TEN-T projects for the North Sea Region.

According to current TEN-T guidelines (Article 12a), the Motorways of the Seas (MoS) funding instrument should be awarded to infrastructure projects which aim to:

1. Reduce road congestion and/or
2. Improve access to peripheral and island regions and States.

The formulation 'and/or' implies that these objectives are equally important to the Commission. However, despite the opportunity to submit a peripheral based application under previous and current MoS calls, no such applications have been submitted to date. In practice there is a bias towards MoS funded projects promoting modal shift, and the Commission therefore has no experience with evaluating this kind of application.

In addition to being one of the key objectives of the Motorways of the Seas (MoS) funding instrument, improving accessibility to peripheral areas is linked to the Commission's overarching aims of territorial and socio-economic cohesion. Economic, social and territorial cohesion are formally adopted EU objectives stipulated by the Lisbon Treaty (Article 158), and are furthermore reflected in EU's inclusive growth strategy set out in Europe 2020.

The work under StratMoS sub work package C-4a has explored the rationale behind improving accessibility to peripheral areas, and some of the reasons for the apparent lack of peripheral based MoS applications.

This report discusses some of the factors which might be limiting peripheral based MoS projects, followed by a discussion of possible initiatives to encourage and facilitate peripheral based applications.

2 FACTORS LIMITING MOS APPLICATIONS FROM PERIPHERAL AREAS

This chapter discusses some of the factors which might be limiting peripheral based MoS projects, focusing on aspects of current application and evaluation procedures for North Sea MoS applications.

2.1 Factors limiting peripheral based MoS applications

Based on a review of background documents for the MoS regime, some of the factors which might be limiting peripheral based MoS applications have been identified (Box 1). A brief overview of each point is provided in the following text.

Box 1: Factors limiting MoS applications for improved access to peripheral areas

- Unclear status for applications seeking only to promote access to peripheral areas
- Less availability of tools and methods for assessing socio economic cohesion & accessibility benefits compared to modal shift
- Evaluation criteria are less specific for socio economic cohesion than for modal shift
- Limiting eligibility for MoS funding to Category A seaports may restrict applications from some peripheral areas

2.1.1 Unclear status for peripheral based applications

The TEN-T guidelines (Article 12a) state that the main objectives of MoS is to reduce road congestion and/or to improve access to peripheral and island regions. The formulation 'and/or' implies that the MoS funding scheme can be used for projects promoting access to peripheral areas even if those projects do not promote modal shift, and vice versa.

A subtle, yet important discrepancy can be observed in the evaluation criteria and checklist for proposals (Annex II of the call for MoS projects from Nov 2009), where it is stated that applications must contribute to cohesion/ accessibility and to modal shift (as opposed to the 'and/or' used in Article 12a).

Based on the evaluation criteria and checklist for proposals under the 2009 call, it would appear difficult to justify an application for MoS projects based only on the objective of promoting access to peripheral areas.

We therefore conclude that the bias in favour of MoS applications aimed at promoting modal shift is not an intended priority/ aim of the TEN-T guidelines, but rather a consequence of the way in which specific calls for MoS applications have been formulated.

2.1.2 Evaluation criteria and tools for assessing socio-economic cohesion

The MoS call from 2009 requires applicants to specify both the projected modal shift from road haulage in tonne-kilometers (applicants are advised to use the Marco Polo modal shift calculator)[1] and to 'identify' socio-economic cohesion and accessibility benefits[2] (Box 3).

The specification of these requirements differs greatly in terms of clarity and practicability: the requirement for calculating tonne-kilometers is clear and unambiguous, whereas the requirement of 'identifying' socio-economic cohesion is to a far greater extent open to interpretation (which aspects require consideration, and to what level of detail?). In addition, there is no reference to the tools or methodology that should (or could) be used for the assessment of accessibility when developing MoS applications.

The discrepancy in clarity between the definitions of these two requirements, combined with far more readily available tools for assessing modal shift, is likely to have led to both applicants and assessors placing more weight on modal shift, with the result that cohesion/ accessibility in practice has become a secondary consideration in MoS applications.

Box 3: Extract from the checklist for the evaluation of project proposals

November 2009 call for MoS projects

3. Contribution to cohesion/accessibility and to modal shift based on the characteristics of the traffic (SSS, rail, road) involved (e.g. frequency and regularity, transport costs, safety and security).

3.1 Modal shift generated.
Projection of modal shift (in tonne-km): . . . . .
Estimates go until _ 2013 _ 2020 _ Other: … _ Not clear

Contribution to congestion reduction in the regions involved?
_ Yes _ No _ Not clear
Remarks: . . . . .

3.4 Contribution to cohesion: socio-economic cohesion (peripheral areas and islands) and cohesion in terms of accessibility, frequency of service, reduction of travelling time.

Are aspects of socio-economic cohesion present in the project proposal?
_ Yes _ No _ Not clear

Are accessibility benefits present in the project proposal?
_ Yes _ No _ Not clear Remarks: . . . . .

2.1.3 Eligibility of peripheral seaports

In the recent responses of the North Sea Commission and the CPMR to the EU consultation on the TEN-T Green Paper, there is a recommendation to broaden eligibility of applicants from Category A ports to small and medium sized ports. This issue has previously been

[1] Paragraph viii p 5 of the November 2009 call for MoS projects
[2] Paragraph x p 6 of the November 2009 call for MoS projects

raised in the report from the NMCII-project in 2008, where there was a suggestion that clusters of smaller ports adding up to Category A should be eligible for MoS funding, even if none of them separately qualified for A-status.

The fact that MoS eligibility is limited to Category A ports might be restricting some peripheral areas from submitting an application to the MoS funding scheme. This should nevertheless not be regarded as the main factor limiting peripheral based applications for MoS funding, as there are peripheral areas which also contain Category A ports (e.g. Aberdeen) but which have not submitted peripheral based applications under the current funding scheme.

Box 4: Characteristics of seaports

Section 5, Article 12.2, TEN guidelines 1996

The seaports included in the network shall correspond to one of the categories, A, B or C, defined below:

A. international seaports: ports with a total annual traffic volume of not less than 1,5 million tonnes of freight or 200 000 passengers which, unless it is an impossibility, are connected with the overland elements of the trans-European transport network and therefore play a major role in international maritime transport;

B. Community seaports, not included in category A: these ports have a total annual traffic volume of not less than 0,5 million tonnes of freight or between 100 000 and 199 999 passengers, are connected, unless it is an impossibility, with the overland elements of the trans- European transport network and are equipped with the necessary transshipment facilities for short-distance sea shipping;

C. regional ports: these ports do not meet the criteria of categories A and B but are situated in island, peripheral or outermost regions, interconnecting such regions by sea and/or connecting them with the central regions of the Community.

3 KEY CHALLENGES AND POTENTIAL SOLUTIONS

3.1 Key challenges

The Commission currently has no framework for assessing the quality of future periphery based MoS applications, and they have no criteria for weighing a periphery based application up against cargo shift based applications.

In order to arrive at functional criteria for assessing peripheral based MoS applications, peripheral challenges have to be more closely defined. One aspect is the issue of periphery within a country in contrast to periphery between regions in Europe. Another aspect is the periphery – centre relations. For the latter there is both a competition element where the traditional ”subsidy syndrome” to the periphery is inherent, but also a dependency element that asks for a win-win situation.

The key challenge is therefore to understand the potential benefits of improved accessibility to peripheral areas, and to develop criteria for good MoS projects (Box 2).

Box 2: Key challenges for peripheral based MoS applications

- No specific **framework** for the Commission to **assess the quality** of periphery based applications
- No **criteria** for weighing a periphery based application up against a cargo shift based application
- The key challenge is to **understand the potential benefits** of improved accessibility to peripheral areas

3.2 Facilitating peripheral based MoS applications

Through two workshops, the Stratmos partners involved in work package C-4a explored the rationale behind improving accessibility to peripheral areas through a discussion around the following issues:

- What is the definition of 'peripherality' in this context?
- What is the justification for support to peripheral regions?
- What does 'improved accessibility' mean in the context of MoS?
- What are the bottlenecks for increasing the volume of freight in peripheral ports?

The discussions around these issues were documented in workshop minutes and formed the basis for the development of a checklist as described below. Some of the main points of the discussions are summarised below.

3.2.1 What is the definition of 'peripherality' in this context?

Peripherality can be defined in terms of a range of issues e.g. geography, political geography, cargo/ industry, population, raw materials, transport nodes, cost of connection, long travel time from main population and economic centers, low concentration of population and economic activity, time to reach areas etc.

The interpretation of what constitutes a 'peripheral' area will most likely vary in different parts of Europe e.g. what is considered 'peripheral' in Zeebrugge will be different to what is considered 'peripheral' in Aberdeen.

Peripherality within a country can be relevant (e.g. particularly in the northern countries), but the peripheral area must be connected to a (peripheral or non-peripheral) port in another EU member state in order to be of interest to the Commission (i.e. not just to the rest of the country where the peripheral port is located). Peripherality in an MoS context must therefore be defined with reference to the existing European maritime transport network.

The concept of a 'core network' is not yet established, but looks likely to incorporate areas covered by TEN-T priority projects. Once established, it is possible to envisage the core network as an 'envelope' of heavily trafficked passenger and cargo routes between the larger ports and capital cities. **Peripheral areas could then be defined as areas outside the core network**. Under this definition, funding for peripheral MoS projects could be targeted toward improving transport services between areas on the comprehensive network and outside the 'envelope' of the core network.

Some peripheral areas which are not on the comprehensive network would benefit from increased accessibility, and the definition of peripherality should not exclude these areas. The MoS funding scheme should enable investment in medium sized areas which currently fall foul of the existing criteria (e.g. the 'next level down' from ports such as Esbjerg and Zeebrugge), and not simply because an area is remote.

One possibility would be to define all areas that are not connected to the comprehensive network as peripheral. However, this would require a distinction to be made between peripheral ports which should be supported and 'remote outposts' that are currently unconnected. In other words, distance alone is not a sufficient measure of peripherality.

In conclusion, the definition of peripherality requires a distinction between the **dense/core part** of the European maritime transport network**, peripheral parts within important national regions,** and **'remote outposts'.**

3.2.2 What is the justification for support to peripheral regions?

The main justification for improved accessibility to peripheral regions is embedded in EU objectives relating to economic, social and territorial cohesion as formally stipulated by Article 158 of the Lisbon Treaty, and is furthermore reflected in EU's inclusive growth strategy set out in Europe 2020.

Territorial and socio-economic cohesion should be a key criterion for peripheral based MoS applications, and requires further definition to make it easier for prospective applicants to adhere to. Job creation might be one aspect of socio-economic cohesion.

Justification for support to peripheral regions should ideally also reflect benefits for the Community as a whole, not just the peripheral areas themselves. For example, improved links between peripheral areas have the potential to reduce congestion in dense/core areas of the European transport network. In this regard it could be more beneficial to link peripheral areas to other peripheral areas than linking a peripheral area to an already congested node.

As MoS is not just about networks between ports but also connections to the hinterland, one way of selecting which ports would benefit most from improved accessibility could be to promote those ports with well connected hinterlands.

3.2.3 What does 'improved accessibility' mean in the context of MoS?

Improved accessibility in the context of peripheral areas can be described as improved reliability and frequency of transport to a region compared to what there is today. For areas where there are low volumes of cargo and where the community has a need for improved accessibility e.g. to improve employment. The main issue is **increased volume** – however the way in which this will be achieved will vary from port to port e.g.:

- In the case of fish transport between Stavanger and Kristiansand it is the infrequency of shipping routes between Stavanger and Europe which is the limiting factor.
- In the north of Norway there is a threshold for competitive seafood transport of approximately 60 hours. In this case freezing technologies/ cooling mechanisms are the limiting factors, and may be eligible for MoS funding.

New or improved route options could also be a way for projects to improve accessibility. This could imply reduced travel time, costs etc. Reduced transport costs for cargo should be seen in the context of the cost of alternative transport options into the peripheral region. There will be a need for applicants to prove that total benefits outweigh the costs.

3.2.4 What are the bottlenecks for increasing the volume of freight in peripheral ports?

Fluctuating traffic volumes is a challenge for all MoS applications, but even more so for areas with low overall traffic volumes which is often the case in peripheral areas.

Increased volume can be achieved by:

1. Growth in the region – this is a more long term issue
2. Competition with other ports and the shifting ('stealing') of volumes
3. Redirecting cargo flows/ major traffic

Redirecting cargo flows could be difficult for many peripheral areas. Looking for funding gaps to start brand new services would require a lot of subsidy until it is proven whether a new route can be feasible. Criteria should therefore be about how to sustain and improve efficiencies in existing cargo volumes.

Smaller routes would never be able to compete with big routes/ projects on tonne kilometers. Peripheral issues are so different from tonne kilometers that we need a particular framework for this.

It is a basic requirement that infrastructure facilities funded under TEN-T should be open to all. Whether the project is open for public use should therefore be regarded as an eligibility criteria for TEN-T applications. An important question will therefore be whether the project is open for wider use, whether it promotes sharing, and whether it enables others to piggy-back e.g. a single user terminal operated by one company or a public use terminal. This could also relate to port facilities e.g. RO-RO ramps.

One potential obstacle/bottleneck is the fear of monopoly – e.g. single use, which is more of a risk in peripheral areas where there are fewer users.

3.3 Short term recommendations

The objectives and criteria for MoS applications in the existing North Sea Open Call do not appear to sufficiently facilitate or encourage applications aimed at improving access to peripheral areas, which is one of the main objectives of the MoS funding instrument according to current TEN-T guidelines Article 12a.

We argue that there is a need for a more strategic view of peripheral areas and suggest that future MoS calls under TEN-T (from 2011 onwards) should be amended to better facilitate peripheral based applications. To this end we have suggested a revised checklist which would facilitate the development and evaluation of periphery based project applications. Suggested amendments to the existing checklists are put forward in Chapter 4.

The need to reinforce the strategic position of peripheral areas on the TEN-T network is also reflected in the recent Annual Activity Report 2009-2010 for Priority Project 21 on MoS, which emphasized the importance of islands as logistics platforms of Europe and called for a dedicated aid system which is better suited to islands and ultra-peripheral regions (Oliveira 2010).

3.4 Long term recommendations

We suggest that there is a need for a stronger emphasis on Motorways of the Seas, accessibility of peripheral areas and territorial cohesion, as voiced in our response to the consultation on the Future Trans-European Transport Network Policy[3].

We also suggest that combining existing funding instruments could generate greater cohesion benefits for the Community, and that greater coordination of MoS TEN-T and Marco Polo funding instruments could contribute to strengthening territorial cohesion and accessibility of peripheral areas. We recognize that this would require the introduction of an explicit "cohesion/ accessibility objective" under Marco Polo, which is currently lacking (although improved accessibility and cohesion could result from modal shift projects). The benefits of greater coordination between TEN-T and Marco Polo and the weaknesses of Marco Polo in relation to MoS were reflected in the Annual Activity Report 2009-2010 for PP21 (Oliveira 2010).

4 AMENDED CHECKLIST QUESTIONS FOR PROJECT APPLICATIONS UNDER MOS TEN-T

Within the context of the current call[4] we have developed a set of criteria which are particularly applicable to peripheral based application. The criteria have been formulated as

[3] STRATMOS RESPONSE TO THE CONSULTATION ON THE FUTURE TRANS-EUROPEAN TRANSPORT NETWORK POLICY Date 2010-09-02, rev. 2010-09-15

questions to correspond with the format of the existing checklist for MoS applications under the North Sea call. (Wider application to other MoS calls under Priority Project on Motorways of the Sea (PP21) is discussed in Chapter 5.)

Proposed checklist questions for peripheral based MoS applications have been developed under the following headline topics:

Topic 1: Does the project comply with criteria for peripherality?

Topic 2: Does the project contribute to economic, social and territorial cohesion?

Topic 3: Does the project contribute to improved accessibility to peripheral areas?

Topic 4: Is the project differentiated from similar existing services?

4.1 Suggested criteria for peripheral based applications

We underline that the criteria/checklist questions put forward at this stage should not be regarded as absolute, but rather as criteria which could be considered to promote peripheral based MoS applications. The number of criteria is fairly large and a scrutinisation would be required before they were adopted or applied.

The proposed criteria for peripheral based MoS applications have been incorporated into the existing checklist questions for MoS applications under the North Sea call (see below). This has been done to underline that periphery issues are a 'normal' part of the criteria for MoS under TEN-T. At the same time it is suggested that in order to address the unbalance currently experienced under the MoS funding scheme, project proposals submitted for peripheral areas require a targeted evaluation procedure. We therefore suggest that peripheral MoS applications should be compared against other peripheral based applications, rather than being compared to modal shift applications.

We have attempted to incorporate our suggested criteria in *italics* within the context of Annex II of the Open Call for tender for Motorways of the Sea projects in the North Sea Region 2009-2013, last amended 1st June 2010. In addition, we suggest there is a need to operationalise the definition of peripherality in order to clarify which project applications should be considered as peripheral based.

Suggested questions for defining peripherality

*What are the **current** characteristics of the area where the destinations are located?*

- *Links to the "core network" (specify 3-5 nearest ports and travel times)*
- *Links to the comprehensive network (specify 3-5 nearest ports and travel times)*
- *Existing route options between the destinations involved*
- *Frequency of existing maritime freight services*

[4] Notification of an Open Call for tender for Motorways of the Sea projects in the North Sea Region. 2009-2013. Publication date: 9th November 2009. Last amended: 1st June 2010

- *Cargo costs of existing maritime freight services*
- *Cost of access (distance, time and carbon emissions)*

Are the involved destinations (e.g. ports, transport centres, dry ports etc.) located outside the (future) core TEN-T network[5]/ an area covered by a TEN-T priority project?

Will the project reduce congestion on the core network/ in central areas/ports?

Is there scope for future traffic growth with this project (provide details)?

CHECKLIST FOR THE EVALUATION OF PROJECT PROPOSALS (*with suggested additional criteria for peripheral applications in italics*):

Evaluating State: . . . . .

Name of the project proposal evaluated hereby: . . . . .

1. Content and structure of the project proposal.

1.1 Does the project proposal include all requested structural items?

Project summary Yes No
Timetable Yes No
Schedule of investments and costs Yes No
Full financial plan Yes No
Technical description Yes No
Description of project management structure Yes No
Letters of commitment Yes No

1.2 Does the project proposal include all requested content items?

Definition of logistic chains Yes No
Contribution to MoS objectives Yes No
Specification of modal shift Yes No
Socio-economical cohesion and benefits on accessibility Yes No
Aspects on distortion of competition Yes No

2. Viability of service and credibility and maturity of the overall project.

2.1 Duration of the project: . . . . .

[5] The term 'core network' has not yet been formally introduced but is expected to be in the new TEN-T guidelines due to be adopted in the first half of 2011

Is the project executed in a reasonable time?

OK too long too short

Remarks:……..

2.2 Scale and geographical extent of the project:

The project includes following countries:

. . . . .

What are the starting point and destination of the freight flows described in this project?

. . . . . .

Is the location of the project considered to be peripheral, and why?

Overall appreciation of the scope of the project:

OK too big too small

Remarks: ……..

2.3 Quality of the technical description of the project:

insufficient OK good

Remarks: . . . . .

2.4 Quality of the proposed investment plan:

Percentage of EU funding requested: . . . . .

Degree of detail of financial/investment plan:

insufficient OK good

Overall appreciation of the investment plan:

insufficient OK good

Remarks: . . . . .

2.5 Composition of the consortium and written commitments of potential users (letters of support).

2.5.1 Do you consider the project consortium relevant for executing the project?

Yes No

Is the role of each partner in the consortium clearly defined?

Yes No partly

Remarks: . . . . .

2.5.2 Letters of support / letters of commitment are present?

Yes No

Is the kind of support/commitment clearly defined?

Yes No partly

Remarks: . . . . .

3. Contribution to cohesion/accessibility and to modal shift based on the characteristics of the traffic (SSS, rail, road) involved (e.g. frequency and regularity, transport costs, safety and security).

3.1 Modal shift generated.

Projection of modal shift (in tonne-km): . . . . .

Estimates go until 2013 2020 Other: … Not clear

Contribution to congestion reduction in the regions involved?

Yes No Not clear

Remarks: . . . . .

3.2 Frequency and regularity of the service.

Frequency of the proposed service: . . . . .

Improved frequency compared to existing situation?

Yes No Not clear

Remarks: . . . . .

3.3 Characteristics of the vessels used.

Is there any information about the (environmental) performance of the vessels used (emissions, fuel efficiency, capacity/tonnage, technical standards, …)?

Yes No

Remarks: . . . . .

3.4 Contribution to cohesion: socio-economic cohesion (peripheral areas and islands) and cohesion in terms of accessibility, frequency of service, reduction of travelling time.

Are aspects of socio-economic cohesion present in the project proposal?

Yes No Not clear

- *Will the project contribute to exploration of natural and human resources?*

Are accessibility benefits present in the project proposal? *Does the project contribute to improved accessibility to peripheral areas?*

Yes No Not clear

- *Does the project contribute to:*
  - *Improved reliability of services*
  - *Increased or sustained cargo volumes*
  - *Reduced cargo costs*
  - *Improved route options*
  - *Reduced travel time*
  - *Improved efficiency*

Remarks: . . . . .

What economic activities consistent with the regional economic profile could be supported by any spare capacity in the link?

4. Contribution to quality improvement in the logistic chain (port services, infrastructure and connections to the rest of the TEN-T, information systems/onestop-shops/single windows etc.)

4.1 Elaboration of the sea transport based multimodal logistic chain.

Is a multimodal logistic chain elaborated in the project proposal? Are the various parts of the intermodal chain integrated and are measures taken or proposed to simplified the complexity of the chain for the user?

Yes No Not clear

Remarks: . . . . .

Is the project open for public use?

Does the project help address cargo balancing (import/export) i.e. reduced "empty running"

Does the project contribute to cooperation between shipping lines (for instance through 'code sharing')

4.2 Availability of efficient hinterland connections to the port area, preferably intermodal. Quality of these hinterland connections. Contribution of this project proposal to improving the hinterland connections.

Do sufficient hinterland connections exist (road, rail, inland waterway)? *Is the project linked/related to hinterland connections which are part of regionally important transport networks?*

Yes No Not clear

How is this documented? . . . . .

Quality of existing hinterland connections is:

insufficient OK good Not clear

Does this project contribute to improving the hinterland connections?

Yes No Not clear

Remarks: . . . . .

Is the project linked to the TEN-T Network? Please explain how it is linked to the TEN-T Network. *Are the involved destinations part of, or linked to, the TEN-T comprehensive network?*

Yes No Not clear

Remarks: . . . . .

Does the project contribute to improving the TEN-T Network? *Does the project contribute to extending or improving links with the TEN-T comprehensive network?*

Yes No Not clear

Remarks: . . . . .

4.3 Availability of flexible port services allowing liner services for offering frequent sailings at any time and limiting the stay of a ship in the port to a minimum.

Are flexible port services available in the ports of call in this project proposal?

Yes No Not clear

Will this project make existing port services in the involved ports more flexible?

Yes No Not clear

Remarks: . . . . .

4.4 Availability of electronic logistics management systems.

Are electronic logistics management systems available in the proposed connection?

Yes No Not clear

Does this project intend to improve existing electronic logistic management systems?

Yes No Not clear

Does this project intend to integrate maritime and land-based information systems?

Yes No Not clear

Remarks: . . . . .

4.5 Availability of simplified administrative and customs procedures.

Are simplified administrative and customs procedures available for this proposed connection?

Yes No Not clear

Does this project contribute to the simplification of administrative and/or customs procedures?

Yes No Not clear

Remarks: . . . . .

4.6 Investments in facilities contributing to quality improvement in the logistic chain.

Are investments in facilities foreseen in this project proposal?

Yes No Not clear

May quality improvements be expected by the investments in these facilities?

Yes No Not clear

Remarks: . . . . .

5. Socio-economic impact and impact on employment.

Does this project proposal have a positive socio-economic impact?

Yes No Not clear

How is this quantified and qualified? What kind of data is used for calculations/evaluations?

. . . .

Does this project proposal have a positive impact on employment? *Will the project contribute to maintaining/increasing employment?*

Yes No Not clear

How is this quantified and qualified? What kind of data is used for calculations/evaluations?

. . . . .

Remarks: . . . . .

6. Environmental impact.

Does this project proposal have a positive environmental impact (e.g. reduction of emissions, better fuel efficiency, …)?

Yes No Not clear

How is this quantified and qualified? What kind of data is used for calculations/evaluations?

. . . . .

Remarks: . . . . .

7. Effects on competition.

Is the project differentiated from similar existing services?

Do similar existing services exist between the destinations involved? If yes, give a description of such existing similar services.

Yes No Not clear

Is the project differentiated from existing similar services e.g. routes, segments of freight market, potential customers?

Yes No Not clear

Does this project proposal have an effect on competition?

Yes No Not clear

How is this quantified and qualified? What kind of data is used for calculations/evaluations?

. . . . .

Does this project proposal have an impact on existing services between the participating ports?

Yes No Not clear

Does this project proposal have an impact on existing services from neighbouring ports?

Yes No Not clear

Does the project contribute to improved services in totality?

Yes No Not clear

Might this impact be distorting?

Yes No

Remarks: . . . . .

5 FOLLOW UP ACTIONS

5.1 Consideration of wider application to other MoS regions

Using TEN-T funding, the Commission supports the development of Motorways of the Sea across Europe. In the guidelines, Priority Project on Motorways of the Sea (PP21) refers to four sea areas; the Baltic Sea, the sea of Western Europe, the Sea of South-east Europe (eastern Mediterranean and Black sea) and the sea of South-west Europe (western Mediterranean).

The recommendations in this report are made specifically for MoS calls under the North Sea calls. Wider application of these recommendations to the other MoS calls would require closer scrutiny of existing application procedures and requirements concerning accessibility and cohesion.

5.1.1 The Baltic Sea Region

The call for proposals for MoS projects in the Baltic Sea area[6] does not contain a checklist for applicants like the North Sea call does. The need for project proposals to "*demonstrate*

[6] Notification of an open call for proposals concerning Motorways of the Sea projects in the Baltic Sea area 2009 – 20131. Publication date: 25 November 2009.

the project's impacts on cohesion and accessibility through for example improvements in the accessibility by way of improving frequency of services, alternative route options, time and costs savings or supporting modal shift" is nevertheless a clear requirement for the content and structure of project proposals. "*Contribution to cohesion /accessibility and to modal shift based on the characteristics of the traffic (Short Sea Shipping, rail, road) involved (e.g. frequency and regularity, transport costs, safety and security*)" is furthermore one of the evaluation criteria.

In a recent report prepared by the Baltic Ports Organization and the TransBaltic Project[7], the barriers and challenges connected with implementing the Motorways of the Sea policy in the Baltic Sea are identified. Interestingly, as there are parallels to our recommendations for North Sea calls, one of the barriers identified was that the "*Geography of the Baltic Sea does not necessarily fit the MoS concept*", and the report concludes that the Baltic Sea may require different modified criteria for MoS projects to ensure a better distribution of EU funds to the Baltic Sea.

The report recommends that the geographical phenomena of the Baltic Sea should be taken into account during the revision process of the MoS policy and that "*The following regional characteristics should be taken into consideration when defining the priorities for Baltic Motorways of the Sea:* ***geographic (peripheral) location****, technical (icebreaking), economic (imbalanced development of member states) and market (main traffic centres) issues*" (emphasis added).

5.2 Distribution of WP C4-a findings and recommendations

Project proposals can be submitted at any time under the open call for North Sea MoS projects. The next European call for MoS projects is expected in spring 2011 (April - May).

It is suggested that the recommendations and proposals in this report are distributed as follows:

- This paper will be submitted and presented to the North Sea task force at their meeting in Bruges on December 8th 2010,
- With the needed updates the paper can, after the Task force meeting, be presented for the Commission DGMove and the Agency dealing with Marco Polo.
- It could also be useful to distribute our recommendations to industry associations and different bodies which might be interested e.g. Focal Point Meetings which represents different Member States and industry which meet regularly to discuss SSS and MoS.

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http://tentea.ec.europa.eu/download/calls_2009/mos/callforproposalsmosbalticsea_2009_final_20110 9.pdf

[7] Baltic Motorways of the Sea: Successful projects, barriers and challenges for MoS policy implementation on the basis of the Seminar and Debate held on 11th May 2010 in Sopot/Poland. July 2010. http://www.transbaltic.eu/wp-content/uploads/2010/08/TransBalticReport_MoS.pdf

6 SUMMARY AND CONCLUSIONS

In order to facilitate MoS project applications from peripheral areas, there is a need for a more strategic view of peripheral areas, and a better understanding of the benefits to the wider EU Community of improved territorial, economic and social cohesion of improved accessibility to peripheral regions. The need to reinforce the strategic position of peripheral areas on the TEN-T network is also reflected in the Annual Activity Report 2009-2010 for Priority Project 21 on MoS, which called for a dedicated aid system which is better suited to islands and ultra-peripheral regions.

We suggest that future MoS calls under TEN-T (from 2011 onwards) should be amended to better facilitate peripheral based applications, and that peripheral MoS applications should be compared to other peripheral based applications rather than modal shift applications. To this end we have developed preliminary suggestions for a revised checklist for the North Sea call which would better facilitate the development and evaluation of periphery based project applications. We also suggest that there is a need to operationalise the definition of peripherality in order to clarify which project applications should be considered as 'peripheral based', and have developed a set of proposed checklist questions for this purpose.

Integration Bottlenecks

Report on StratMoS WP C-4b
FDT – Association of Danish Transport and Logistics Centres

StratMoS WP C

The Interreg IVB North Sea Region Programme

Table of Contents

1 Introduction

Information and communication technologies have become a crucial element in logistics, as well as information flows, which have a significant impact on the supply chain and effect its successful operations. (Lee, et al., 1997). As emphasised by Lee, *et al*. (1997) information flows among members of the supply chain are important, because they acts as a mechanism for co-ordination. These information flows are central due to their direct impact on production scheduling, inventory control and delivery plans of individual members in the supply chain. In 2010 these statements still reflects some of the critical issues currently experienced within the maritime transport administrative and handling procedures, where the data on flows of information's concerning transport and logistics flows often are time-consuming, very complex and till now often paper based. This forces companies to be conscious and observant about the developing information technologies, in order to understand the full advantages for competitiveness and sustainability benefits and make it possible to follow up on them.

The largest European ports are operating advanced information systems, which creates great competences and efficiency benefits when managing the transport and logistics flows in the given port and towards the hinterland of the port. In spite of this, the interoperability between different ports and different information systems used in the ports is almost absent, which is limiting the possibilities for integrating new joint services and creating economies of scale. The majority of the small ports have no electronic data transmission in general, and that creates a lack of integration between the smaller and larger ports. Generally for each port call, shipping companies have to provide the same data repeatedly and often manually, which results in repetitiveness, errors and ineffective information transactions (E-Maritime.com, 2010). **Such problems within the information sharing system between the port and hinterland connection as well as communication within and between the ports could be addressed as an integration bottleneck.** This bottleneck is linked to the problems which exist within the port and hinterland operation on different levels, and requires special attention.

In the previous researches and reports made as part of Work Package C, it has been indicated that there is a great opportunity for cooperation between North Sea Region (NSR) ports. Even though a lot of the companies in the transport industry are reluctant to share information, the WP C-1 report shows that there are ports that are willing to share and cooperate for different purposes. Referring to the report, small and medium firms stated that "sharing of knowledge", "economic benefits" and "innovations" offer the greatest motivation for seaports to work together. In Denmark, "learning and

acquiring knowledge" was indicated as the area where firms in the transport industry would most likely cooperate with one another. In Germany, several possible areas where cooperation can be most likely are "Innovations", "learning and acquiring knowledge" and "economies of scope". The response from Norway indicated that "learning and acquiring knowledge and internationalization" were the two most likely reasons for cooperation (WP C – 1). Such cooperation reasons could be evaluated and considered from different angles, thus enabling an enhanced integration between port and hinterland and the port to port relation.

2 Objectives

There is one major objective of the report – investigation of the integration bottleneck. This bottleneck is defined as a main problem concerning integration of all the modes of transport in the logistic chain. The major concern about this bottleneck is hidden in the low exchange of information or documents with some of the participants of the transport chain, as well as lack of systematic and up-to-date information on origin/destination cargo flows in the door to door process. The majority of the companies that are engaged in international trade have to submit large volumes of information and documents to government authorities to fulfill import, export and transit - related regulations. What is more, there is not enough information about goods, destination, custom clearance, incomplete details about loading especially from the smaller harbour customers (E-Maritime.com, 2010). Such information and documentation often must be presented through several different agencies, where each has its own specific (manual or automated) system and paper forms. Such requirements, in combination with associated compliance costs, create a burden both to governments and to the business community and can also be a major barrier to the development of international trade, particular in developing economies (E-Maritime.com, 2010).

This problem could be approached by addressing the establishment of the "Single Window". This facility allows players involved in trade and transport to lodge standardized information and documents with a single entry point to fulfil all import, export and transit-related regulatory requirements (UN, 2010). Application of such facility is mainly focused on the development of the better information sharing systems between ports and hinterland on both private and public level. However it is not limited to this question only. This topic creates an opportunity to investigate whether the ports want to cooperate and create one common information sharing systems, which will contribute to the port cooperation activities and will strengthen relationship bonds between the ports and authorities. Therefore the objective of the research could be expressed as following:

- **Investigate what factors can foster development of the information sharing systems on the regional and international level.**
- **How comparison of already existing systems in the NSR can determine those factors.**

To answer this question we will investigate the different practices applied by ports within the information sharing systems, their advantages and disadvantages, as well as opportunity for cooperation on the regional and international level.

3 Methodology

Based on the objectives and goals of the report the data collection methods for this research include *secondary data analysis, brainstorming*, as well as *interview* conduction. The secondary data analysis as well as brainstorming sessions purpose was to create the list of more specific and goal oriented interview questions in order to collect the required information for further investigation of the integration bottleneck.

Secondary data analysis based on the desktop research method includes:

- European Regional Reports
- Publications in maritime and business related magazines
- Information from the websites of the ports, as well as e-publications
- Earlier reports made within the StratMos project

The brainstorm was completed by the FDT team for the purpose of creating interview questions. During several sessions the set of structured questions was developed that would allow investigating topics within the integration bottleneck.

Interviews were selected as the primary method of the research findings due to relatedness and accessibility of information gained though them. The outline for the purpose of the research consists of three main sections of questions, with twelve detailed subsections. Each of the sections is related to the investigation aim, however have its limitations. As mentioned before the set of questions have been developed based on secondary data research in combination with the brainstorming sessions referring to the goal of investigation.

Table 1: Structure of the interviews and of the analytical framework

I. Structures	History - Port Description	Reason for establishment and current status of the facility
	Setting Up	Identification of the inspiration models and set process
	Services Provided	Type of services provided, amount of users and ports, link between private and public sector, port hinterland integration
	Functional Structure	Description of model operation, identification of major clients
	Business Structure	Description of the business and financial structure, estimated establishment and operational costs, sustainability of the system
	Technological Structure	Technological information regarding: data submission/operation, system profile
	Communication Structure	Customer communication and training strategies
	Legal Structure	Privacy protection, need of legislation for system use and operation
II. Drawbacks vs. Benefits	Advantages	Benefits for users and government
	Disadvantages	Identification of drawbacks and weaknesses of the system
III. Cooperation	Cooperation Comparison (Single Window Creation on the Regional and International Level)	Identification of cooperation need on international and regional level, influence of competition and B2G perspective on the cooperation between ports

This interview structure was used for six telephone interviews conducted in October 2010. Respondents were chosen according to their ability to access to the required information as well as professional expertise within the research topic. Majority of the respondents were selected among the highest level positions within the organizations, which gave us a possibility to obtain high quality information from the original source. The following ports representatives participated in the interviews:

Table 2: Interview respondents and the organisation they represent

Country	Port	Information Sharing System	Contact Person	Position
Norway	Kristiansand , Stavanger	Seamless	Olav Madland Helge Haaland	CEO Port Captain
Netherlands	Port Of Amsterdam	PortBase	Micha Hes	Project Manager
Denmark/Sweden	Copenhagen/Malmo Port	NetApp	David Boden	IT General Manager
Belgium	Flemish Ports	N/A	Ilse Hoet	Head of Division
Germany	Hamburg Port	Dakosy	Evelyn Eggers	Director Sales

Information processing has been completed though the transcription of the information collected during the telephone interviews conduction, as well as through compilation of the information using desktop research methods. For the easiness of the analysis process a comparison matrix has been developed for certain sections of the research.

Limitations

By reason of the large number of ports located around the North Sea Region, this paper has only focused on a selected number of ports. Ports have been selected based on consultations with members of StratMoS from each of the countries – Norway, Germany, Denmark, Belgium, and Netherlands. The ports chosen are based on the presumption that they represent an important port, which could

prove vital in developing a stronger cooperation network in the North Sea Region and which have the capacity and ability to create viable information sharing alternatives**.**

Several limitations also apply to the evaluation and analysis criteria. The technological structure of the first section was complex for analysis due to the limited technological competence and resources, as well as the business structure the systems were operating on (some of the systems are privately owned, some publicly owned therefore it is more or less impossible to compare it on a single scale).

4 Analysis

As already mentioned before, information sharing systems have a vital role in the operation of the port and hinterland connections. One of the solutions recognized for resolving the integration bottlenecks occurring in this sector is by setting up a Single Window.

Establishing a Single Window facility is one means of addressing this problem. It can enhance the availability and handling of information, and can simplify and expedite information flows between trade and government. It can also bring about greater harmonization and better sharing of the relevant data across governmental systems, bringing meaningful gains to all parties involved in cross-border trade. It can result in improved efficiency and effectiveness of official controls and reduce costs both for Governments and for traders due to better use of resources (UN, 2009). Some of the successful examples of establishing a Single Window as a mean of information sharing are presented below.

- **PortNet**

The Finns are well ahead in IT communication systems. This also holds true for the development of Finnish Maritime Information systems. The Finnish Maritime Administration is the host of the PortNet system that is used nationwide for vessel traffic in Finland. Each and every ship calling at a Finnish port has to provide information regarding its timetable, route, cargo, any hazardous cargo and maritime fees. It is also possible to give security announcements according to ISPC -instructions. The best way to submit this information is the PortNet system.

The user interface for the PortNet system is Internet-based. PortNet is a telematic system, where telecommunications and an information system are combined together. The main user groups for the system are the Customs, Port Authorities, Ship Agents, Stevedoring Companies, Maritime Administration, Vessel traffic operators, and the Frontier guard (PortNet.com).

- **PortBase**

Via the Port Community System, PortBase currently offers 34 different services to around 1,400

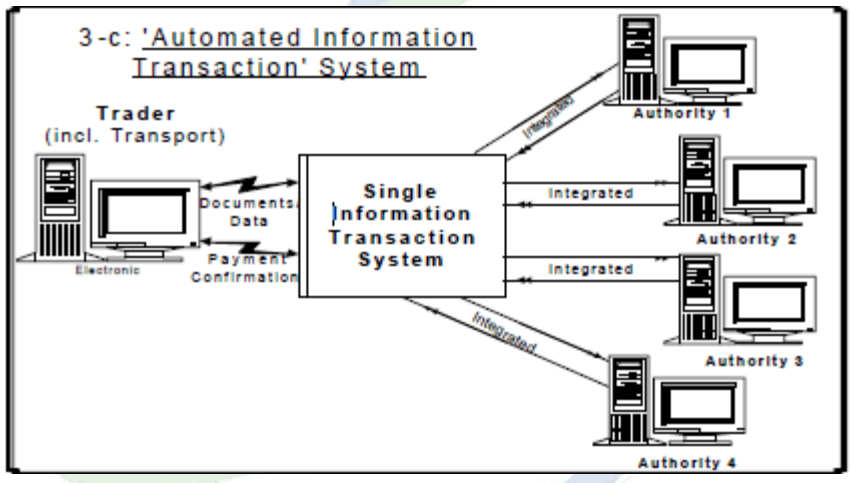

Figure 1. An automated Information Transaction System through which a trader can submit electronic trade declarations to the various authorities for processing and approval in a single application

clients in every sector of the ports of Rotterdam and Amsterdam. Participating companies enjoy concrete savings in time and money from day one. Nearly 3 million electronic messages are sent via the Port Community System every month. In an effort to cater for the needs of the business community and the authorities, PortBase is also constantly developing new services. (PortBase.com)

- **SafeSeaNet**

Naval Operational Command is the National Responsible Authority SafeSeaNet in Denmark. SafeSeaNet (SSN) is an EU - based electronic network for exchange of maritime -related information among member countries. The information in SSN is based on the reports described in EU Directive 2002/59/EC and subsequently ratified in Danish law through several technical notices (SafeSeaNet.dk).

The system was established after several major accidents at sea had indicated the need for authorities in EU member states to quickly obtain reliable information about particular ship loading of dangerous cargo, number of occupants, etc. Information that is vital for such disposition of the action when there is danger to life and pollution of the marine environment.

It was also described in the directive that European network infrastructure / system should be established so that all maritime alerts to the authorities eventually had to be fused into this one system. This would be possible to streamline and reduce the burden on the ships and the profession generally.

4.1 Structures

This section will give a detailed overview of the Single Window information sharing system concept created by six different ports covering the North Sea Region.

4.1.1 Port of Hamburg

Port Description

The area of the Port of Hamburg comprises 4,249 ha shore area and 2,987 ha water area. Apart from that, there is an extension area of 833 ha. available. The range of services offered in the universal Port of Hamburg covers all requirements of the ports customers. These range from traditional handling and warehousing activities and logistics solutions to IT and communication services (WP C 1). The Port of Hamburg is a "paperless port". All companies and authorities involved in the export, import and transit

processes can handle their transport processes rapidly and with electronic assistance by using the B2B services and applications of DAKOSY.

History

The reason for establishment the system was the urgent need to speed up the flow of information within the harbor of Hamburg. A group of liner agents, forwarders and quay operators set up a working group to discuss a possible solution. This group agreed that:

- Efficient organization of transportation needs early information
- Information exchange using EDI (Electronic Data Interchange)[1] which avoids double typing
- Avoid errors due to double typing saves time and saves money
- Flow of information within the harbor was too slow and too expensive.

Setting Up

The basis for the Single Window was the pilot project of 1974 "Datenbank Hamburger Hafen". Participants at that time were a number of liner agents and forwarders and the two biggest quay operators (basically the same companies who started again in 1982) as well as IBM. The technical solution of that pilot was a central host with dialogue interface (i.e. terminals) for users, no EDI.

The Set up process consisted of the set-up of a committee and included the following activities:

- Identification of the first Business Cases: Quay order and B/L
- Engagement of an external adviser: "Write the concept"
- "Take into account the existing IT- Structure of the acting parties"!

A case study, written by an external consultant, proposed the technical and commercial solution

Services Provided

Type of services provided DAKOSY AG operates as a full service provider, offering both pure EDI and SW-applications with EDI-modules. All documents needed during the transport can be exchanged via the network of DAKOSY.

DAKOSY's IT Services include:

[1] **Electronic data interchange (EDI)** *is the structured transmission of data between organizations by electronic means. It is used to transfer electronic documents or business data from one computer system to another computer system, i.e. from one trading partner to another trading partner without human intervention.*

- Backup Services
- Disaster Management
- Networks and Communications
- Outsourcing
- Internet Services
- Data Centre Services

The amount of users within the port have already reached 2, 050 and it is interlinked with systems of customers and authorities by EDI.

Figure 2. Main Users of Dakosy Software Solutions. (Dakosy.com, 2010).

Functional Structure

DAKOSY is owned by three shareholding companies. These companies represent the interest of the forwarder, liner agent / ocean carrier and quay operator. In order to become part of the so-called basic-network (i.e. all documents needed for the business within the harbor), each participant has to sign a contract with one of the three shareholding companies. The shareholders pay a yearly fee to uphold the so-called basic-network. They charge their clientele accordingly. All services beyond the basic-network are charged directly by DAKOSY. The main clients of the system are mainly forwarders, warehouses and logistics departments of industries and manufacturing companies.

Business Structure

AG with the shareholders:

- 33.33% - quay operators
- 33.33% - liner agents and shipping
- 33.33% - forwarding agents

Shareholders pay a yearly fee for the so called “traditional EDI- business within the port - community”. Additional services of DAKOSY (EDI, ASP and IT- Services) are charged by DAKOSY directly. Estimated cost of the system is 1 million €. Revenues exceed operational costs (i.e. profits are generated).

Communication Structure

As a normal sales and marketing activity. Users promote DAKOSY by asking their customers to use the system. There is a yearly user conference (per application), as well as workshops with users to discuss new topics. A monthly newsletter for various applications and a quarterly newsletter (companywide) in addition to the Open Day event fairs.

Legal Structure

There are no special legal requirements needed for using or operating DAKOSY. Only the announcement of Dangerous Cargo Movements and announcements of export (for Customs Control) is obligatory. In order to establish a Dangerous Cargo Movement Control System, the City of Hamburg had to change some regulations to make the announcements obligatory.

4.1.2 Norway – Seamless

Port Description

The Norwegian National Coastal Administration is an agency under the Ministry of Fisheries and Coastal Affairs. The NCA is the Ministry's advisory and executive body in matters pertaining to the Administration of ports and seaways, as well as national pollution preparedness and response. As a governmental agency it does not have any direct information systems towards the ports. However, there is a vendor company Seamless, which is being used as current information sharing and security system in Norway. Seamless are the first system with a flexible range of security services designed to support efficient security management and logistics across terminals integrated to different gate control systems. Seamless is a leading actor in the Norwegian market and has profound experience in maritime business. Seamless is a vendor of Port Administration Tools, Portwin and PortTools to 95% of Norwegian ports. Seamless competences and systems are in addition used daily by over 1100 service and logistics companies and 60 ISPS terminals[2] (Seamless. no, 2010).

History - Port

The reason for establishing the system was to improve efficiency and controls as well as security between the actors in the port. One more goal was to make it possible for the clients to share the

[2] ISPS – International Ship and Port Facility Security Code

information about port call, as well as vessel services. The whole idea of the project is to cut down the cost and improve quality and shared results.

Setting Up

The system was developed together with the customers from scratch using the gained knowledge about the previous platforms of the system of year 2000. It was also co financed and developed as R&D project together with Norwegian government. All of them are based on standards as long as there exists standards. All the messaging is based on the EDI standards, and XML on the EPC2XML and ShortSea XML. ISPS modules are based on the ISPS codes and EU regulations and directives.

The solution is modularized and supports integration with interneal business systems and ERP systems used by terminals, Port Authorities and Maritime Administration The development of the modular systems is done by usage of the SCRUM method where workshops together with the vessel operators, transport companies and terminals for figuring out what is important for them and what could be done to improve control, efficiency, and the way of collaboration. For that there were different goals set up for different phases within the project, which helped them to achieve a harmonized solution.

Services Provided

Seamless delivers systems that work with existing physical security infrastructure and enterprise systems to:

- Control the flow of employees, contractors, visitors, and vehicles within the site
- Correlate access with qualifications
- Ease administrative burdens and compliance activities
- Support harmonized access rules across terminals and thereby support one single access card for several terminals
- Integration with national Single Window Solutions
- Integration with ERP systems used by vessel operators ad terminals
- Portal for those with no ability to send messages, or for information which is not supported to be sent by messages.
- Integration with customes for declaration of goods.
- Statistics and reporting

Amount of users within the Seamless is quite impressive, it covers almost 95 % (48 ports) of the Norwegian Ports using the PortWin Solutions. It also includes users from large international corporations like Hydro and Statoil, as well as shipping lines and agents: WMS, UECC, MAersk, Sea-Cargo and Color Line.. In total there are more than 1100 corporations and daily users of Seamless applications.

The cooperation with other systems- SafeSeanet is handling the SW for the national government reporting, also for the pilot through that solution. The system is being used for the vessel operator reports, and the information is being acquired by Seamless for the further distribution within the system.

Business Structure

Seamless is a privately owned company.

The business models are based on competence and skills from:

- Security and business models from telecom & finance
- Understanding of Global technology models
- Supply Chain and logistics

The estimated costs of the company have a positive correlation with the real ones due to "phasing method" of the project cost control. By implanting the project in phases it was easy to see what was the real cost. However it would be hard to estimate the cost of the final goal, since there is a constant development going within the company.

The company is being co-financed by the government by an Industrial Research and Development (IFU) Contracts, (up to 34 %) and by Skattefunn. Under the SkatteFUNN scheme, business enterprises engaged in research and development activity on their own or in collaboration with others may apply for a tax deduction.

Communication Structure

The communication strategies are being built through the user community where there is a representative board which holds meetings two – three times a year. There are also articles and website information for better communication with the clients.

Legal Structure

There is a requirement for the ISPS code regulation. By law all vessel operators should report e.g. passenger list, however it is not regulated by law on how it should be done. The usage of the system is optional. There is a legislation that requires an archived list of the transactions; therefore it creates an opportunity and need for using this system.

4.1.3 Port of Amsterdam

Port Description

The Port of Amsterdam is a seaport in Amsterdam, the Netherlands. The port is located on the bank of a bay named IJ and the North Sea Canal, with which it is connected to the North Sea. The port was first used in the 13th century and was one of the main ports of the Dutch East India Company in the 17th century. Today, the Port of Amsterdam is the second largest port in the Netherlands, the largest port being the Port of Rotterdam. In 2008, the Port of Amsterdam had a cargo throughput of 75.8 million tons, most of which is bulk cargo.

The port in fact belongs to the municipality or city of Amsterdam under whose instructions Port of Amsterdam manages, operates and develops the port. The main aim is stimulating economic activity and employment in the entire Amsterdam port region (WP C 1).

Port Single Window

Via the Port Community System, PortBase currently offers 34 different services to around 1,400 clients in every sector of the ports of Rotterdam and Amsterdam. Participating companies enjoy concrete savings in time and money from day one. Nearly 3 million electronic messages are sent via the Port Community System every month. In an effort to cater for the needs of the business community and the authorities, PortBase is also constantly developing new services (portbase.com, 2010).

History

The reason for establishing the system was to make sure that messages that are being sent towards government are done on one – to - one basis. There was one platform created to host all the messages, and add extra value to it. The main focus of the system was to make a “post office” to receive the information, and add extra value to the messages, as well as to make sure that efficiency of the

government information is guaranteed. Once you have all info aligned on one platform, you can have this platform for the business information, so the process is B2B which is also added value. The main focus was to make sure that there is more efficiency towards the clients

Setting Up

The establishment of the system is based on Infolink, former port of Rotterdam system. The platform is redesigned and remodulated the platform is still the same based.

Services Provided

34 different services, 50 million electronic messages a year. 7.500 users. Mainly Rotterdam and Amsterdam are the main ports which are using the system. There is a direct cooperation with the customs since messages generated through PortBase are going through them. The system also corresponds to the government message services.

Messaging to hinterland, which is one of the main focuses of the PortBase, within the port but also make it possible to decrease congestion. With PortBase there is a possibility to make planning of the terminal more efficient, without having any delays.

Functional Structure

The services in the Port Community System are aimed at all port sectors: containers, general cargo, dry bulk and liquid bulk. All the links in the logistic chains can exchange information easily and efficiently: importers

- agents
- barge operators
- shipbrokers
- Customs
- empty depots
- forwarders
- exporters
- port authorities
- inspection stations
- shipping companies
- rail infrastructure operators
- rail operators
- traction suppliers
- terminals
- inspection authorities
- road hauliers

Business Structure

Part of the PortBase comes from Shareholders, who invested about 34 million EUR . On the other hand of the users pay for subscription, and every message and container information they send. There is a specific price for each service, however the neutral budget is being developed right now, since the company is not seeking for the profit.

PortBase is a non-profit organization. Companies only pay a contribution for the use of services with a clearly demonstrable added value. When set off against the advantages, these costs are relatively small. The financing of services that are of particular strategic interest to the port is done using the general income of shareholders of the Port of Rotterdam Authority and the Port of Amsterdam.

Communication Structure

The newsletter in Dutch and English, ECS export control system. The whole marketing and sales team involved in promotion of the facility and public relation.

Legal Structure

System is obligatory to use because of the regulation on communication and piloting issued by ministry of transport. It is mandatory to use for the 1st call of the ship. It is required to use the system to say the ship is coming in within 24 hours.

4.1.4 Rogoland Stavanger Port

Port Description

The main fairway along the coast of Rogaland is in open sea south of Stavanger, and more sheltered northward through Karmsund to Haugesund. From this main fairway there are local fairways to the different ports of Egersund, Risavika (in Sola), Stavanger, Sandnes and Haugesund. Cargo to and from ports in Rogaland totalled near 21 mill. tons in 2005, increasing to 22.5 mill tons in 2007 (+ 7,2%).

History

Portwin was established, developed and owned jointly between 47 or 48 ports in Norway and with Seamless. Prior to establishing Portwin, Stavanger Port used a system called ‘Havnedata’ [direct translation Portdata].

The port information sharing system 'Portwin' is delivered by Seamless and started to operate in 1999. The 47-48 ports had a 10 year contract with Seamless on the Portwin system. Seamless who also owns Portwin has developed the system further and will support all the ports the coming years. Seamless gives all the Ports who already have Portwin the right to upgrade to the new version for free. . Seamless, the private developer has already developed further modules which can be purchased by the ports as 'add-ons' to the basis system. There is for example a module which can contribute to better integration between Portwin and other systems, which has been purchased by the relatively newly established Risavika Havn in the Stavanger region.

Setting Up

Portwin was established jointly by 48-49 ports in Norway, with the common goal of reporting to 'Statistisk Sentralbyrå' SSB – Statistics Norway (governmental statistics body ssb.no)

Services Provided

Data reported in Portwin includes:

- Arrival and departure times of ships.
- Not the owner of the ships but the agent/ client/ end user.
- Type of goods (20 goods categories)
- Type of freight
- Weight / tonnage of freight (bulk: liquid and dry)
- Number of containers (TEU)
- Weight of cars/trailers/anything on deck which is strapped down but cannot be put into a container

There used to be 47 or 48 ports using Portwin, but there are now some few ports which are piloting other information solutions. Portwin was originally co-owned by the 48-49 ports which established the system. Portwin both exports data, and imports data from security systems, vessel opertators etc..

The port hinterland integration working through Seamless and the cooperation with The Norwegian Coastal Administration, the aim of the port is to receive goods directly from the terminal or from their customers.

Functional Structure

Portwin is provided by Seamless. Each port has a separate system, and there is no central server or database.

The main clients of the system are mainly all Port Authorities, Industry Actors (Hydro) and Statistics Norway (governmental statistics body ssb.no). There is a requirement to report to Statistics Norway within a EU Directive. But also the ports themselves – uses PortWin for planning, service allocation, service delivery and invoicing.

Business Structure

The development of Portwin was financed by the 47/48 ports. The operation and maintenance of the system is also financed by the ports – in terms of a percentage of trading/ business. There is also a steering group which has given Seamless instructions about the need for further developments. The programmers within Seamless are now developing their own system and modules which they are selling. Now that the program is no longer owned by the ports, the individual ports have greater choice in which modules to purchase/ which systems to chose, which suits them well as some ports are happy with the status quo whilst others want further improvements and are willing to pay for better integration with other information systems.

Stavanger Regionen Havn IKS has yet not decided on which system they will use in the future.

Estimated costs for establishment - the budget was exceeded, and it became very expensive. There was also an investment from the ports in terms of time etc. which was never documented (development, and especially testing)

The operational annual cost

The ports pay a percentage of trading/ business. For Stavanger Harbour this is close to a quarter of a million NOK. It is a stand-alone system but possible to integrate to other parties in the supply chain, and each port is independent from one another. They can call a help line if there are any problems. Training is paid for in addition by the hour.

With the new ownership system they will pay 130 000 NOK a year to use the system (basic/entry level package) and pro rata for help etc.

If they were to change systems the alternative system may not be so expensive, but the main cost would be training and integration with existing systems.

Legal Structure

Parts are obligatory to use the system. It is obligatory to provide specific data to SSB. There is a Yes and no situation in need of specific legislation. There is no need for specific permission or legislation to have or use such a system. But it is a legislative requirement through the EU Directive to provide certain types of information to SSB.

4.1.5 Port of Copenhagen and Malmo

Port Description

The Port of Copenhagen-Malmö (CPM) was founded in 2001 with the merges of ports in Copenhagen, Denmark and Malmö, Sweden. The distance between the two ports is 26 kilometres. The initiative behind the merger was to create a more coherent transport hub in the Øresund region and to take advantage of the proximately of the ports in bringing synergies and cost savings to port operations.

CMP is a major modern port operator, offering all types of port services. CMP's efficient production facilities are continuously updated as technological opportunities and customer needs change.

CMP services are available in all port areas 24 hours a day, 7 days a week. Being a full-service port operator, CMP handles most types of cargo, and carries out loading, unloading, transshipment and warehousing (malmo.se, 2010).

History

The primary reason for establishing new information sharing system was the old and not reliable system, which had less features for providing better service.

Setting Up

This model was created from scratch, by looking at the availability of the system on the market. The system was found by matching the needs by 80 %, 20 % were created themselves.

The setting up process was created through the project template, which overview the list of wishes to fulfil and gaps to cover. After that the system that would match the needs was found – NetApp. There was a consultancy team which give some educational sessions for the staff.

Services Provided

Type of services provided by the CPM ISS is to report statistic information to national statistic department, as well as to provide detailed information delivered regarding amount of handled cargo, and required documents by this transaction. Reporting of cargo operations from ship operators. Transmit cargo handling information to ship operators. Transmission of such information is being done through the built e-services: automated process of ship call announcement through subscriptions. The amount of users and ports 200 internally/ 400 – 500 using on the regular basis.

Business Structure

It's a mix of private and public owned company. The company is owned by Malmo and Copenhagen Municipality, and Swedish private investors.

The estimated cost for the whole system is hard to calculate since there is an operation budget for every system. Company explains such shared operational budget move by reluctance of the cost increase for the internal customers. "When you implement a new system you have some initial pros both in consultancy time, hardware and software. We set up a budget and managed to deliver on both – time and estimates. However, when you see what the system can do, there is always some place for improvement. Therefore the new budget for further development is created."

The system is sustained by service agreement within IT department towards other business areas within CPHM port and it covers all costs for development and sustainability. Also there is a service agreement discussion with port's internal customers, who sometimes want to increase the amount of services according to which the prices differentiate.

Communication Structure

Customer communication and training strategies are pretty developed within the CPM Port information sharing system. There is a magazine issued four times a year in order to update current clients about the latest developments and news within the system. There is also effective communication going through the website and personal meetings with the clients, that create an open dialog which allows considering all pros and cons of the system directly. Clients are also provided with the onsite training on the system usage.

Legal Structure

The use of the system is not mandatory by law, but as much as possible useful information is provided to foster the usage. In general the usage of the system is voluntary, which creates free choice.

4.1.6 Flanders Port Area

Port Description

Flanders Port Area' relates to both the Flemish port area that can pursue a joint promotion policy for the four seaports of Antwerp, Ghent, Ostend and Zeebrugge under this brand, and an ambitious strategic action programme of the Flemish Government to reinforce the international competitive position of its ports. 'Flanders Port Area' is used as a brand to position the ports in a wider European and global context – as Flemish port area beside the other European port areas – in view of the competitive context. Making the ports known abroad as one port area implies combined forces and allows our ports to make the most of their complementarities (WP C 1). The hinterland is very important for the Flemish seaports. The quality and capacity of the hinterland connections are an important element in the competitive position of the Flemish seaports. The hinterland connections are very important as establishment factor for companies that are looking for a suitable location in a Western European port. Within the framework of Flanders Port Area, initiatives will be taken to support the Flemish ports in this respect (flandersportarea.be, 2010).

Future Port Single Window

Reason for establishment and current status of the facility. The aim of the project is to increase efficiency in the port-related transport and logistical processes by reducing the completion time of logistical processes, decreasing the costs of each step in the process, increasing attractively of the "Flanders Port Area".

The system is planned to be developed from scratch. It is also planned to receive some support from the Flemish government within the research and co - financing. The most financing will come from the port and port industries, small subsidies from the Flemish government.

Setting Up

One of the first tests, the Flemish institute for logistics they developed so called Flemish e-logistic platform and it’s only proof of concept which is being developed now. The next step will be the questionnaire to make sure the market is interested in this service, and clients are willing to pay for the service. According to the research outcome the decision on who would build a platform would be made.

While developing the system the “white spot analysis” had been done in order to see what services are already covered today, in other ports, and are in demand on the market. ECS (Electronic Clearing Service) is one of them, pre announcement of the containers in the ports, two examples application that are being thought of to develop first, which are missing in other ports. Some of the features of future application have been inspired by PortBase, and Dakosy systems.

Cooperation with Port Authorities

Cooperation with the Central Broker system, exchanges information with all the different authorities, CCS (Cargo Community System) has an exchange of info between authorities and private sector, or private companies. For a big port it will be a different kind of information, where the info in broker is also interested for private, there will be connection between both systems.

Services Provided

The aim of the project is to increase efficiency in the port-related transport and logistical processes by reducing the completion time of logistical processes, decreasing the costs of each step in the process, increasing attractively of the "Flanders Port Area".

Functional Structure

In the beginning it was planned to develop a common platform which is connected to the ports and industry and which would make an exchange of information of data a lot easier in one way for all of the ports. Now it seems to be quite difficult to make one platform because each port has its own cargo types and specific market, so most of the time it’s one or three ports which is interested in a certain application. Now there is a lot of discussion about financing, and we are thinking to work from bottom up, and start from what the industry needs and what is the plan that ports has in their vision to develop.

Business Structure

The business model includes four Flemish ports, the port related industry and Flemish government in a separate organization. The most important partner which is taking the lead is the “industry”.

The estimated costs of operation are still in the progress since the projections of the whole system have changed. The cost could be determined later on, depending on the amount of the ports which are willing to use the application.

Legal Structure

The legal structure of the future project will be voluntary and won't be forced by any policies or governmental legislation. The Flanders Port will cooperate with government and customs as much as possible while creating the system.

4.1.7 Findings from All the Ports

Bringing up the general conclusion of the analysis several statements could be addressed, however the major concern could be expressed regarding the Legal Structure and type of ownership of the systems. While looking at the structure description of each system majority of them have the same background for the establishment: more efficient flow of information and security of the port operation. The same is concerning the major users as well as the services provided within the system. There are quite a few differences within the functional and business as well as the legal structure of the systems.

The business structure of the systems varied from the private to public, as well as to the mixed ownership of both during the discussion. This factor makes it hard to generalize and create one single conclusion. What is more, there was quite a big difference within the legal structure of the system operation. Some of the ports are working under the specifically issued regulation which makes the use of the system mandatory, when the rest is operating on the voluntary basis. This again brings to another issue to consider.

4.2 Drawbacks vs. Benefits

This section focuses on the analysis of the benefits and drawback of the information sharing system results provided by the respondents. Overview of such minuses and pluses would create a possibility for a better evaluation of added value and detrimental features that could be gained by such system.

There are several benefits of computer based information systems in transport chains:

- Enhanced management through tracking and tracing, together with more efficient control of own services and those of subcontractors;
- Outsourcing transport services, but staying in control of logistics performance;
- More accurate and transparent information on market demand and supply (Kabashkin, 2007).

Regardless of the predicted advantages and potential of network based information sharing system establishment, occasionally efficiency level is not completely reached due to several major factors:

- Major companies positioned in a logistics centre or other transport terminal/complex often have their own network, thus they are not interested in joining other networks;
- Regional technological solutions are often reluctant for a constant change and follow the new technologies or the changes in logistics standards.
- Integration of new systems is often followed by high implementation costs for the ports and their users.

Potential weaknesses and threats must be kept in mind while implementing information sharing systems in transport terminals. The logistics industry is dynamic and experiencing constant changes. Consequently it is important that the system would be available for changes and technological updates (NeLoC, 2003).

There are technical and functional profiles of the system suggested (NeLoC, 2003). From the functional side it is recommended to consider the benefits in economic and quality sense, logistics and transport processes, as well as individual demands and existing solutions. What is more the system preferably should be optimal for both joint and individual usage. In addition, technical description should include individually or jointly usable toolboxes, open architecture and interfaces, high level accessibility and safety standards, and at last ability to integrate existing information technologies (NeLoC, 2003).

Table 3: Advantages and disadvantages of the different systems

Ports	Disadvantages	Advantages
Port of Hamburg	• None	• Information Chain established • Flow of information speed up • Less double typing • Better quality of data • Saved time and money • Less documents due to standardization
Norwegian Coastal Administration, Rogoland Stavanger Port	• Misuse of the system • Competitiveness of intermodal and multimodal systems. • The need for manual data entry • More automation in data entry needed • System does not communicate both ways • Lack of will to share information between ports	• Improve efficiency and the control • Security between the actors in the port • Sharing the information about port call and services • Cut down the cost and improve quality and shared results.
Port of Amsterdam	• Avoidance of the fee payment by users • Future financing and investment	• Greater efficiency • Lower costs • Better service provision • Better, more transparent planning • More rapid throughput times • Fewer mistakes; • Optimal re-use of information
Copenhagen Malmo Port	• Disaster and recovery procedures, which are critical for this kind of business. • Maintenance of the automation level due to growth of the demand	• The latest updated information within the online application • Txt messages for the cruise ship could be obtained all the time • Booking of the services online all the time • 24/7 information
Flemish Ports *(in the future)*	N/A	• To facilitate the transport of the goods, • To make transport of goods independent of exchange of information and data. • To make logistic process more smooth and faster.

The presented above are the results and opinions about the information sharing systems directly from the system owners. However it is also important to mention what kind of benefits such systems bring to the government and trade, since both of these sectors are irreplaceable players of the logistic chain. A Single Window can ease the process of providing and sharing the essential information to fulfil the trade related regulatory requirements for authorities and traders. The application of such a system can improve the effectiveness and efficiency of official controls, security and can cut costs for both government and traders due to better use of the recourses.

Table 4: Benefits to Government and Trade

Benefits for government	Benefits for trade
More effective and efficient deployment of resources	Cutting costs through reducing delays
Correct (and often increased) revenue yield	Faster clearance and release
Improved trader compliance	Predictable application and explanation of rules
Enhanced security	More effective and efficient deployment of resources
Increased integrity and transparency	Increased transparency

4.3 Cooperation

A lot of different firms are providing hinterland transport services. As a result, there is a need for cooperation and coordination in hinterland chains and ports. However, different firms have different market positions and business models. This leads to differences in incentives, resources, capabilities, and attitudes concerning coordination. Consequently, coordination and cooperation are challenging and necessary for efficient transport chains, but does not always emerge. Thus, it is not surprising that approaches to enhance coordination are center stage in many projects to improve the efficiency of hinterland transport (Van der Horst and de Langen, 2008). Such enhancement of cooperation and coordination could be addressed by introduction of the Single Window Concept. This section will focus on the willingness and ability of the ports to cooperate on the regional and international level, as well as focusing on the factors that can foster or discourage such cooperation.

4.3.1 Cooperation on Regional Level

Norway, Rogaland - 95% is already using the system.

Netherlands - This is indeed the aim. A national Port Community System is good both for service provision to the business community in the Netherlands and abroad and for the Netherlands' competitive position in general.

Denmark/Sweden – Cooperation is already being implemented between two ports in two different countries.

Germany – Cooperation with i.e. other PCS.

4.3.2 Cooperation on the International Level – Need for that

Norway - the same solution has to be set up in each country, there are different laws and regulations in each country. Therefore there should be a shared solution for all ports, or systems should adapt to already existing ones.

Rogaland – Seamless has an agreement with Hogia (Swedish logistics system used by Swedish ferries and railways) and the Norwegian Coastal Administration, and are therefore in a stronger position than they were when they cooperated only with the ports. The new cooperation has the potential for improving data sharing. Stavanger port believes there will be a positive development with regards to information sharing and integration of systems via the web. The port also believes the data will no longer be stored in-house.

Netherlands - logistic chains do not stop at the border. International information exchange is increasingly becoming both a matter of added value and of necessity. It is therefore logical that co-operation should take place between the port community systems of the ports in various European countries in future, and PortBase would like to play a key role in this in future.

Denmark/Sweden - The system they have is so flexible that they could manage to get other ports and other services in our umbrella, and that is the whole idea between building it the way they have done it because it gives an opportunity for growth. There could be some benefits in gathering more ports in the same umbrella, because it is an internal IT within this specific port, and there would be some difficulties to provide services to other ports, because they can question their independence.

Germany - Cooperation on the international is being considered at the moment**.**

4.3.3 Implementation of One International Single Window

Norway - Yes, but hard.

Rogaland – A system which is suitable for international use would be hard to establish, as the ports in different countries have different requirements/ needs in terms of the number of actors involved and transport chains. However, all European ports must meet EU regulations, and the same level/type of information is required.

Netherlands – "Why not? On the air cargo it is already there." It is transparent on how much a flight costs. There is competition between the airports on specific types of services. So you might understand that on a communal European level there will be one main technology. There will be competition in the other area. If it's cheaper to not compete on things like essential by products like governmental services, we could have just one big platform which everybody could use and compete on other issues.

Denmark/Sweden - Could benefit, but difficult to provide due to technical reasons.

Germany – No. Due to a great variety of the regional and national implications. There are too many differing procedures of the terminal operators in Hamburg, including the different organization in the various ports.

4.3.4 Type of Information to Share If Cooperating

Norway – disclosure of non - commercial information

Rogaland - SSB has been dissatisfied with the information sharing system in Norway as there are frequently discrepancies in data between the ports. The ports do not report which locations the boats load on/off, which means SSB must cross-check their data with the various actors involved. However, this statistical data is more likely to be shared if cooperating.

Netherlands – governmental, not on commercial level

Denmark/Sweden - The system should be kept as open as possible, there always corporate things that you cannot open to everyone (pricing etc), but all the free information should be published.

Germany – Harmonization of the interfaces for the customers of the port, meaning carrier (sea, rail, truck), exporter, importer, forwarder.

4.3.5 Competition as Prevention of European Ports Cooperation

Norway, Rogaland - Have political interest; many ports compete commercially, but there is a shared interest in security.

Netherlands – "It is not imaginable at the moment, but looking further ahead, why would you want to develop your own system B2G, if it's possible to build one flow - system." Looking at Antwerp, Schiphol Amsterdam there is main hub within Europe; there will be usage of one platform. This will be elaborated on the national port community system, which might happen in 5-10 years. The question for other ports, if they will support already developed technologies. "The truth is there is a lot of information that you don't want to expose to one common system."

Denmark/Sweden - Mostly on the international level competition between ports sometimes prohibits development of some department's development. If it would be an independent IT business, there could be much more customers gained from other ports, than it is now when it is publicly owned.

Germany – Yes, to a certain extent.

4.3.6 Factors That Can Foster Cooperation

Norway - One common interest as well as value reports.

Rogaland – Use of other systems/SW, use of common database for the ship type, owner, next harbour.

Netherlands – Port Community Systems organizing themselves to become one lobby towards Brussels to exchange knowledge and experience. On the other hand there is willingness to connect port community system to have information already at hand. There is a lot of collaboration going on between the systems.

Denmark/Sweden - Development and possibility to reduce costs is driving the business to look at more straight and simple solutions. In the future there is a possibility and advantage of having one system is much bigger than the disadvantage.

Germany N/A – EU.

5 Results Overview

The main purpose of this report was to investigate what factors can improve the development of the information sharing systems on the regional and international level. In order to answer this question a comparison of already existing systems in the NSR have been implemented. This created a possibility to identify some of the factors that can foster the development of the systems.

Summing up the findings from the first part of the analysis the most important factors are being emphasized.

Setting Up process and reasons for establishing the systems were approximately similar for each company. Each port was seeking to enhance and improve the information sharing process between the players within the logistics chain. It is interesting to mention that some of the ports were motivated by other systems. For instance port of Flanders is currently developing the system using some of the features from PortBase and Dakosy.

Services Provided by majority of the ports are focusing on the implementation of relatively the same services. The difference of the services varies together with the size of the port and the company providing the information sharing services. Therefore it is hard to generalize on this factor and give objective evaluation.

Business Structure varies a lot between the systems. Dakosy is a private ownership with three different shareholders. Seamless, is a privately owned company which is linked to the public sector. PortBase is public non-profit organization. NetApp used by ports of Malmo and Copenhagen is a mix of privately and publicly owned company, which is owned by Malmo and Copenhagen municipality and Swedish private investors. As the result, it is hard to compare all the systems on the single level due to a big difference in the ownership, which has a direct influence on the development and operation of the system. For instance Copenhagen Malmo Port representative claimed that if they were an independent IT business, there would have been a bigger chance to gain more customers from other ports, than it is right now, when the company is publicly owned.

Communication Structure of all the systems with the clients has excellent strategies. Each system holds tight connections with the customers informing about the updates on the regular basis, as well as adopting the changes that make the use and operation of the system more efficient.

Legal Structure also varies quite a lot within the systems. Some of the ports have a stable policy which requires all the players in the logistic chain to use this information system, and some of the ports are using it on the volunteer basis. Dakosy system of Port of Hamburg does not have any special legal obligations. Only the announcement of Dangerous Cargo Movements and announcements of export (for Customs Control) is obligatory.

In Norway there is a requirement for the ISPS code regulation. By law all vessel operators should report e.g. passenger list, however it is not regulated by law on how it should be done. The usage of the system is optional. There is a legislation that requires an archived list of the transactions; therefore it creates an opportunity and need for using this system.

The Port of Amsterdam system is obligatory to use because of the regulation on communication and piloting issued by ministry of transport. It is mandatory to use for the 1st call of the ship. It is required to use the system to say the ship is coming in within 24 hours.

Whereas in Copenhagen Malmo Port the use of the system is not mandatory by law, but as much as possible useful information is provided to foster the usage. In general the usage of the system is voluntary, which creates free choice.

As you can see, each port has its own requirements and regulations, which again might be seen as a bottleneck on the way to the regional and international cooperation.

6 Recommendations

This section will give possible recommendations on how to improve the development of the information sharing system and enhance cooperation on the regional and international level between the ports.

Recent objectives of the trade and logistics require more efficiency in terms of the throughput of the products, time and destinations. IT technologies meet these objectives by reflecting the transport chain process and organization meeting the demands and providing the safety and security. Currently, there is a great amount of the information systems which aid the processing of these tasks. However there is a clear need for a balance between the individual systems that would foster the cooperation between them, as well as the certain standards that would facilitate the delivery of the better service. What is more there is a necessity for support within the joint development of the transport information systems that enhance the integration of maritime transport in the global transport chain and follow the development of the concrete project. A good and potential point that should follow up by the practical results in the short period could be determined by the framework created by the e-maritime initiative and the latest results of the research project **MARNIS**.

Another angle for potential cooperation and improvement of the system integration could be evaluated from the legal perspective. After the preliminary review of the analysed sections of the report the emphasis would be made on the legal issues concerning the information system operations**. Legal structure of the systems might be the one to foster the regional and international cooperation by future policy initiative**. Referring back to the results overview in the legal structure section it could be seen that a lot of the port has different legal requirements for the Single Window usage and operations. Some of the ports do it on the voluntary basis some are obliged to do that. Therefore initiative of the specific policy which would make the operation of such systems obligatory could foster cooperation on the regional and international level.

To support this recommendation, several findings could be presented from the latest E-Maritime Conference, which implies that, a single approach towards and between authorities communication is a string value added. More commercial, business to business applications on the other hand seem to be less relevant and rather risky to distract energy and resources from the real objective (FEPORT, 2010). A single window should therefore start with the authorities rather than with the industry (FEPORT,

2010). Integration of Port Single Window with national and international web portals will certainly enhance efficiency of data collection and distribution.

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Overcoming the economic crisis

Report on StratMoS WP C-4c

TU Hamburg-Harburg

The Interreg IVB North Sea Region Programme

November 2010

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1. Introduction

With the collapse of the financial markets in autumn 2008 and the ensuing global economic crisis, the European ports were hit hard after a decade of continuous growth. But not everywhere in the EU the crisis had shown up equally: while some ports in 2009, compared to the previous year, had to respond to losses in turnover of up to 30 % (Hamburg) others showed growth rates of 7 % (Zeebrugge) (Eurostat, 2010). The reactions during the crisis were also very different: while some ports were unimpressed by the freight decline and pointed to the long-term positive outlook for the maritime economy and in particular for container traffic, others planned to push back expansion projects and focused on cost reducing and efficiency-enhancing measures (Slack, 2010; Pallis and Langen, 2010). Already a large volume of literature exists regarding port development and sea port competition in Europe. The various developments during the alleged worst economic crisis since the last 80 years, though, is still largely unexplored (Theys et al., 2010). A cluster analysis was used in this study to group ports that have undergone similar development during the crisis. These different groups had different internal drivers for the turnover development, which served as an explanation for their performance during the crisis. Identified drivers were, e.g. the types of goods handled, the origin and destination of goods and the geographical location. Even if in October 2010 the signs are good that the crisis is overcome, this study only has data available until the third quarter of 2009. The possible ending of the crisis will not be discussed, so the survey still takes place in the crisis. This study is organized as follows: Chapter one gives a brief introduction to this study. The second chapter deals with the state of research, the analysis of various ports and the existing literature on the crisis in the ports. In the third chapter the concept of a cluster analysis is briefly introduced. In chapter four the implementation and the results of the cluster analysis are being presented. In the fifth chapter the conclusions and the further research needs are discussed.

2. State of research and literature review

This chapter deals with the state of research, the analysis of various ports and the existing literature on the crisis in the ports.

With the increasing development of the port away from the traditional storage and handling facility to become a multimodal pivot point in global supply chains, ports have also become a field of growing scientific interest. This growing interest can a.o. be shown via bibliometric measures. In a broad review covering the years 1997 to 2008 Pallis et al. (2010) came to the conclusion that there have been 114 scientific publications on ports in the period from 1997-2001, 172 in the period 2002 to 2006 and altogether 109 studies in the years 2007 and 2008 only. The study examined about 50 scientific publications in English. According to Pallis et al. (2010), the trend goes to more theoretical and globally oriented investigations. The three major fields of port studies are competition and competitiveness, port policy and regulation as well as port governance. Especially the role of ports in transport and supply chains has gained importance in the last two years examined.

2.1. Analysis of seaports

For the comparative analysis of several ports, comparable information and data are necessary. The aforementioned change of the role of the port so far have lead to a higher heterogeneity of ports in general (Heaver, 2006). In the literature this problem has been discussed for some time (Rimmer, 1966; Langen, 2004; Bichou and Gray, 2005; Cetin and Cerit, 2010). A distinction must be made between general *categories*, into which ports can be classified, and *selection criteria* that allow the selection of ports on qualitative aspects by the market. Overlaps are possible.

2.1.1. Categorization

The classification of ports is often defined by their geographic location (Kreukels, 1998), their specialization (Ninnemann, 2006), their common hinterland (Hamburg-Le Havre- Range) or their cargo handling capacities (Container port rankings; Mohi-Eldin and Mohamed (2010)). Bichou and Gray (2005) identify, in their critique of the conventional terminology for classifying seaports, four different levels within the port, which vary greatly and make standardisation difficult:

- **Organisational differences**: issue of ownership (public port versus private port), institutional status (landlord/tool port versus service port), social arrangements (labour and manpower), etc.

- **Operational differences**: types of cargo handled, ships serviced, terminals operated, etc.

- **Physical and spatial differences**: location, access, connectivity, available capacity, etc.

- **Legal and regulatory differences**: trade and transport policy, administrative procedures, safety and security regulations, environment, etc.

To make a meaningful comparison, each level must be checked for discrepancies, that cannot be too large. A comparison between a private and a public port may still be useful. A comparison between a crude oil port and a container port probably is not. Already 40 years ago, Rimmer (1966) described the difficulties in comparing and classifying ports. In his study of New Zealand ports, he came to the conclusion that the cargo volume in tons is the appropriate measure of seaports for comparison. By using correlation matrices, the relationship among various dimensions was observed over several years. Here, the cargo volume in tons had the highest correlation with all other dimensions. Other measures, such as the number of goods transshipped and the maximum draught for ships proved to be of little use in this context. Therefore, the total cargo throughput in tons has become established as a key differentiator for ports and is one of the outputs most used in literature (Simoes and Marques, 2010). Nowadays, all major port rankings use this unit for comparative measurements, for container ports the *twenty feet equivalent unit* (*TEU*) is also very common (Notteboom, 2009). The EU has developed their own classification for seaports. According to the categories in Table 1, all European ports are classified according to cargo throughput volumes or passenger traffic over a one year period.

Category	Criteria	Definition
A – international seaports	ports with a total annual traffic volume of not less than 1,5 million tonnes freight or 200 000 passengers	play a major role in international maritime transport
B – community seaports	ports with a total annual traffic volume of not less than 0,5 million tonnes of freight or between 100 000 and 199 999 passengers	equipped with the necessary transshipment facilities for short-distance sea shipping
C – regional ports	ports which do not meet the criteria of categories A and B	situated in island, peripheral or outermost regions, interconnecting such regions by sea and/or connecting them with the central regions of the Community

Table 1: EU categories, criteria and definitions for seaports. Source: European Parliament

A certain distinction by types of goods is useful because of the large differences between volume, weight and value. The typical distinction into different types of goods is the following, which was also used for a study on behalf of the *European Sea Ports Organisation* (Notteboom, 2009):

- Container
- RoRo (Roll-on/Roll-off)
- General Cargo
- Liquid Bulk
- Dry Bulk

The collection of information on types of goods for the *EUROSTAT database* (Eurostat, 2010) is regulated by the administration of the EU and differentiates additionally between self-propelled and non self-propelled RoRo units (European Parliament, 2009). This database will be used for the cluster analysis, although self-propelled and non self-propelled RoRo units will be merged in this study.

2.1.2. Selection criteria

In the literature on port competition and port selection criteria for shipping companies, there are a variety of decision factors that allow the classification of port characteristics. Different studies came to comparable results in their literature review over port selection criteria (Wiegmans et al., 2008; Cahoon and Notteboom, 2008). Table 2 shows the criteria identified with their indicators that influence port and terminal selection by (container) shipping lines.

Criteria	Indicator
Port physical and technical infrastructure	nautical accessibility profile, terminal infrastructure and equipment, hinterland accessibility profile
Geographical location	vis-á-vis the immediate and extended hinterland, vis-á-vis the main shipping lines
Port efficiency	port turnaround time, terminal productivity, cost efficiency, port operating hours
Interconnectivity of the port	frequency of deep-sea and feeder shipping services
Inland transport services	reliability, capacity, frequency and costs of inland transport services by truck, rail and barge
Auxiliary services	quality and costs of auxiliary services
Administrative costs	efficiency and costs of port management and administration
Logistic services	availability, quality and costs of logistic value-added activities efficiency
Port security	port security/safety and environmental profile of the port
Port reputation	satisfactory ranking in benchmarking studies

Table 2: Port selection criteria and indicators used by (container) shipping lines. Source: Wiegmans et al. (2008); Cahoon and Notteboom (2008).

These indicators can be measured with more or less effort and thus serve the shipping companies as input for their decision models. Because of the difficulty to measure some of them, and because the data is subject to constant change, these indicators are, in a comprehensive analysis of many ports, only of limited benefit. A method developed to circumvent this problem are the so-called *Key Performance Indicators*.

2.1.3. Key Performance Indicators

In particular, the global success of the container has lead to a steady increase in setting up container terminals. These terminals are, compared to the port as a whole, highly specialized and similarly constructed worldwide. This fact has enabled the application of so-called *Key Performance Indicators (KPI)* to compare one terminal with another. That is why they can be used by logistics service providers and investors to ensure a better comparability of ports. As this is desirable for all other ports, KPIs have been extended to other ports as well. KPIs can use for example berth length, terminal area, cranes and employees as input and TEUs moved and tons throughput as output. The extent of publications in this field ranges from surveys using the Delphi method (Cetin and Cerit, 2010; Langen, 2004) to mathematical models from operations research (*DEA Data Envelopment Analysis, SFA Stochastic Frontier Analysis, FDH Free Disposable Hull*, Simoes and Marques (2010)).

The low standardization of data collection procedures and their low level application make a comparison, in addition to the extensive data needs, very difficult. In this context Slack (2010) points out, that KPIs play an increasing role in the allocation of public funds since the ports are faced with declining results after a decade of prosperous growth. According to the annual report of the *European Sea Ports Organisation (ESPO)* 2008-2009 (European Sea Ports Organisation, 2009) the *European Comission* has initiated a discussion in 2008 regarding standardized *port performance indicators*.

2.2. The crisis and the impact on the maritime economy

The global economic crisis began in September 2008. The bankruptcy of U.S. investment bank *Lehman Brothers* at that time led to the downturn of global financial markets and as a result, to the downturn of the real economy. After an average growth of the GDP in the EU of about 3% p.a. in the years 2006 and 2007 and still 0.5% p.a. in 2008, the GDP showed a reduction of 4% p.a. in 2009. Figure 1 shows the five largest North Sea ports, where the crisis has lead to a decline in traffic volume of 13% to 20% in the third quarter of 2009 compared to the same quarter in the previous year.

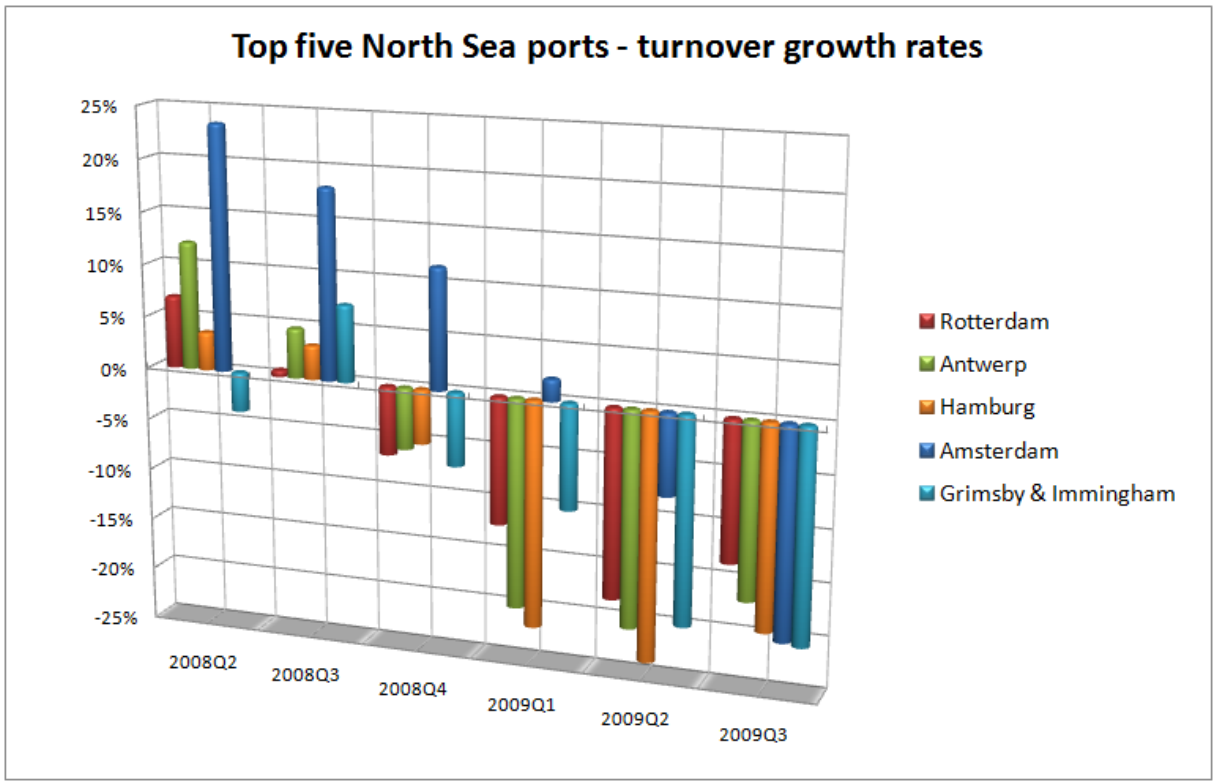

Figure 1: Turnover growth rates compared to the same quarter in the previous year for top five North Sea ports. Source: Eurostat (2010).

Since the start of data collection, the largest seaports have not experienced such strong decline in such a short time span. Given the short duration of the crisis, there is still little data available. Thus the impact of the crisis cannot be clearly quantified. Nevertheless, there are some scientific studies on the impact of the crisis on the ports and maritime industries published. With a focus on the financial sector Rodrigue et al. (2010) have explored the origins of the crisis in the port industry. According to the authors' opinion problems arose while the decade from 1998 to 2008 of continuous growth in most container ports suggested an ongoing growth as given. This resulted in expectations of high levels of return on investments and an increasing value for port infrastructure. The influence of managers coming from a financial background to the port industry grew and with it, the lack of fundamental understandings of this traditionally long-term planning industry. Considerable investments were made by a large number of investors, e.g. pension funds, insurance companies and mutual funds focusing on short-term results and forgetting the need for long-term strategies. According to the authors, the drop-off in turnover rates lead to overcapacities in seaports which were not only driven by exogenous factors like the declining demand worldwide but also supported by the disproportionate investments of the finance industry which did not anticipate dynamic changes in growth rates. For the time after the crisis six trends have been predicted by Rodrigue et al. (2010) for the future development of ports:

- Trend 1: **Rebalancing short-term and long-term benefits** - The market of terminal infrastructure will see fluctuations in asset prices due to the record prices paid befor the crisis and overcapacities. New entrants and investors will be sensitized for balancing short-term gains against long-term performance improvement.

- Trend 2: **Redefining public involvement** - After the crisis the secularization of port infrastructure is a question of growing importance because some countries have rediscovered the vital function of ports for their own economy and want to limit the influence of foreign companies in this sector.

- Trend 3: **Refocus on resource management** - Terminals refocus on operations, work force, resources and asset optimization for long-term improvements rather than short-term gains.

- Trend 4: **Reassessing portfolios, vertical disintegration and consolidation** - The downturn of the industries benefits consolidation on some fields of freight forwarding and logistic companies. These sectors offer new potentials for mergers or acquisitions for some funds. The expansion plans of shipping lines as active investors in port infrastructure will resurrect slowly due to the low profit margins in the market.

- Trend 5: **Restrictions in getting finance** - Funding shortage will remain a problem in the finance sector and will influence investments in ports as well.

- Trend 6: **Dealing with mature markets** - Future perspectives see moderate long-term growth in the old economies in North America and parts of Europe. Trade might not return to double-digits growth rates soon. Growing market shares will be achieved only with fierce competition and that means to focus on costs, efficiency, performance and quality for the port industry.

According to the authors, these trends and the return of a certain level of embeddedness in the region, experience and knowledge are essential for the future of the port industry. The withdrawal of over-investments and unrealistic expectations of profits will guide the port industry back to its core business: offering trade and intermodal connectivity. That affords capital intensive assets and long-term strategies.

Coming more from the trade flows, Pallis and Langen (2010) choose an output-driven approach to find out the consequences of the crisis. They explain the decline of various flows of goods in the ports with the decline in demand for the secondary products. That is why turnover rates cannot be seen as a derived function of the GDP development. The following examples illustrate this characteristics of good flows: According to the authors the demand for coal is extracted from the demand for energy, which is hard hit by the loss of production in energy-intensive sectors, e.g. the automobile and steel industries. Refrigerated container shipments on the other hand decrease less strongly because they are directly dependent on consumption of perishable foods, which in the crisis has remained largely stable. In addition to this the demand for crude oil has declined though the refinery output did not. This has lead for example to an increase of export of refinery outputs, as the authors found in their surveys of the Port of Rotterdam (Pallis and Langen, 2010, p.12).

As a consequence of these developments, the port authorities (PAs) are faced with an increasing interest in subsequent negotiations from shipping companies (SCs) and terminal operating companies (TOCs) regarding fees and concessions, an increasing interest of some financial investors who had recently invested in port infrastructure and now search for an exit strategy for their investments, and an increasing interest in withdrawal of planned

development projects with private TOC. Thus, Pallis and Langen (2010) assume that the ports must focus more closely on the future, especially on their responsibility towards the environment and society.

This social responsibility, also called license to operate, is in the focus of a study by Adams et al. (2009) regarding sustainability strategies in ports. They found out that the ports do not believe they are giving themselves a competitive advantage over other ports through the fulfillment of environmental protection requirements. Through the decline in shipping volume, due to the economic crisis, the truck queues and congestion problems around port areas have largely disappeared. Apparently that gives some ports the impression that they are no longer exposed to much public pressure regarding sustainable measures for the benefit of the environment. According to the authors, these problems will recur - only with a delay. Similarly, the maritime industry may hardly escape from the political will to involve all transport modes in the climate debate. In a survey of several SCs the study also found out, that over half of the questioned SCs are actually interested in ports' environmental performance (Adams et al., 2009, p.16).

The rising interest of ports in corporate social responsibility is also reflected in the report of the *ESPO* regarding Societal Integration of Ports (European Sea Ports Organisation, 2010). It becomes clear that ports need to improve their image in order not to lose community support and to counteract the threatening shortage of qualified employees. Cooperating in the initiative people around ports, started by the port authority of Rotterdam and supported by the *ESPO*, the PAs of the ports of Amsterdam, Antwerp, Cartagena, Constantza, Gijón, Hamburg, Helsinki, Klaipéda, Le Havre, Livorno, Marseilles, Rotterdam, Stockholm and Valencia created a *best-practice* database regarding societal integration. Out of this project the second edition of the *ESPO Code of Practice* emerged in 2010. Table 3 presents the themes, inlcuding target groups, and their aims for a better social integration of ports regarding the new *ESPO Code of Practice*.

Theme	**Target group**	**Aim**
General public support and image	General public	By involving the general public the image of ports will improve and will result in public support which is needed to maintain the *social license to operate* of ports and to achieve expansion and development projects.
Education and labour market	(Future) employees	To have an impact on the supply side of the labour market in order to attract better educated workers to ports. This concerns investment in education, connecting port companies to educational institutes and to engage support of governmental bodies.
Port-city relationship	People living in and around ports	To conserve good relations with inhabitants in and around port areas, but also to cooperate between cities and ports within transformation areas. This should result in a good quality of life in the surrounding areas of ports supporting an attractive business climate.

Table 3: Themes, Target groups and Aims of the ESPO Code of Practice. Source: European Sea Ports Organisation (2010).

Theys et al. (2010) investigate the awarding of terminal operating licenses in seaports during the crisis. They have found out that PAs are now mostly confronted with further renegotiations with TOCs. In order to prevent this in the future, the procurement procedures should be aimed not only at the maximum profit of the PA, but may also contribute to include the experience and financial resources of a TOC. Throughput guarantees with a (moving) threshold could also stimulate pricing and investment decision of the concessionaire.

Slack (2010) considered in his study of the maritime industry in the world economic crisis the decline in performance in the big old economies in North America and Europe and the impact on the major shipping routes, such as the Asia-Europe route and the trans-Pacific route. He concludes that the younger, emerging markets in Asia and India can power up their economic performance more quickly and so the intra-Asian traffic will grow stronger. The shipping lines will still fight for some years with their overcapacity problems through due to several new building orders of container vessels.

The volume of new orders was expected in June 2008 to be over 53% of the current container fleet capacity worldwide. In September 2010 the orderbooks still held 28% of the current container fleet capacity containing a doubling of container vessels bigger than 8,000 TEU (Clarkson Research Services Ltd., 2010). This tightening of competition among container shipping lines will induce renegotiations of tariffs with TOCs. Although the impacts of the crisis are still not fully exposed, Slack (2010) presents four crucial points that will change the maritime industry sooner or later:

1. The intra-Asia trade flows are growing faster than any other and will become the most important trade link.

2. The port and shipping industries have to make greater efforts regarding environmental management, simply because manufacturers and users pay more attention to sustainable actions.

3. The governmental influence in ports and shipping have increased due to bailouts where governments have assisted financially (Slack, 2010, p.8). This trend continues because governments have realized the importance of the maritime industry for their economic strength.

4. The ports are forced to implement performance-related and quality indicators for accountability, not only due to financial reasons and further investment in infrastructure financed by public funds, but also for more transparency for supply chain customers and shipping companies.

2.3. Classification of the present study

The recent publications on ports in the world of the post-economic crisis either choose the global view of markets and trade flows and their consequences for the maritime industry in general (Mohi-Eldin and Mohamed, 2010), or choose a special topic in the microcosm port (Theys et al., 2010). This study reflects more the real turnover development of ports before and in the crisis in order to have an indicator how the crisis effected them. Due to the fact that the latest available data for all European seaports is the third quarter of 2009, that was still in the middle of the crisis when nobody could anticipate the end of it, this study tried to use all available data provided by Eurostat (2010) to show the process in the crisis based on turnover growth rates, which are comparable between ports. For this approach a cluster analysis was chosen to find some groups in the large number of ports with a comparable performance and a set of different factors which influenced the ports in the crisis in order to explain why some ports performed better or worse than others.

3. The cluster analysis

In this chapter the theory of cluster analysis is briefly introduced. For further information see Backhaus (2008) and Arabie et al. (1996).

3.1. The concept of clustering

Cluster analysis is a procedure for finding groups of similar subjects in large data sets. Cluster analysis is used in several fields, e.g. medicine, biology, finance, urban planning, social sciences, etc. and can be applied to metric and non-metric attributes. In this study seaports are the subjects and turnover growth rates over six quarters the attributes. The aim is to find groups of ports which had a similar development during crisis.

3.2. The metric

The definition of similarity is in mathematical terms a metric, a distance function, which measures the difference between two values. Usually the Euclidean metric is used, that is, in the two-dimensional understanding, the direct distance between two points. It is the special case with from the general Minkowski metric:

$$d_{jk}^{r} = \sqrt[r]{\sum_{i=1}^{M} \left| x_{ji} - x_{ki} \right|^{r}}, \qquad r \in N$$

κ defines the distance between the element x_j and x_k with I $\in$ m different attributes.

3.3. Clustering process

A clustering algorithm is applied to the data. In case of unstandardised data a standardisation is necessary (see Subsection 5.2). Two general types of cluster algorithms exist:

- Hierarchical clustering
- Partitional clustering

Partitional clustering starts with a number of preselected cluster centres and tries to assign every subject to one cluster. *Hierarchical clustering* puts clusters together in a step-by-step process. Either the algorithms are agglomerative, so they are starting with all subjects as one cluster and gain less but larger cluster, or they are divisive and start with one big cluster and try to achieve more smaller clusters. Because it is sometimes difficult to identify a certain number of cluster centres, hierarchical clustering is often preferred. In general an agglomerative hierarchical clustering process works as follows:

1. Calculation of the distance matrix, i.e. all distances between all elements are measured by using the previously defined metric.

2. The shortest distance between two elements is defined as the first cluster. Both elements are assigned to one cluster.

3. The distance matrix is recalculated.

4. Step 2 and 3 are repeated until each object is assigned to a cluster.

This approach requires the definition of a metric and a clustering algorithm. The clustering algorithm has to define how the distance from a new cluster to one subject is measured (Step 2 to 3). There are several algorithms calculating this in different manners. For this study Ward's method is being applied because the method tries to keep the variance within the clusters low. The study searches for similar development in the growth rates between the ports, so the variance in the clusters should be lower than the variance between all ports.

4. The results of the cluster analysis

In the following the results of the cluster analysis are being presented.

4.1. The data collection

Eurostat provides quarterly data about turnover in European seaports. The latest data available for all European seaports is the third quarter of 2009 (named: 2009Q3). The data collection used contains turnover volume, volume of cargo origin and target country and type of cargo for each port and every quarter. At first all seaports from the countries France, United Kingdom, Belgium, Netherlands, Germany, Denmark, Sweden and Norway were chosen, secondly only ports with a minimum of 250,000 tons of cargo turnover in 2009Q3 (Definition A and B-ports) were taken into account, so that 309 ports were left. The extraction of only North Seaports was done manually including the ports of the Channel and the Skagerrak. In uncertain situations the port was included in order to get a large data sample. At the end 68 seaports have been identified. The data set *UK01GB221 - Rivers Hull & Humber* had to be removed, because it was an aggregated data set for more than one port.

4.2. Data processing

To obtain comparable data from absolute turnover volumes, a standardisation is required before clustering. Growth rates were calculated in the following way:

$$growth\_rate(year+1) = \frac{turnover\_volume(year+1) - turnover\_volume(year)}{turnover\_volume(year)}$$

Growth rates were calculated for all 67 North Seaports for the time span 2007Q3 to 2009Q3.

4.3. Implementation

Table 4 gives an overview of all requirements and input for the cluster analysis.

Requirements	**Input**
Subjects	67 category A and B-ports in the North Sea
Attributes	growth rates from 2008Q2 to 2009Q3
Clustering process	agglomerative hierarchical clustering
Number of clusters shown	between 4 and 12
Metric	squared euclidean distance
Clustering algorithm	Ward's method
Program used	PASW Statistics 18.0 (SPSS Inc.)

Table 4: Implementation of the cluster analysis. Source: own work.

Table 5 shows in each row the ports' EU-code, official name, country and then a number of the cluster it belongs to. For a better overview each cluster has a different color. Between 4 and 12 clusters are shown and the process from more to less clusters can be studied. It is possible to calculate the best amount of clusters for a given data set, but this is only necessary for large datasets. Outliers can be identified easily, cause of their behavior to represent only one cluster during successive steps. In this case the ports *Kirkwall* (UK01GBKWL) and *Cromarty Firt* (UK01GBCRN) have been detected. Also *Thyboron* (DK00DKTYB) was rejected due to missing data. Because of the development of all the cluster before and after and in order to obtain neither too many nor too few cluster, the eight cluster solution was chosen. Extracting three ports from the set, the analysis found six clusters for 64 ports.

no.	eu_code	port_name	country	12 Cluster	11 Cluster	10 Cluster	9 Cluster	8 Cluster	→Cluster-Definition	7 Cluster	6 Cluster	5 Cluster	4 Cluster
1	BE00BEANR	Antwerp	Belgium	1	1	1	1	1	→medium_decrease	1	1	1	1
2	BE00BEGNE	Ghent	Belgium	1	1	1	1	1	→medium_decrease	1	1	1	1
3	DE01DEBRV	Bremerhaven	Germany	1	1	1	1	1	→medium_decrease	1	1	1	1
4	DE01DEEME	Emden	Germany	1	1	1	1	1	→medium_decrease	1	1	1	1
5	DE01DEHAM	Hamburg	Germany	1	1	1	1	1	→medium_decrease	1	1	1	1
6	FR01FRDKK	Dunkerque	France	1	1	1	1	1	→medium_decrease	1	1	1	1
7	NL00NLAMS	Amsterdam	Netherlands	1	1	1	1	1	→medium_decrease	1	1	1	1
8	NL00NLRTM	Rotterdam	Netherlands	1	1	1	1	1	→medium_decrease	1	1	1	1
9	NL00NLVLI	Vlissingen	Netherlands	1	1	1	1	1	→medium_decrease	1	1	1	1
10	NO00NOKRS	Kristiansand	Norway	1	1	1	1	1	→medium_decrease	1	1	1	1
11	NO00NOSVG	Stavanger	Norway	1	1	1	1	1	→medium_decrease	1	1	1	1
12	SE02SEGOT	Goteborg	Sweden	1	1	1	1	1	→medium_decrease	1	1	1	1
13	UK01GBHUL	Hull	United Kingdom	1	1	1	1	1	→medium_decrease	1	1	1	1
14	UK01GBMED	Medway	United Kingdom	1	1	1	1	1	→medium_decrease	1	1	1	1
15	DE01DENHA	Nordenham	Germany	2	2	2	2	2	→stable_growth	2	2	2	2
16	DK00DKHIR	Hirtshals	Denmark	2	2	2	2	2	→stable_growth	2	2	2	2
17	FR01FRCQF	Calais	France	2	2	2	2	2	→stable_growth	2	2	2	2
18	FR01FRLEH	Le Havre	France	2	2	2	2	2	→stable_growth	2	2	2	2
19	NO00NOBGO	Bergen	Norway	2	2	2	2	2	→stable_growth	2	2	2	2
20	NO00NOFRO	Floroe	Norway	2	2	2	2	2	→stable_growth	2	2	2	2
21	NO00NOTON	Tonsberg	Norway	2	2	2	2	2	→stable_growth	2	2	2	2
22	UK01GBDVR	Dover	United Kingdom	2	2	2	2	2	→stable_growth	2	2	2	2
23	DE01DEBRE	Bremen	Germany	3	3	3	3	3	→continuous_decrease	1	1	1	1
24	DE01DEBUZ	Buetzfleth	Germany	3	3	3	3	3	→continuous_decrease	1	1	1	1
25	DE01DECUX	Cuxhaven	Germany	3	3	3	3	3	→continuous_decrease	1	1	1	1
26	DK00DKFDH	Frederikshavn	Denmark	3	3	3	3	3	→continuous_decrease	1	1	1	1
27	FR01FRCFR	Caen	France	3	3	3	3	3	→continuous_decrease	1	1	1	1
28	NL00NLTNZ	Terneuzen	Netherlands	3	3	3	3	3	→continuous_decrease	1	1	1	1
29	NL00NLVLA	Vlaardingen	Netherlands	3	3	3	3	3	→continuous_decrease	1	1	1	1
30	NO00NODRM	Drammen	Norway	3	3	3	3	3	→continuous_decrease	1	1	1	1
31	NO00NOGVL	Grenland/Skien/ Porsgrunn/Bamble	Norway	3	3	3	3	3	→continuous_decrease	1	1	1	1
32	NO00NOKAS	Karmsund/Haugesund/ Karmøy	Norway	3	3	3	3	3	→continuous_decrease	1	1	1	1
33	NO00NOOSL	Oslo	Norway	3	3	3	3	3	→continuous_decrease	1	1	1	1
34	UK01GBGOO	Goole	United Kingdom	3	3	3	3	3	→continuous_decrease	1	1	1	1
35	UK01GBIMM	Grimsby & Immingham	United Kingdom	3	3	3	3	3	→continuous_decrease	1	1	1	1
36	UK01GBLON	London	United Kingdom	3	3	3	3	3	→continuous_decrease	1	1	1	1
37	UK01GBMME	Tees & Hartlepool	United Kingdom	3	3	3	3	3	→continuous_decrease	1	1	1	1
38	UK01GBRMG	Ramsgate	United Kingdom	3	3	3	3	3	→continuous_decrease	1	1	1	1
39	UK01GBSUL	Sullom Voe	United Kingdom	3	3	3	3	3	→continuous_decrease	1	1	1	1
40	BE00BEZEE	Zeebrugge	Belgium	4	2	2	2	2	→stable_growth	2	2	2	2
41	DE01DEWVN	Wilhelmshaven	Germany	4	2	2	2	2	→stable_growth	2	2	2	2
42	DK00DKAAL	Aalborg	Denmark	4	2	2	2	2	→stable_growth	2	2	2	2
43	DK00DKEBJ	Esbjerg	Denmark	4	2	2	2	2	→stable_growth	2	2	2	2
44	NO00NOBRE	Bremanger/Svelgen	Norway	4	2	2	2	2	→stable_growth	2	2	2	2
45	UK01GBABD	Aberdeen	United Kingdom	4	2	2	2	2	→stable_growth	2	2	2	2
46	UK01GBFXT	Felixstowe	United Kingdom	4	2	2	2	2	→stable_growth	2	2	2	2
47	UK01GBPME	Portsmouth	United Kingdom	4	2	2	2	2	→stable_growth	2	2	2	2
48	UK01GBSHO	Shoreham	United Kingdom	4	2	2	2	2	→stable_growth	2	2	2	2
49	SE02SEBRO	Brofjorden Scanraff	Sweden	5	4	4	4	4	→strong_growth	3	3	2	2
50	SE02SESTE	Stenungsund (Ports)	Sweden	5	4	4	4	4	→strong_growth	3	3	2	2
51	DE01DEBKE	Brake	Germany	6	5	5	5	5	→deep_fall	4	4	3	3
52	UK01GBHRW	Harwich	United Kingdom	6	5	5	5	5	→deep_fall	4	4	3	3
53	DK00DKROR	Aalborg Portland	Denmark	6	5	5	5	5	→deep_fall	4	4	3	3
54	NL00NLVEL	Velsen/Ijmuiden	Netherlands	6	5	5	5	5	→deep_fall	4	4	3	3
55	UK01GBKWL	Kirkwall	United Kingdom	7	6	6	6	6	→out	5	5	4	4
56	BE00BEOST	Ostende	Belgium	8	7	7	7	7	→strong_downturn	6	4	3	3
57	DE01DEBRB	Brunsbuettel	Germany	8	7	7	7	7	→strong_downturn	6	4	3	3
58	NL00NLDZL	Delfzijl/Eemshaven	Netherlands	8	7	7	7	7	→strong_downturn	6	4	3	3
59	NO00NOLAR	Larvik	Norway	8	7	7	7	7	→strong_downturn	6	4	3	3
60	UK01GBTYN	Tyne	United Kingdom	8	7	7	7	7	→strong_downturn	6	4	3	3
61	NL00NLMOE	Moerdijk	Netherlands	9	8	8	8	5	→deep_fall	4	4	3	3
62	NO00NOMOL	Molde	Norway	9	8	8	8	5	→deep_fall	4	4	3	3
63	DK00DKTYB	Thyboron	Denmark	10	9	9	2	2	→out	2	2	2	2
64	NO00NOKSU	Kristiansund	Norway	10	9	9	2	2	→stable_growth	2	2	2	2
65	UK01GBCRN	Cromarty Firt	United Kingdom	11	10	10	9	8	→out	7	6	5	1
66	UK01GBIPS	Ipswich	United Kingdom	12	11	4	4	4	→strong_growth	3	3	2	2
67	UK01GBNHV	Newhaven	United Kingdom	12	11	4	4	4	→strong_growth	3	3	2	2

Table 5: Results of the clustering analysis. Source: own calculations based on data by Eurostat (2010).

4.4. Defining of the clusters

The arithmetic mean and variance have been calculated in order to check if the cluster performed better than the entirety. Also a specific name for each cluster was chosen in order to reflect the development during the crisis for the ports assigned to it. The results are presented in Table 6 and visualized in Figure 2.

	period	strong_ growth	stable_ growth	medium_ decrease	continuous_ decrease	strong_ downturn	deep_ fall	64_ports
arithmetic mean	2007Q3	-0,0790	0,0722	0,0585	0,3354	0,1455	-0,0255	0,1262
	2007Q4	-0,2226	-0,0044	0,0721	0,0786	0,3025	0,1279	0,0571
	2008Q1	-0,0603	-0,0146	0,0439	0,0102	0,2336	0,1461	0,0364
	2008Q2	-0,0889	-0,0293	0,1278	-0,0356	0,2778	0,2441	0,0493
	2008Q3	0,2147	-0,0500	0,0455	-0,0688	0,1891	0,0546	0,0109
	2008Q4	0,3945	-0,0198	-0,0257	-0,1137	-0,0392	-0,1764	-0,0363
	2009Q1	0,2414	0,0179	-0,1429	-0,2194	-0,2760	-0,3260	-0,1215
	2009Q2	0,0314	-0,0155	-0,2207	-0,2291	-0,1723	-0,5197	-0,1737
	2009Q3	-0,0983	-0,0010	-0,1495	-0,1182	-0,4000	-0,2445	-0,1247
variance	2008Q2	0,0051	0,0094	0,0039	0,0044	0,0289	0,0280	0,0237
	2008Q3	0,0116	0,0198	0,0052	0,0057	0,0043	0,0363	0,0209
	2008Q4	0,0052	0,0128	0,0040	0,0048	0,0122	0,0086	0,0230
	2009Q1	0,0669	0,0175	0,0079	0,0105	0,0171	0,0450	0,0413
	2009Q2	0,0100	0,0119	0,0087	0,0068	0,0195	0,0221	0,0335
	2009Q3	0,0092	0,0102	0,0027	0,0048	0,0043	0,0248	0,0197
number of ports		4	18	14	17	5	6	64

Table 6: Arithmetic mean and variance for six clusters. Source: own calculations based on data by Eurostat (2010).

The red colored cells in Table 6 show a violation of the rule for a cluster to lay beneath the variance of the entirety. Only the cluster *deep_fall* violated this rule several times due to the six ports of the cluster which had to face high rates in the beginning and then extreme declining rates in the crisis. For the other clusters no severe violation can be detected.

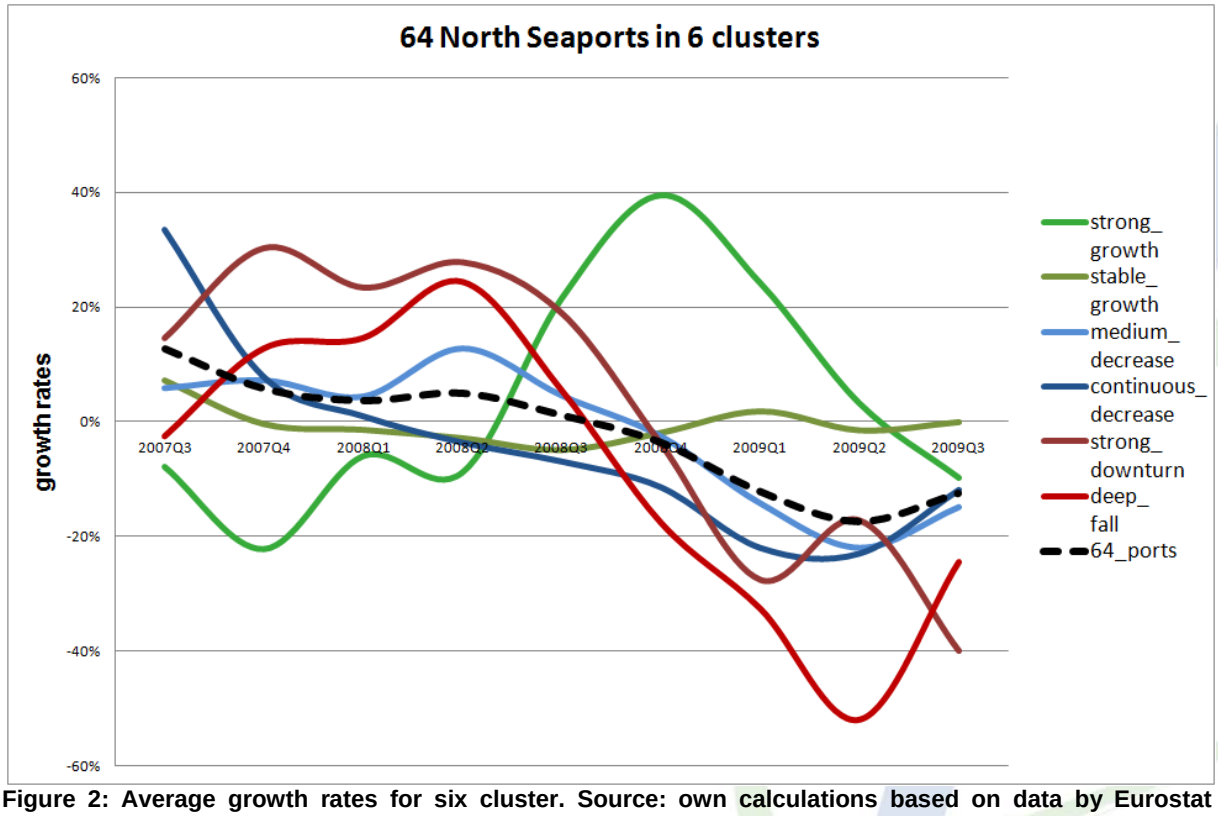

Figure 2: Average growth rates for six cluster. Source: own calculations based on data by Eurostat (2010).

The cluster analysis was only based on six quarters from 2008Q2 to 2009Q3 to find similar developments in the crisis, but for a better overview the time line is shown from 2007Q3 to 2009Q3. So the periods 2007Q3 and 2008Q1 had no influence on the cluster analysis.

Before the crisis defines the period before 2008Q2 and *the crisis* defines the time after it. In the following graphs the colored lines represent the ports assigned to the cluster and the black dotted line the arithmetic mean of all ports of this cluster. Even though the growth rates are discrete values, curves instead of columns were chosen to visualize the dynamics of the development. Due to the large amount of data used, this approach was necessary to enhance clarity, even if it is mathematically unconventional.

strong_growth The *strong_growth* cluster includes 4 ports which showed weak rates before the crisis and strongly increased rates in the crisis. In the second half of 2009 the rates went down to zero.

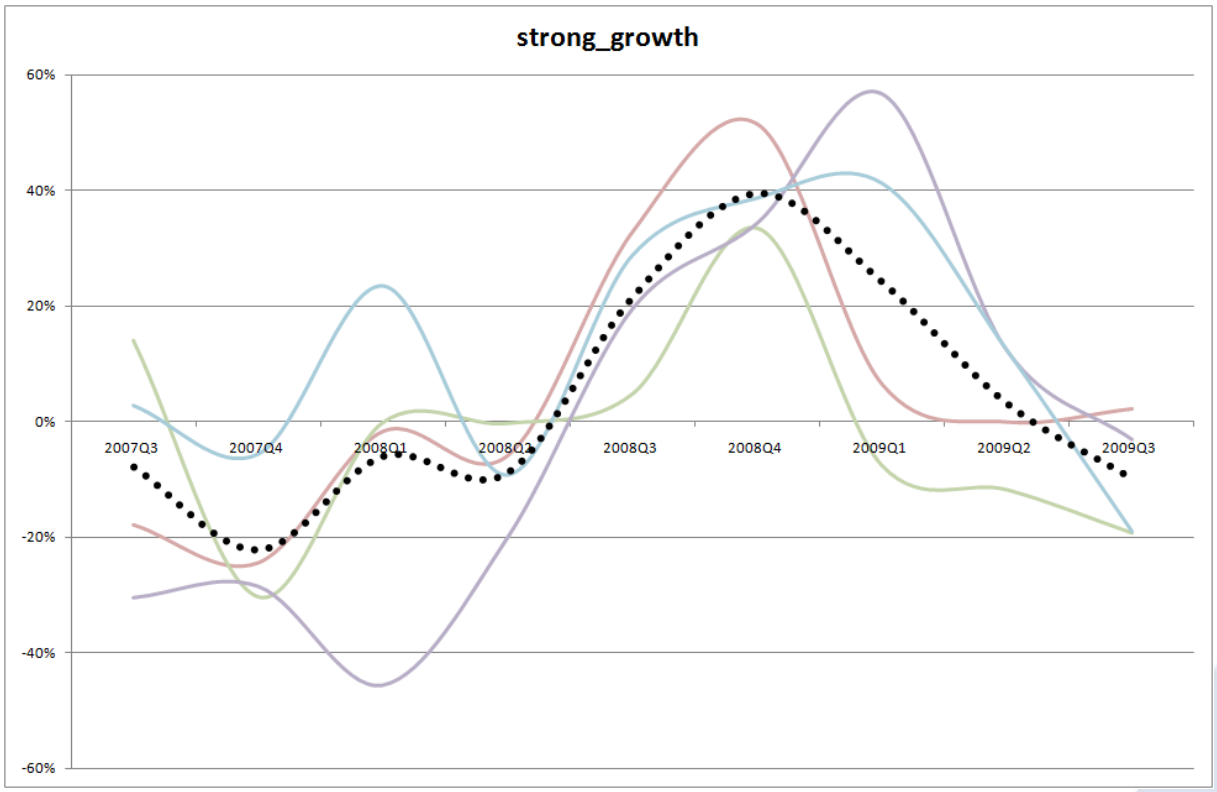

Figure 3: Cluster: strong_growth. Source: own calculations based on data by Eurostat (2010).

stable_growth The *stable_growth* cluster represents 18 ports which showed highly oscillating rates before and during the crisis. In the crisis the rates tend lightly to be more positive.

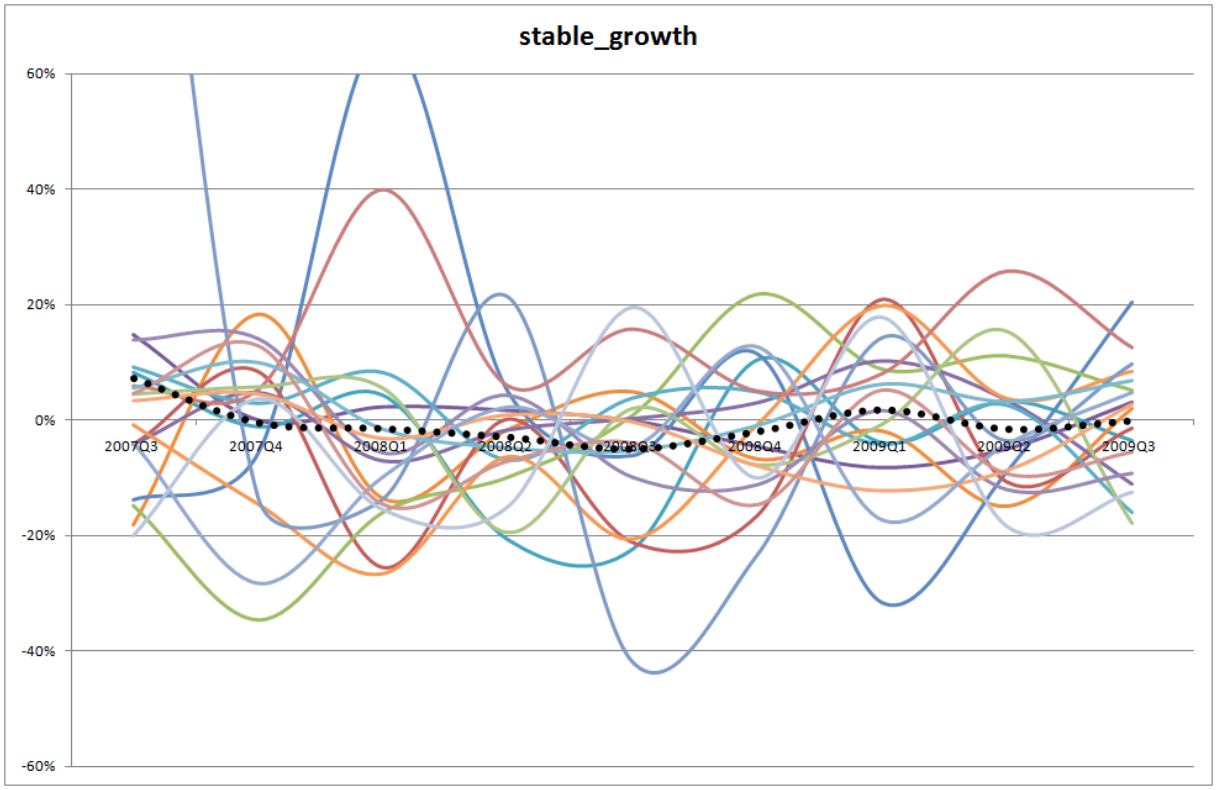

Figure 4: Cluster: stable_growth. Source: own calculations based on data by Eurostat (2010).

medium_decrease The *medium_decrease* cluster contains 14 ports which had before the crisis mostly positive rates and with the beginning of the crisis instantly declining rates.

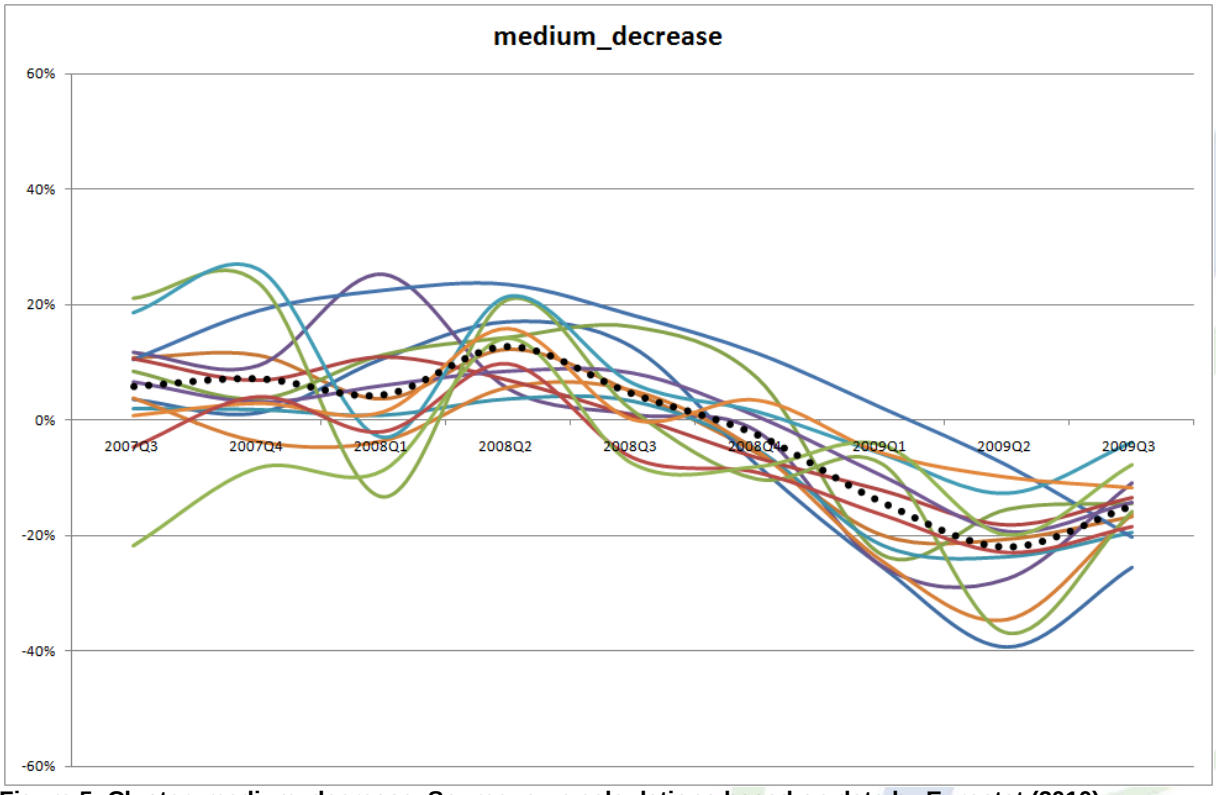

Figure 5: Cluster: medium_decrease. Source: own calculations based on data by Eurostat (2010).

continuous_decrease The *continuous_decrease* cluster includes 17 ports which had constantly shrinking rates even before and also during the crisis. In the middle of 2009 the rates seem to rise again.

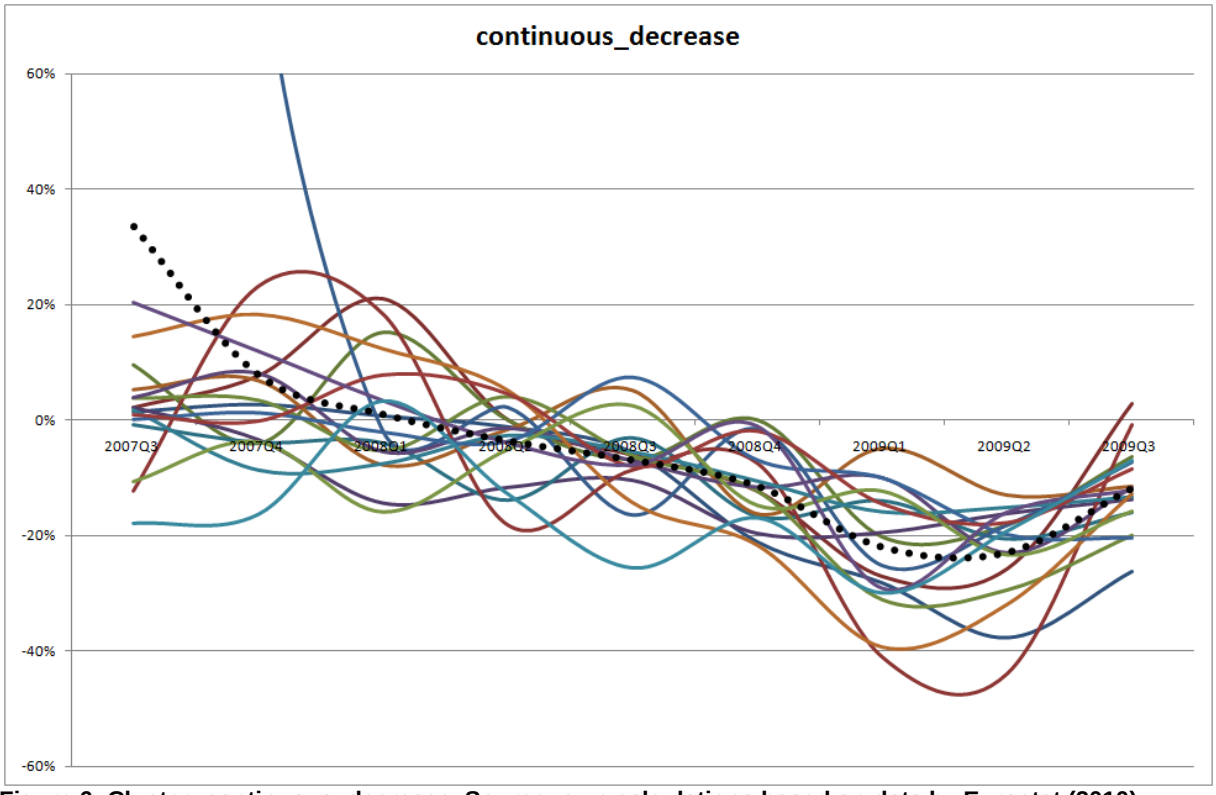

Figure 6: Cluster: continuous_decrease. Source: own calculations based on data by Eurostat (2010).

strong_downturn The *strong_downturn* cluster contains 5 ports which showed high growth rates before the crisis. With the beginning of 2009 a strong downturn lead to an ongoing decline in rates at the end of 2009.

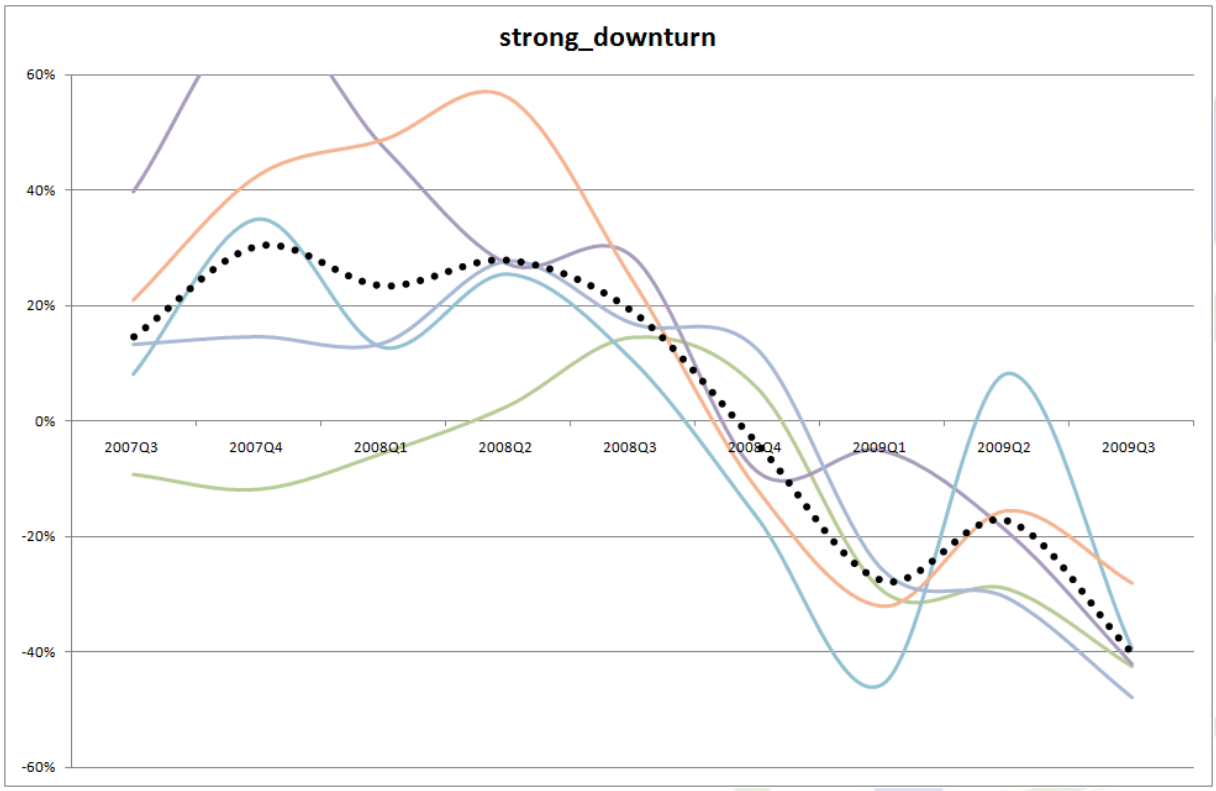

Figure 7: Cluster: strong_downturn. Source: own calculations based on data by Eurostat (2010).

deep_fall The *deep_fall* cluster represents 6 ports which showed high growth rates before the crisis and a very sharp reduction of rates in the crisis. From the middle of 2009 the rates tend to go up again.

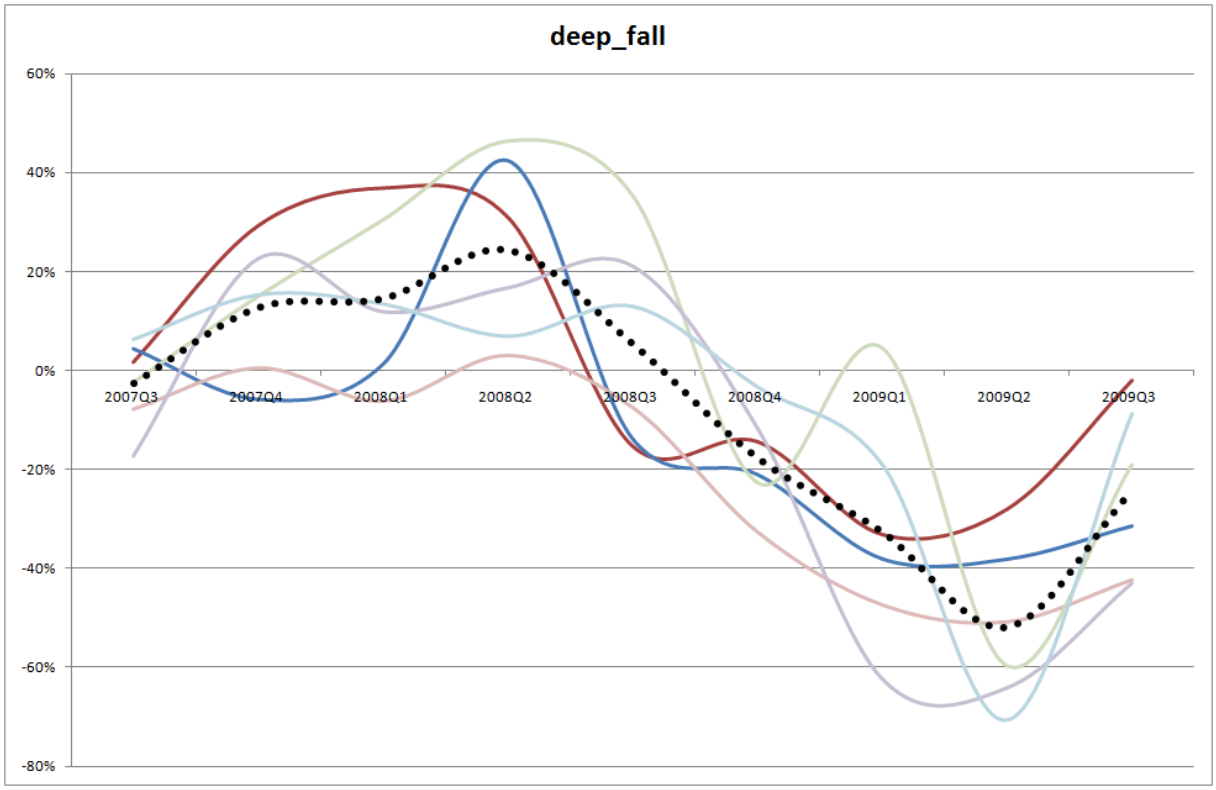

Figure 8: Cluster: deep_fall. Source: own calculations based on data by Eurostat (2010).

Table 7 gives an overview of the six clusters and their behavior shown with these symbols: ++ for very positive, + for positive, 0 for around zero, - for negative and -- for highly negative growth. Data for the end of 2009 (2009Q4) were not available for all ports.

Cluster	**before crisis**	**in the crisis**	**end of 2009**	**share of all ports**
strong_growth	--	++	0	6.2%
stable_growth	0	0	0	28.1%
medium_decrease	+	-	+	21.9%
continuous_decrease	-	--	+	26.6%
strong_downturn	++	--	+	7.8%
deep_fall	++	--	++	9.4%
arithmetic mean	+	-	0	100.0%

Table 7: Overview of the six clusters and their performance. Source: own calculations based on data by Eurostat (2010).

Especially the cluster *medium_decrease* and *continuous_decrease* are very similar to each other, so are the clusters *strong_downturn* and *deep_fall*. The specification of eight clusters, including two outlier clusters, and the tendency of the chosen Ward-method, sometimes leads to very similar clusters of the same size. This is not a disadvantage because it can be used for the factor identification as a control sample. This means if there is a factor identified in one cluster, which can be used to explain the behavior in the crisis, it is likely to be a factor in the similar cluster as well.

4.5. Identification of influencing factors

By studying the profiles of the ports includes in each cluster, this survey tries to find out which factors had more influence on the ports development than others. The factors examined are:

- geographical location of the ports
- trading partners worldwide (deep sea shipping)
- trading partners within Europe (short sea shipping)
- types of cargo

In this part the data for the periods 2008Q1 to 2008Q4 were aggregated into one year for a better overview and to exclude seasonal outliers. Only the year 2008 was chosen for further investigations.

4.5.1. Geographical location of the ports in the clusters

The comparison between cluster and geographical location implied no influence of the ports nationality. The results are visualized in Figure 9. In nearly every cluster nearly all countries surveyed could be found. British ports were found in every cluster and Norwegian ports in all but one, the *strong_growth* cluster.

country\cluster	strong_ growth	stable_ growth	medium_ decrease	continuous_ decrease	strong_ downturn	deep_ fall	All clusters
Belgium		1	2		1		4
Denmark		3		1		1	5
France		2	1	1			4
Germany		2	3	3	1	1	10
Netherlands			3	2	1	2	8
Norway		5	2	4	1	1	13
Sweden	2		1				3
United Kingdom	2	5	2	6	1	1	17
Total	4	18	14	17	5	6	64

Figure 9: Number and nationality of ports per cluster. Source: own work based on data by Eurostat (2010).

4.5.2. Origins and destinations of cargo volumes worldwide - deep sea shipping

The shares of incoming cargo volumes can be seen in Figure 10 (Europe means in this context the continent and not the European Union. That is why Norwegian and parts of Russia are accounted to Europe.). The *strong_growth* cluster shows a high dependency on trading with Europe. But Europe has a very high share in the other clusters as well so further investigations have to be made. For the *stable_growth* and *medium_decrease* cluster the high share of cargo coming from Asia seemed to stabilize ports' turnover in contrast to the weak-performance clusters *strong_downturn* and *deep_fall*, which hold a higher share of cargo coming from North and South America. The share of cargo coming from Africa was over 10% in the *stable_growth* and the two *decrease* clusters, which implicates that there is no strong relation to the cluster performance. The overall share of cargo coming in (% of total turnover) might influence the performance of the clusters in a positive way: the two *growth*

clusters had a smaller share of cargo coming in than the *strong_downturn* and *deep_fall* cluster.

Incoming	strong_ growth	stable_ growth	medium_ decrease	continuous_ decrease	strong_ downturn	deep_ fall	All clusters
Africa	1%	12%	12%	10%	1%	4%	11%
Asia	0%	17%	17%	4%	1%	4%	14%
Europe	97%	66%	43%	68%	82%	45%	52%
North America	1%	3%	11%	6%	5%	9%	9%
Oceania	0%	0%	2%	3%	0%	3%	2%
South America	0%	2%	15%	8%	12%	35%	12%
% of total turnover	57%	56%	68%	61%	60%	73%	64%

Figure 10: Cargo flow volumes incoming. Source: own calculations based on data by Eurostat (2010).

The shares of outgoing cargo volumes can be seen in Figure 11. Looking at the outgoing cargo volumes, the two most different clusters, namely the *strong_growth* and the *deep_fall* cluster, show nearly the same share of outgoing cargo: around 85% going to Europe and nearly 10% going to North America. That implicates that noticeable discrepancies of cargo turnover must exist within these two continents. Again only a higher share with Asia and this time a bigger share with North America are characteristically for *stable_growth* and *medium_decrease* cluster. This fact can be considered to have positive influence on the cluster performance.

Outgoing	strong_ growth	stable_ growth	medium_ decrease	continuous_ decrease	strong_ downturn	deep_ fall	All clusters
Africa	2%	3%	10%	2%	1%	4%	6%
Asia	1%	10%	25%	3%	2%	3%	16%
Europe	88%	75%	48%	85%	93%	84%	63%
North America	9%	11%	14%	9%	4%	8%	12%
Oceania	0%	0%	0%	0%	0%	0%	0%
South America	0%	0%	3%	1%	0%	1%	2%
% of total turnover	43%	44%	32%	39%	40%	27%	36%

Figure 11: Cargo flow volumes outwards. Source: own calculations based on data by Eurostat (2010).

4.5.3. Origins and destinations of cargo volumes within Europe - short sea shipping

Because of the high share of trading within Europe the incoming and outgoing cargo volumes between the most active countries lying on European soil have been outlined (see Figure 12). In some cases the total share does not sum up to 100% because some countries with smaller shares have been left out.

Incoming	strong_ growth	stable_ growth	medium_ decrease	continuous_ decrease	strong_ downturn	deep_ fall	All clusters
Belgium	2%	4%	3%	10%	11%	1%	4%
Denmark	16%	2%	3%	3%	2%	4%	3%
Estonia	1%	0%	3%	1%	0%	1%	2%
Finland	0%	0%	4%	2%	1%	5%	3%
France	5%	17%	5%	2%	1%	4%	7%
Germany	1%	1%	3%	6%	3%	2%	3%
Ireland	0%	1%	1%	0%	1%	1%	1%
Latvia	2%	1%	4%	4%	14%	2%	3%
Lithuania	0%	1%	1%	1%	0%	1%	1%
Netherlands	3%	5%	4%	15%	8%	13%	6%
Norway	11%	28%	15%	14%	9%	41%	18%
Poland	1%	1%	1%	1%	1%	0%	1%
Portugal	0%	0%	1%	1%	2%	3%	1%
Russia	49%	8%	20%	6%	9%	6%	15%
Spain	1%	1%	3%	2%	1%	2%	2%
Sweden	2%	3%	4%	8%	1%	3%	4%
United Kingdom	6%	26%	21%	23%	34%	10%	22%

Figure 12: Inner European cargo flow volumes inwards. Source: own calculations based on data by Eurostat (2010).

For incoming cargo from Europe a higher share for the countries Russia, Denmark and France have been found in the *strong_growth*, the *stable_growth* and *medium_decrease* cluster. These countries seem to influence the cluster performance in a positive way, while they hold a very low share in the other three clusters. Also in the other three clusters the shares of the Netherlands and Belgium were higher, which seemed to be an indication for a weaker performance. Norway's and United Kingdom's shares were represented in every cluster and could not be linked specifically to any cluster performance. The outgoing cargo volumes to Europe are visualized in Figure 13. The differences between the clusters are even harder to see than the in the inwards overview before. The results from Figure 13 can be mostly confirmed, except that Russia plays no important role for outgoing cargo for any cluster. In addition to that a higher share of Germany seems to go hand in hand with a weaker performance. For the *strong_growth* cluster Sweden is the most important trading partner for outgoing cargo. The United Kingdom is strongly represented in all clusters. The Netherlands and Norway are, with smaller shares, represented in every cluster, too. Having one of these three countries as a trading partner for outgoing cargo does not seem to determine any specific performance.

Outgoing	strong_ growth	stable_ growth	medium_ decrease	continuous_ decrease	strong_ downturn	deep_ fall	All clusters
Belgium	3%	4%	5%	8%	2%	2%	5%
Denmark	9%	2%	3%	2%	4%	15%	3%
Estonia	0%	0%	1%	0%	1%	1%	0%
Finland	0%	1%	6%	2%	4%	11%	3%
France	7%	16%	6%	5%	2%	2%	8%
Germany	4%	3%	7%	11%	9%	8%	7%
Ireland	1%	3%	3%	2%	0%	2%	3%
Latvia	0%	0%	1%	0%	0%	0%	0%
Lithuania	0%	0%	1%	0%	0%	0%	1%
Netherlands	7%	12%	4%	15%	9%	17%	10%
Norway	3%	12%	6%	7%	9%	8%	8%
Poland	2%	1%	4%	1%	1%	1%	2%
Portugal	1%	1%	2%	1%	0%	1%	1%
Russia	0%	0%	7%	0%	1%	1%	3%
Spain	3%	3%	6%	3%	1%	4%	4%
Sweden	33%	4%	7%	6%	4%	7%	6%
United Kingdom	22%	35%	27%	32%	53%	18%	31%

Figure 13: Inner European cargo flow volumes outwards. Source: own calculations based on data by Eurostat (2010).

4.5.4. Types of cargo

Five different types of cargo have been identified referring to Subsection 2.1.1. The share of every cargo type of the total cargo coming in is shown in Figure 14. The good performance of the two *growth* clusters appear to be due to the high share of liquid bulk goods and the small share of dry bulk goods, which are overrepresented in the weaker performance clusters *continuous_decrease*, *strong_downturn* and *deep_fall*. Also a high share of containers is found in the *stable_growth* and *medium_decrease* cluster what might implicate a more positive influence on the performance. Only Ro-Ro could not be linked to any specific cluster performance. Other cargo had not more than 5% share in any cluster.

Incoming	strong_ growth	stable_ growth	medium_ decrease	continuous_ decrease	strong_ downturn	deep_ fall	Total
Dry bulk goods	10%	10%	32%	40%	49%	71%	31%
Large freight containers	0%	15%	22%	6%	2%	0%	17%
Liquid bulk goods	83%	53%	38%	34%	26%	14%	39%
Other cargo, general	0%	2%	2%	3%	5%	5%	3%
Ro-Ro	5%	19%	3%	14%	17%	7%	8%

Figure 14: Cargo types coming in. Source: own calculations based on data by Eurostat (2010).

Figure 15 shows the results for outgoing cargo. For the outgoing types of cargo the combination of a high share of liquid bulk goods and a small share of dry bulk goods again implicated a positive performance. But this time a high share of containers going out was detected more in the medium_decrease than in the stable_growth cluster. The highest Ro-Ro share was in the strong_downturn and the second highest in the stable_growth cluster.

Outgoing	strong_ growth	stable_ growth	medium_ decrease	continuous_ decrease	strong_ downturn	deep_ fall	Total
Dry bulk goods	8%	3%	10%	12%	28%	30%	10%
Large freight containers	0%	19%	49%	4%	5%	3%	32%
Liquid bulk goods	89%	48%	26%	56%	18%	36%	38%
Other cargo, general	0%	3%	3%	2%	6%	5%	3%
Ro-Ro	4%	26%	8%	17%	43%	8%	14%

Figure 15: Cargo types going out. Source: own calculations based on data by Eurostat (2010).

5. Conclusions and further research

In this chapter the conclusions and further research needs are discussed.

5.1. Conclusions of the cluster analysis

This study tried to find the factors influencing the development of North Sea ports during the crisis. Six different clusters were found out of 64 North Sea ports. Two clusters represented a more positive development, two clusters a moderate decrease and two further clusters a strong decline in growth rates for the period from the second quarter of 2008 to the third quarter of 2009. By aggregating up detailed data from every seaport assigned to one cluster, each cluster represented the average characteristics of the ports included. This aggregated data was used for a comparison between the clusters according to the nationality of the ports, directions of good flows, trading partners in Europe and the types of cargo handled.

A connection between the location of the port and its performance could not be found. That goes hand in hand with the fact, that the effects of the economic crisis within the North Sea community did not differ that much (GDP went down in 2009 between -2% and -5% in all North Sea countries (Eurostat, 2010)).

The comparison of cargo flows coming in indicated that connections to Asia had a positive influence, while connections to North and South America had a negative one. Outgoing flows showed also a positive Asia-effect but no other dependencies could be found. For both directions and all clusters Europe was always the most important trading partner. A weak link could be found between a positive performance and a higher share of outgoing cargo volumes on total turnover. These observations confirm statements found in the literature review, e.g. the positive China-effect and the declining of the old economies (Slack, 2010).

The examination of the trading partners within Europe showed that incoming cargo flows from Russia, because one port in Sweden (*Brofjorden Scanraff* - SE02SEBRO) handles all the liquid bulk goods (crude oil) coming from the Gulf of Finland, Denmark and France had a higher share in better performing clusters and the Netherlands and Belgium in the weaker performing clusters, because of having a higher share of dry bulk goods. For outgoing cargo flows no specific observation could be made because all clusters showed a high variance about destination countries. The United Kingdom is highly represented in every cluster in both directions which could be due to the fact that all bulky goods must be transported to the United Kingdom via ship.

The comparison of the different cargo types per cluster has brought to light that ports handling mostly liquid bulk showed a better performance in the crisis than ports handling mostly dry bulk. Especially the strong decline in the demand for energy had a strong influence on the demand for coal. Because most of the crude oil is refined and used for fuel for road transport, the demand for oil has not suffered so heavily in the crisis (Pallis and Langen, 2010). Both directions showed also that a higher share of container cargo influenced the performance in a positive way. This could be driven by the stronger trade connections with Asia or the trend of containerization due to the falling freight rates for container during the crisis. Ro-Ro was found in different performing clusters so that no clear allocation could be made.

5.2. Reflections and further research needs

Comparing all types of cargo with only one indicator (tons of turnover) is a problem because for example bulk goods are heavier and are mostly less valuable per ton than other goods. In aggregated sums of tons of turnover, bulk goods are thus overrepresented in the statistics in comparison to container and Ro-Ro. Also the aggregation of large data sets leads to the problem of a growing similarity between the clustered objects. The cluster analysis is still a good approach handling large data sets and to find groups with similar characteristics. Grouping by too many categories will not necessarily result in clearer distinctions, though,

due to the *curse of dimensionality*. The method is not suitable for deriving practical recommendations yet, but it has the potential to be developed further in order to be applied on any group of seaports.

The right choice of standardized data and its availability is the most difficult point within the process and cannot be defined before. Further research regarding port performance measures and different indicators for all types of goods must be done. Also new ways of visualizing the highly detailed data should be developed in order to see the connections between all the data more quickly. Geographical maps showing the ports identified using different shadings (from green to red) are a possible way for a better visualization of different performances.

Further research should cover the period after the crisis and should also include port organization information like ownership, source of finance for the port, management and environmental issues.

6. List of Tables

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New intermodal solutions combining containers and RO/RO

Report on StratMoS WP C-4d
Hafen Hamburg Marketing

INTERREG IVB North Sea Region

The Interreg IVB North Sea Region Programme

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1 Purpose and Objectives

This study should highlight container and RoRo transports within the North and Baltic Sea regions as well as related hinterland areas. It will be assumed that a combined and integrated sea transport of container and RoRo cargo generates a modal shift in hinterland transportation from road to sea (compare figure 1).

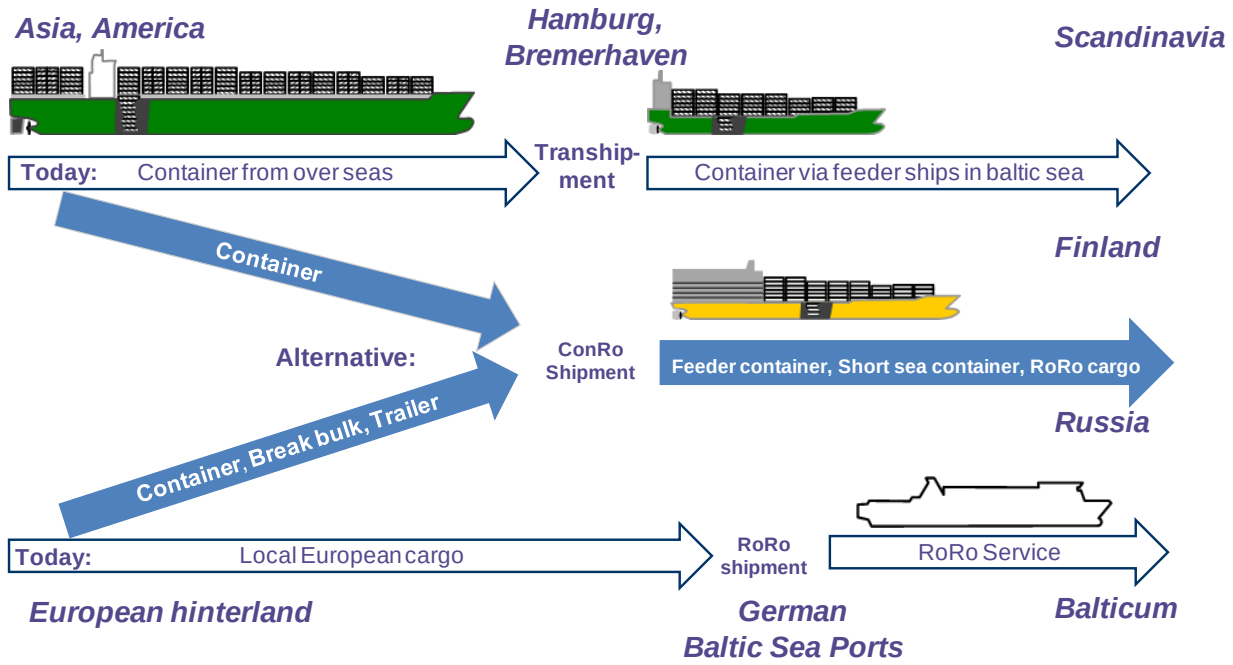

Figure 1: Integrated ConRo services as alternative to separated container and RoRo sea transports

Container and RoRo cargo are the most important break bulk commodities in Baltic Sea transports [1]. Normally containers are transported by overseas carriers to North Sea ports like Hamburg or Rotterdam and feeder ships which fulfill the Kiel Canal requirements. Containerized Baltic Sea cargo had a share of around 42% of the total handlings in the Port of Hamburg until 2009[1]. In contrast import/export of RoRo cargo from/to Baltic Sea is low in the North Sea ports. Baltic Sea RoRo cargo predominantly runs via southern Baltic Sea Ports like Luebeck, Kiel or Rostock. Until today RoRo cargo was not an essential cargo potential of the North Sea ports. It often requires fast transport speed and the location of the North Sea ports was not adequate for fast transport services in the Baltic Sea because of the Kiel Canal. Cargo which has high requirements on transport speed is not very sensitive in terms of transport price. Under the influence of the current economic crises a stronger orientation on transport prices is expected in the future. Today RoRo cargo can have more requirements on the transport price as in the past and these requirements can enable new changes for the North Sea ports. In relation to Scandinavia, Finland, Russia on one hand and Western Europe on the other hand, the North Sea ports offers a shorter road transport within the total transport chain as the southern Baltic Sea Ports due to there geographical upstream location. However for the longer and more expensive sea transport through the Kiel Canal and Elbe, the use of combined container and RoRo carriers (ConRo carriers) is necessary. The concentration of more cargo on a ConRo ship offers a large scale effect which aims in lower transport costs per unit.

Objective of the present study is the theoretical evidence that under specific circumstances of the North Sea ports ConRo services can work and that they can lead to a modal shift from road to sea or rather road to rail. The following methodology is planned.

[1] Source: Official modal split published by Hafen Hamburg Marketing e.V.

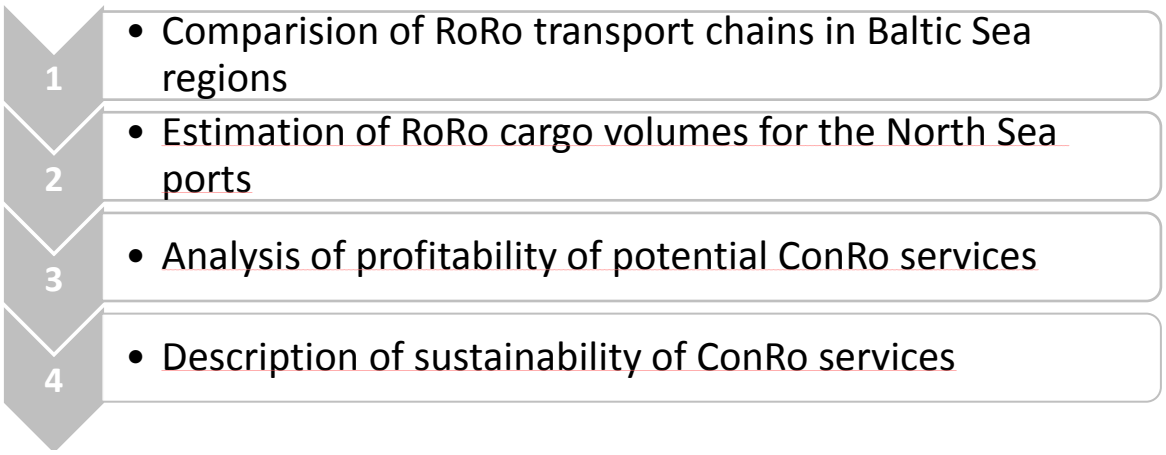

Figure 2: Planned methodology

First the existing and potential transportation chains between southern Baltic Sea ports, the North Sea ports and Scandinavia, Finland and Russia will be compared for evaluating the locational advantage of the North Sea ports in terms of time and costs. An estimation of the potential RoRo cargo volumes for the North Sea ports follows up which based on already existing results of a study of the company Baltic Marine Consult GmbH from 2006. To show that ConRo services via the North Sea ports are more profitable that RoRo services via the Baltic Sea ports an analysis of profitability will be done under consideration of specific local costs. Based on this results environmental and sustainability aspects will be investigated especially under the focus of saving road kilometers.

2 Comparison of RoRo transport chains in Baltic Sea regions

Due to the current crises the cost pressure on all kind of logistics services is also increasing on transport services. The requirement on high transport speed today is often replaced by the requirement of low transport costs. The so called “slow steaming” of container ships in overseas transports is an evidence of this requirement. For a lot of industrial transports accuracy not speed is important. “Just in time” was often contrary to high transport speed. If a “just in time” transport is cheaper than a high speed transport, a lot of consignees and consignors would accept an increase in transportation time. An example of different transport chains between the German hinterland city Kassel and Helsinki can underline this thesis.

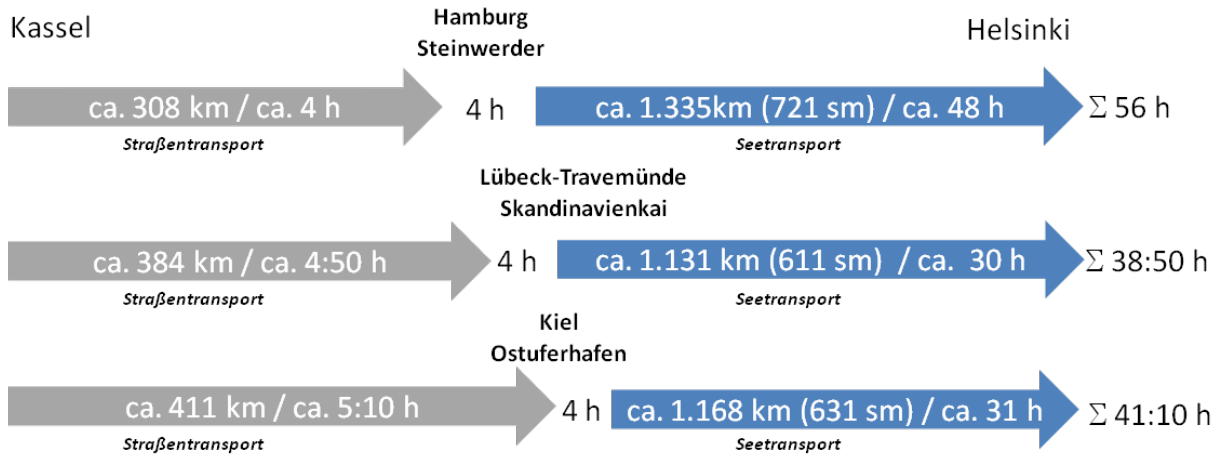

Figure 3: Comparison of distance and transport times of different transport chains between Kassel and Helsinki using RoRo sea transports

For example, considering the German hinterland, the Port of Hamburg has shorter road distances as e.g. Luebeck (ca. 80km) or Kiel (ca. 100km). A truck based pre and on carriage would be faster via the Port of Hamburg. The effect is much higher considering Bremerhaven. 80km is not a high distance, but the European truck driving laws says that e.g. Nurnberg would be inside an 8h truck driving action radius from the Port Hamburg or Bremerhaven but not from the Baltic Sea ports. A round trip within 8h driving time between Kassel and Hamburg is also possible but not for the Baltic Sea ports. Trucks are typical cargo for RoRo services. Under this assumption the hinterland RoRo cargo attractiveness of the North Sea ports especially in the high industrial developed regions of Germany is higher than the attractiveness of the Baltic Sea ports. Unfortunately today no Baltic Sea RoRo transport via the North Sea ports is in operation.

Considering the same cargo emergence in the German hinterland, road transport cost savings would be possible by RoRo sea transport via the North Sea ports. Assuming specific truck transport costs of 1Euro/km [2] the potential savings would be around 160-200Euro per each truck round trip.

The distance advantage in the rail sector is unimportant in the North Sea ports. The advantage of the Port of Hamburg in comparison to Luebeck-Travemuende is smaller because of the route split near to Luenburg (German hinterland). The train operation area relating to current number of trains is more or less equal, also the accessibility to the hinterland. But the train departure frequency in the Port of Hamburg is higher than in Luebeck. In comparison to the Port of Kiel, Hamburg as well as Luebeck have better rail hinterland connections [3].

Concerning inland waterway a transport, the Port of Hamburg has the best conditions for pre- and on carriage by barges compared with all remaining German North Sea Ports. Luebeck-Travemuende is only

[2] Average value of different freight matrixes of forwarders for a trailer transport

accessable via seven small locks [4]. Kiel is accessible by great barges via the Kiel Canal but not with pusher units of the river Elbe which are often used [5].

Chart 1 highlights the comparison of the three ports Luebeck, Hamburg and Kiel concerning hinterland connection with three different carriers.

Chart 1: Comparison of the hinterland connection of the three ports Luebeck, Hamburg and Kiel in the relation Kassel-Helsinki

Pre and On carriage to W-Europe via:	**Kassel-Helsinki via Luebeck**	**Kassel-Helsinki via Hamburg**	**Kassel-Helsinki via Kiel**
Train	++	++	o
Truck	+	++	o
Barge	o	+	-

++ very good ;+ good; o sufficient; - not companionable ; -- not existing

The Port of Hamburg has the best pre- and on carriage conditions of RoRo transports. Especially in road transportation Hamburg would be an interesting alternative if the price conditions are the same as in Kiel or Luebeck.

Chart 2 figures out a comparison of a trailer transport on the basis on equal sea freight costs. The chart demonstrates the above assumed advantage.

Chart 2: Time and costs comparison of a trailer transport under the assumption of equal sea freight costs

Parameter	**Kassel-Helsinki via Lübeck**	**Kassel-Helsinki via Hamburg**	**Kassel-Helsinki via Kiel**	**[Dim]**
Average transport time	39	56	41	[h]
Transport costs road	384	308	411	[€/Trailer]
RoRo handling in two ports	74	74	74	[€/Trailer]
Transport costs sea	400	400	400	[€/Trailer]
Total costs	858	782	885	[€/Trailer]

If there´s a possibility to use a RoRo service in Hamburg with the same sea transport prices as in Luebeck or Kiel, the service would have a market opportunity and could generate new short sea cargo volumes. The use of a ConRo ship instead of a simple RoRo ship could enable this service because of scale effects. A ConRo ship has more or less the double cargo capacity as a container or RoRo vessel. The scale effect is one of the most important reasons concerning ship growth in container ship sector [6].

Before looking at the economic effects, the potential cargo volumes and transport routes have to be estimated.

3 Estimation of RoRo cargo volumes for the Port of Hamburg

3.1 Cargo area and main transport routes

Figure 4 shows the investigation area and main transport routes of potential RoRo and ConRo cargo volumes.

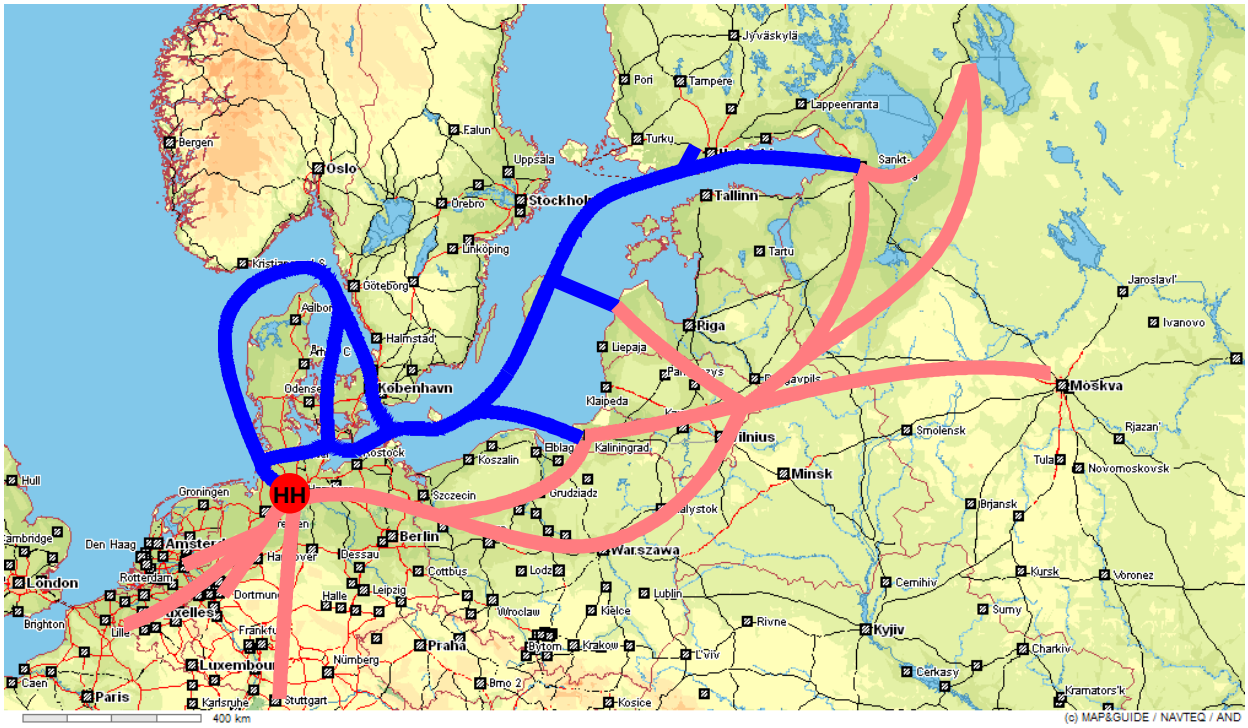

Figure 4: European cargo area of RoRo sea transports on the north south relation via Baltic Sea (Red = Land transports, Blue = RoRo sea transports)

Chart 3 highlights different transport solutions within the investigated area.

Chart 3: Transport solutions within the investigated area

Parameter	**Solutions**				
Cargo/Transport unit	**Container (Overseas)**	**Container (Intra Europe)**	**Trailer resp. Trucks**	**Swaps**	**Mixed cargo**
Western Europe	Benelux	North East France	Ruhr	Baden Württemberg	
Eastern Europe	North West-Russia	Central Russia	Finland		
Ports Western Europe	Hamburg				
Ports Eastern Europe	St. Petersburg	Ust Luga (Russia)	Helsinki/ Vousaari	Ventspils (Latvia)	Kaliningrad Baltijsk
Transshipment ports (optional)	Kiel	Rostock	Trelleborg (Sweden)	Gdynia (Poland)	
Transport versions	Truck (direct)	Train (with Pre-	RoRo (with Pre-	Container	ConRo

		and Oncarriage)	and On-carriage)	Feeder (North Sea)	(North sea)

The potential cargo volumes for a ConRo service between Hamburg and North East Europe consists of the following parts:

- Oversea container with origin/destination North East Baltic Sea
- Intra European container with origin/destination North East Baltic Sea
- Trailer and Swaps from/to central Europe from/to North East Baltic Sea
- Heavy cargo from Western Europe from/to North East Baltic Sea

Beside the cargo volumes along the Baltic Sea longitudinal axis the relation Germany-Norway offers a sufficient cargo volume for at least one ConRo service. In the frame of the cargo volume estimation especially the non urgent cargo is of note. Urgent RoRo cargo will probably use the existing RoRo services via the Baltic Sea Ports. Therefore the cargo volumes for a potential ConRo service is located in the non urgent and low cost demanding RoRo cargo sector. The influence of the transport costs and cargo values on the transport mode`s selection can be demonstrated on the cargo flow between Russia and Western Europe. 95% of the Russian export goods (predominantly row materials) are transported by sea transport from East to West. Only 40% of all goods are transported by sea transports from West to East because more expensive consumer goods dominate the foreign trade (2007) [7].

All existing traffic prognoses (e.g. [8]) assume that cargo flows will increase in the future. In addition the existing cargo flows still have a small potential of more containerization. More containerization will also effect the European intra traffic. Besides it will be assumed that economic crises have no permanent effect on the international division of labour. There will be a disproportionate dynamic in cargo transportation in the future for the relations North and Eastern Europe. Transports from and to Northern Europe will have a share of around 35-40% in German Sea ports (e.g. [9]). This assumption is underlined by the massive investments of international conglomerates in the regions of Moscow, Kaliningrad and St. Petersburg in automotive Industries and consumer goods production. With the implementation of various free economic zones, perfect conditions for foreign investors are implemented in Russia. On the other hand, Russian energy, steel and machinery concerns invest a lot of money in Western Europe. So the integration of the Russian economy will be continuing in the future.

Chart 4: Total estimated transport volume of RoRo cargo for a ConRo service according [2]

Investigation area	**Relation**	**Basis 2005 Mill. T.**	**Basis 2007 Mill. T.**	**2015 Mill. T.**	**2020 Mill. T.**
Russia	Westbound	2,87	2,01	3,81	4,64
	Eastbound	13,75	14,44	20,20	25,78
	Total:	**16,62**	**17,45**	**24,01**	**30,42**
Baltic States	Westbound	1,59	1,64	2,06	2,39
	Eastbound	1,94	2,00	2,52	2,93
	Total:	**3,53**	**3,64**	**4,58**	**5,32**
South Finland North Sea Ports	Westbound	10,45	10,97	12,73	13,72
	Eastbound	4,86	5,10	6,28	7,11
	Total:	**15,51**	**16,08**	**19,01**	**20,83**
Over Seas	Westbound				

container	Eastbound				
	Total:				
Asia railway container	Westbound	0	0	0,01	0,01
	Eastbound	0	0	0	0
	Total:	**0**	**0**	**0,01**	**0,01**
South East Europe	Westbound	0		0	0
	Eastbound	0,03	0,03	0,03	0,04
	Total:	**0,03**	**0,03**	**0,03**	**0,04**
Total cargo potential	Westbound	14,91	15,62	18,61	20,76
	Eastbound	27,88	21,57	29,03	35,86
	Total:	**35,69**	**37,19**	**47,64**	**56,62**

In the regarded area of Chart 4 the Russian cargo flows in 2007 were around 17,5 mill. t. Under the assumption of the further integration of the Russian economy for 2020, 30 mill. t of cargo will be expected.

The development of the three Baltic States (Lithuania, Latvia and Estonia) will be evaluated similarly [10]. The expected RoRo cargo volume for the Baltic States in 2020 is around 5.3 mill. t.

Because the economy of Finland is deep integrated in the world economy, the foreign trade of Finland related to the number of citizen is much higher than the foreign trade of Eastern European countries [11]. Beside transport to Russia, the foreign trade of Finland is mostly based on sea transports. Around 70 mill. t of cargo are handled in Finish ports. The Western European countries have a share of around 40% on this throughput. Around 70% of this amount is RoRo cargo. For 2020 it will be assumed that the RoRo cargo between Western Europe and Finland will have an amount of around 20 mill. t.

An additional cargo potential exists in the field of transit cargo, especially for the Russian railways from Europe to Asia. This potential cargo amount can also be handled via Russian or Finnish ports. Chart 4 shows the different estimated RoRo cargo volumes for the regarded investigation area. In total a cargo volume of 57 mill. t is assumed for 2020.

Overseas containers (today's feeder traffic) are not considered because they are already transported via North Sea ports and do not represent additional cargo volumes. But they will be considered in the business calculation of potential ConRo services from and to the North Sea ports.

3.2 Suitable relation and departure frequencies

Taking into account that cargo declines in the last two years, the existing potential of RoRo cargo of about 26-30 mill. t per year would be already big enough for ConRo services between North Sea ports and the Baltic sea. The estimated distribution on several Baltic Sea regions is shown in chart 5.

Chart 5: Distribution of the assumed potential of RoRo cargo in the regarded area (detailed investigation in [2])

Baltic Sea port as counterpart for a North Sea port	**Basis 2005 [Mill. t]**	**Basis 2007 [Mill. t]**	**Assumption 2015 [Mill. t]**	**Assumption 2020 [Mio. t]**
Russian Baltic Sea ports	4,81	3,51	4,72	5,95
Finnish Baltic Sea ports	14,84	11,88	14,63	16,82
Baltic States Sea ports	7,8	7,03	9,13	10,97

Kaliningrad	2,97	2,2	3,1	3,94
Total Baltic Sea	44,62	37,19	47,64	56,62

There exists a potential volume of approximately 16 mill. t per annum from the Port of Hamburg to Finland [2]. Most important is the Port of Helsinki-Vousaari. This new port is designed for RoRo and container handlings. A potential ConRo service could be integrated as needed.

Besides, the Port of Ust Luga (North West Russia) could be adjusted very easy for a ConRo service. Furthermore the competition to Russian ports is weaker than to Finish ports.

To extend the potential amount of cargo other transport relations could be integrated. The relation between a North Sea port and Helsinki could be extended to the Port of Nynäshamm for loading and unloading cargo of Stockholm`s metropolitan area. Furthermore the relation to Ust-Luga could be enhanced by a stop in Gdansk/Gdynia for cargo of Belarus, Ukraine and West Russia.

Nevertheless the first additional ConRo service should be started between Hamburg or Bremerhaven and Helsinki on the basis of the existing data and assumptions. The North Sea ports have important feeder container volumes. E.g. in 2007 the container volume from Hamburg to Helsinki was around 500.000 TEU. Even under the latest declines of 30% in feeder traffic, today's container volumes are big enough for a new ConRo service from the North Sea ports to Helsinki, as aforementioned.

4 Calculation of profitability of a potential ConRo service form the Port of Hamburg

A ConRo service from a North Sea ports can only works when the service is more profitable than an existing (simple) RoRo one from a Baltic Sea port. The relation Hamburg-Helsinki in ConRo mode as well as the relation Lübeck-Helsinki in RoRo mode will be compared in order to show the difference in profitability. To do so chart 6 lists performance and cost parameters in comparison between a ConRo with a RoRo service as input values for the calculation.

Chart 6: Performance and cost parameter in comparison between a ConRo with a RoRo service

Ship parameter	**ConRo**	**RoRo**	*[Dim]*
Year of construction	2005	2009	*[ ]*
LOA	205	193	*[m]*
max. beam water line	26,2	26	*[m]*
max. beam for Kiel canal	29	-	*[m]*
max. draught	8,4	6,45	*[m]*
Gt	28.301	26.000	*[ ]*
tdw	18.250	9.830	*[t]*
eff. engine power	25.200	14.850	*[kW]*
power of auxiliary engines	2.500	2500	*[kW]*
Service speed	22	22	*[kn]*
Loading capacity RoRo	2900	3200	*[lm]*
Loading capacity Trailer [17,5 t/Trailer]	210	232	*[n]*
Loading capacity container	640	0	[TEU]
Important cost parameter			
Fuel consumption at service speed	103,42	61,2	*[t/24h]*
Fuel consumption port	10,26	10,26	*[t/24h]*
Fuel consumption canal and estuary trip	2,10	1,24	*[t/24h]*
New building price (according FSG)	60	40	*[Mill. €]*
Crew costs HTV See 2008	1,46	1,46	*[Mill. €/a]*
Capital costs accord. AfA 10%/a	6	4	*[Mill. €/a]*
Maintenance accord. VDI 7% of Capital costs	0,43	0,28	*[Mill. €/a]*

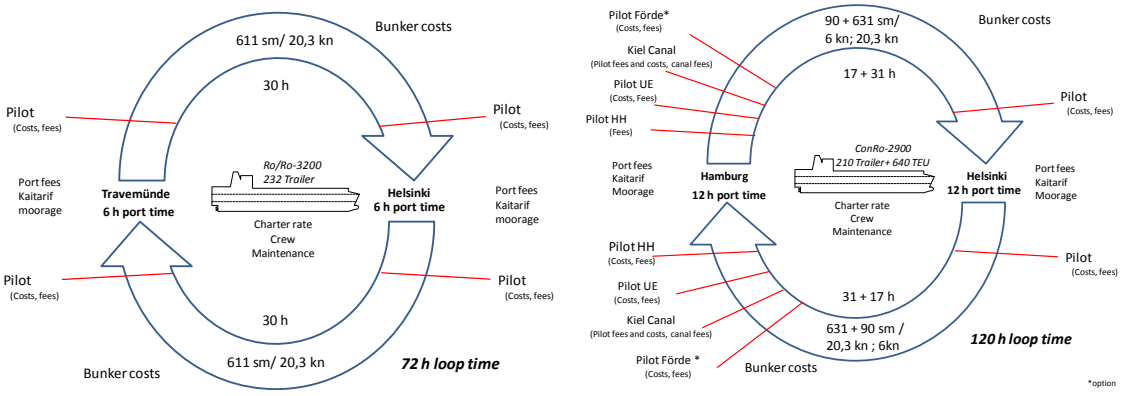

Figure 5: Comparison of a RoRo with a ConRo service

The basis of the fuel consumption calculation is a specific engine consumption of 170 g/kWh [12] and the similarity law of naval architecture to estimate the engine power of different ship speeds [6].

The average price for a tone of heavy fuel IFO amounts to 180 euro, while this one for a tone of MDO amounts to 467 euro according to the data record of [13].

The port and canal fees for each loop are shown in chart 7. For Helsinki the average of the port fees of Hamburg and Travemünde will be assumed as no data was available.

Chart 7: Port, pilot and canal fees [14], [15],[16],[17]

Costs	**RoRo Travemünde**	**ConRo Hamburg**	***[DIM]***
Port fee	4,4	3,9	*€/100 GT*
Pilot per Port	552	310	€ per departure
Passage Unterelbe	nil	2394	€ per voyage
Passage Kiel canal	nil	6860	€ per voyage
Passage Kieler Förde	nil	654	€ per voyage
Berthing per call	500	500	€ , estimated
Kaitarif per Trailer	47*	37	€ per Unit;* 10,- € Kaitarif included
Kaitarif per TEU	nil	0	FIOS, Handling payed by carrier

The handling costs of a container are not included in the cost model because of the transport mode “free in, out and stowed” (FIOS) which is applicable for most shipments. That means that a feeder shipping line does not pay for the container handlings in a port. The overseas carrier is responsible for the respective fee. Furthermore the terminal handling charge (THC) is not part of the income of a feeder operator as he has to pay it to the terminal operator himself.

The calculated income (freight rate) under presented terms and conditions of the shipping line per trailer respectively TEU is visualized in chart 8.

Chart 8: Estimated freight rates

Freight rate	**€**
Trailer Travemünde <-> Helsinki	350
Trailer Hamburg <-> Helsinki	350
1 TEU Hamburg <-> Helsinki	160

The freight rate for containers on TEU basis is a mixt calculation depending on full and empty containers. The average utilization of the ship was estimated by 70%.

The basis for the following calculation is the maximum annual number of loops or turnarounds per each service. On the basis of these data, the following costs and earnings are calculated for each service:

Chart 9: Estimated costs and earnings of the alternatives transport modes

Parameter of service	**Travemünde Helsinki RoRo**	**Hamburg Helsinki ConRo**	**[Dim]**
Loops per year	121	73	[ ]
Fixed costs	5.740.000	7.880.000	[€/a]
Bunker costs	5.191.024	5.577.243	[€/a]
Canal and pilot fees	236.525	1.601.474	[€/a]
Port fees	268.983	166.311	[€/a]
Berthing	121.000	73.000	[€/a]
Quay tariff	1.847.138	794.094	[€/a]
Total costs	13.404.669	16.092.122	[€/a]
Earnings	13.755.280	17.976.980	[€/a]
Annual profability of ship	**2,6**	**11,7**	**[%/a]**

The profitability[3] of a potential ConRo service amounts to 9%. This result is a better one than the existing pure RoRo service can possess within the Baltic Sea. However, for a service within the Baltic Sea only three ships are necessary while five ships (higher expensive in investments) are necessary for a ConRo service from Hamburg. Nevertheless each of these five ships in ConRo service has a higher profitability.

[3] Profability = (Earnings-Costs)/Costs

5 Sustainability and environmental effects of a potential ConRo service

5.1 Economic Sustainability

The profitability calculations of the ConRo and RoRo services are based on current earning and cost parameters. For an evaluation of the economic sustainability, the comparison of the costs structure is necessary. According to figure 6 and 7, the share of public fees like port charges is higher at the ConRo service as at the RoRo service. Especially the canal and pilot fees are very high.

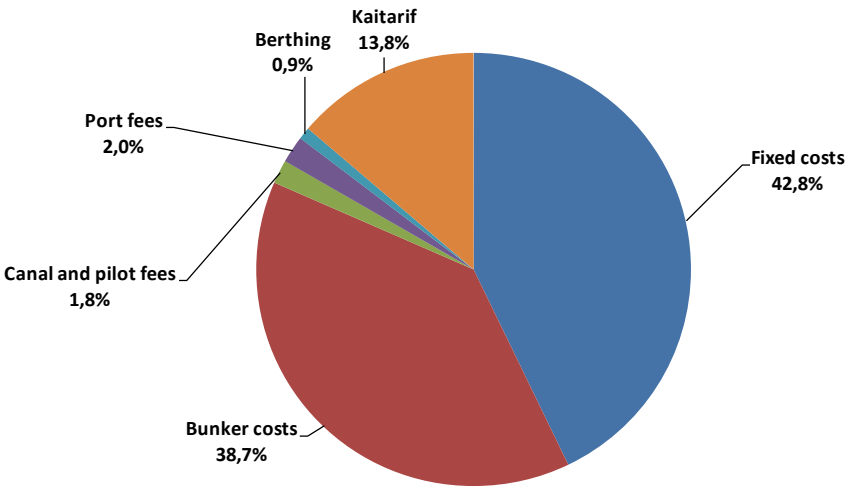

Figure 6: Costs structure of RoRo service Travemünde – Helsinki

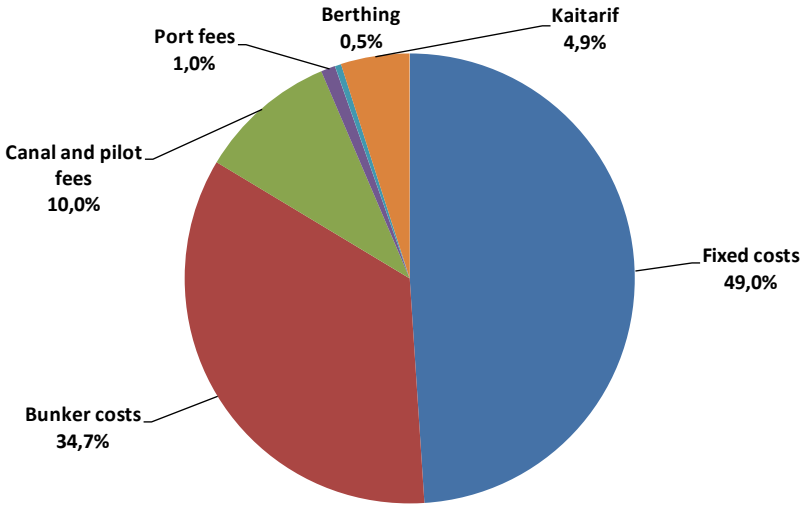

Figure 7: Costs structure of ConRo service Hamburg – Helsinki

A reduction of the canal and pilot fees would be desirable for the economic sustainability of the ConRo service. Furthermore the question “Why does a crew which passes more than 30 times per year the Kiel Canal need to have a pilot each time?” should be asked.

An approved and important criterion for sustainability of a shipping line service is the sensitivity against fuel price variability. The fuel price had a variance of more than 50% within one year [13]. But the different shipping services have diverse behavior of fuel price variances. The simple RoRo service would profit by a reduction of the fuel price. In case of a fuel price increase, the ConRo service would have a better competitive capability.

Chart 10: Alteration of relative costs in dependency of fuel price development

Fuel price development (100% =today)	60%	80%	100%	120%	140%
Costs index Travemünde Helsinki RoRo	0,85	0,93	1	1,07	1,15
Costs index Hamburg Helsinki ConRo	0,86	0,94	1	1,06	1,13

Regarding the income per trailer similar income for each port was assumed up to now. The different road distance from the hinterland regions to the different ports were not considered. In case of considering the North Sea ports would have an important advantage compared to the Baltic Sea Ports, as the North Sea ports are deeper located in the relevant cargo hinterland as the Baltic Sea ports.

Costs for road transportation to e.g. Hamburg are equal to the costs difference about 80 euros for the benefit of Hamburg. This means that theoretically the freight rates from Hamburg could be increased by about 80 euro.

Chart 11: The development of profitability of a ConRo service from Hamburg to Helsinki in dependency of the increase of trailer freight rates

Increase of Trailer freight rates[€]	0	+20	+40	+60	+80
Profitability Hamburg-Helsinki ConRo [%]	11,7	14,4	17	19,7	22,4

This short consideration of the profitability shows the sustainability of a potential ConRo service from a North Sea port (in this example Hamburg) to the Baltic Sea.

5.2 Environmental aspects

According to environmental aspects an important advantage of a North Sea port is the shorter road distance in comparison to a Baltic Sea port within the considered investigated area. By using a ConRo service instead of an existing RoRo service from Baltic Sea ports could be more profitable on basis of the presented example calculation. If an average weight of 17.5 t per trailer is assumed, the shift from road to sea would be approximately 128 mill. tkm per year (dead weight of towing vehicle not included). CO2 emissions can be lowered by approximately 3.8 mill. kg per year. Turning the view to the seaside the CO2 ejection of the two different services is equal.

5.3 Existing ConRo-services

Al already mentioned before, ConRo is not an idea between Hamburg and the Baltic Sea only. Following shipping lines offers already ConRo services for short sea traffic:

- Transfennica

- Cobelfret

Transfennica in total is operating with 6 ships in various versions between following ports:

Bilbao, Tilbury, Antwerp, Zeebrugge, Lübeck. Gdynia, Rauma, Hamina, Hanko, Paldiski and St. Peterburg

Figure 8: ConRo services of Transfinnica in North and Baltic Sea

Cobelfret is operating with 6 ConRo ships between:

- Zeebrugge-Esbjerg
- Zeebrugge-Goteborg
- Zeebrugge-Killingholme
- Zeebrugge-Purfleet
- Zeebrugge-Dublin
- Rotterdam-Dublin
- Rotterdam-Killingholme
- Rotterdam-Ipswich
- Rotterdam-Purfleet

Cobelfret is using following at FSG constructed type of ConRo ships:

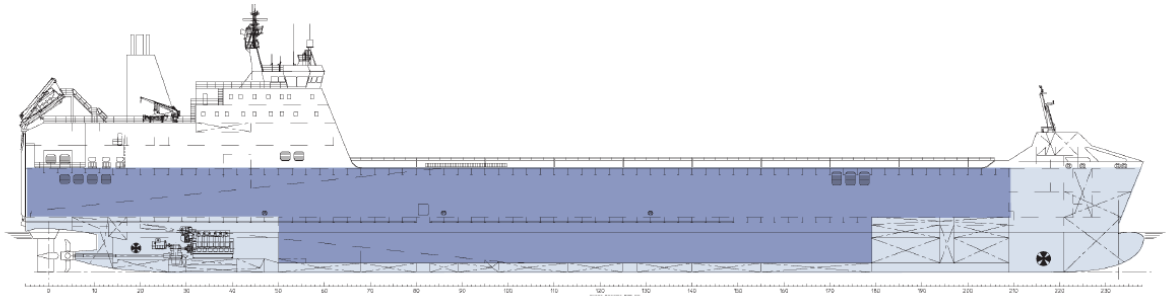

Figure 9: Cobelfret ConRo ship (FSG ©)

MAIN DIMENSIONS	DEADWEIGHT/ TONNAGE	Cargo Capacity	
Length (overall) 195.40 m	Design 13,375 t	Upper deck	1,256 m
Length (between perpendiculars) 186.22 m	Scantling 14,800 t	Main deck	1,102 m
Breadth (moulded) 26.20 m	Gross tonnage 25,235 GT	Tank top	549 m
Depth to main deck 9.65 m	Net tonnage 7,570 NT	**Total**	**2,907 m ≈ 640 TEU**
Depth to upper deck 18.15 m			
Draught (design) 7.05 m			
Draught (scantling) 7.40 m			

Furthermore ACL and Grimaldi offer oversea links by ConRo ships in following ports:

Hamburg, Gothenburg, Bremerhaven, Le Havre, Southhampton, Liverpool, Rotterdam, Antwerp, Amsterdam, Bilbao, Tilbury

That is also an indicator that the most ports in the North Sea are able to handle ConRo ships.

6 Conclusion

This study highlighted the theoretical possibility of introducing ConRo services as a new mode for short sea traffic from North Sea ports in the Baltic Sea regions.

ConRo is the combined transport of container and RoRo cargo with a new ship class, called ConRo Vessel. Transport by ConRo vessels offer a better profitability as simple RoRo transports. The potential RoRo cargo volume for North Sea ports in the Baltic Sea regions was estimated up to 30 mill. t per year. As container volumes already exist and transports are executed, they were not included in this study. On basis on a fictive route between Hamburg and Helsinki, the profitability of ConRo services was calculated in comparison to existing RoRo services between Travemünde and Helsinki within the Baltic Sea region. The result of this example shows that both - the profitability as well as the sustainability - is higher with ConRO services.

ConRo services could be an interesting option for the North Sea ports to enter or open new RoRo markets in the North Sea. ConRo ships can operate in existing or potential new short sea connections more efficient than normal RoRo ships. A strengthening of short sea traffic by more efficient means of transportation is in accordance with the European policy to shift traffic from road to sea.

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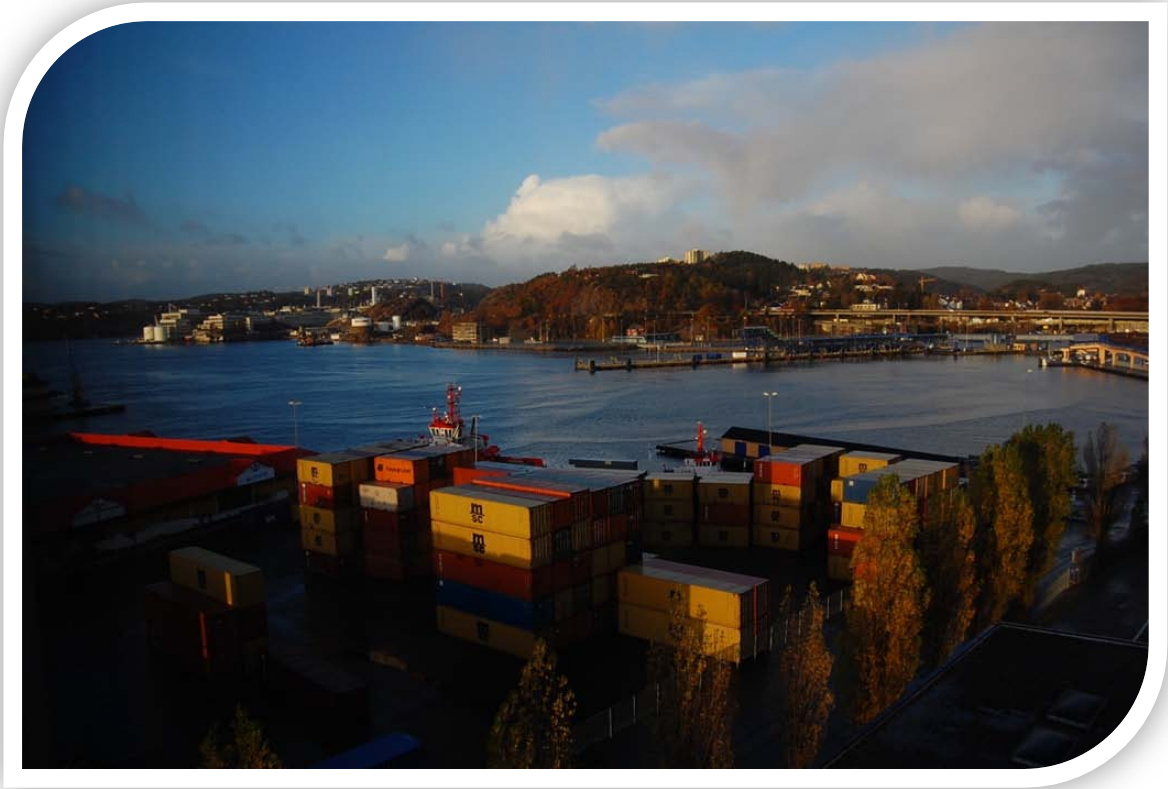
StratMoS Work Package C 4 (WP C 4) Workshop Report
C-4a: Periphery Issues,
C-4b: Overcoming Bottleneck,
C-4c: Overcoming the Economic Crisis,
C-4d: CONRO Sea Transports via North Sea Ports.



Kristiansand, Norway
November 3, 2010

FDT – Association of Danish Transport and Logistics Centres
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fdt@ntu.eu

This workshop report contains information, findings and work plans based on group discussions for Activities C 4 which took place in Kristiansand, Norway, November 3, 2010.

Contents

1. Preface

The WP C leader – FDT – Association of Danish Transport and Logistics Centres brought active partners together to discuss, comment on and plan the work under the activities of the WP C – 4 at the workshop in Kristiansand on November 2nd and 3rd 2010.

The activities under WPC - 4 were first launched on March 11th, 2010 at the Copenhagen workshop. Discussions in Amsterdam on September 9th 2010 formed the bases for the ongoing work since.

All available WP C-4 materials and presentations from the workshop can be found on the StratMoS homepage - www.stratmos.com under the files menu.

The workshop was hosted by WP C partner - Vest Agder County. FDT thanks for their great help in organising and hosting the workshop.

Authors: Inna Gvozdareva, Aleksandra Kafanova, Michael S. Laugesen & Kent Bentzen

FDT – Association of Danish Transport and Logistics Centres

Aalborg, November 10, 2010

2. Participants at the Kristiansand Workshop

	First Name	Last Name
Flemish Ministry of Mobility and Public Works	Pim	Bonne
FDT - Danish Association of Transport and Logistics Centres	Inna	Gvozdareva
FDT - Danish Association of Transport and Logistics Centres	Michael	Laugesen
FDT - Danish Association of Transport and Logistics Centres	Aleksandra	Kafanova
FDT - Danish Association of Transport and Logistics Centres	Kent	Bentzen
Aberdeenshire Council	Philip	Smart
Rogaland County Council	Monica F.	Tetlow
Port of Hamburg Marketing	Stefan	Breitenbach
TUHH – Technical University of Hamburg	Maximilian	Barm
Vest Agder County	Jon Halvard	Eide

Workshop Participants November 3rd, 2010

3. Workshop Schedule

Agenda for the WPC meeting on Wednesday the 3rd of November 2010		
9.00 – 9:15	Welcoming and coffee	All participants at the workshop
9:15 – 9:30	Introduction to the programme of the day	StratMoS WP C Project Coordinator, Michael Stie Laugesen, FDT, Denmark
9.30 – 10.15	Presentation of Activity C-4a results including Q & A session	Monica Fundingsland Tetlow - Rogaland County Council, Norway
10.15 – 11.00	Presentation of Activity C-4b results including Q & A session	Aleksandra Kafanova - FDT, Denmark
Coffee Break 11:00 to 11:15		
11:15 - 12:00	Presentation of Activity C-4c results including Q & A session	Maximilian Barm - Technical University of Hamburg-Harburg, Germany
Lunch 12:00 to 13:15		
13.15 – 14.00	Presentation of Activity C-4d results including Q & A session	Stefan Breitenbach - Port of Hamburg Marketing, Germany
Coffee Break 14:00 to 14:15		
14.15 – 15.00	Overall discussion session of the results Agreement on the final works	StratMoS WP C Project Coordinator, Michael Stie Laugesen, FDT, Denmark
End 15:00		

4. Objectives of the WPC 4 Report:

As it was discussed and proposed during the WP C Workshop in Copenhagen March 2010, WP C Activity C-4 should have a different approach, compared with the other WP C activities and reports previously finalised (C-1, C-2, C-3 and C-5).

In March 2010 FDT presented four topic areas under which the partners were required to take ownership, thus being involved in at least two of the four topics. For each of the four activities a Lead Partner was chosen. Thereafter it was the responsibility of the Lead Partner's of the topics (C-4a to C-4d) to structure and undertake the analyses, with support and commitment from the other partners, under the topics. The outcomes are four papers (25-30 pages each), based on the four topics decided upon under the general title of ***"Analysis of organizational and administration issues in relation to MoS and SSS."***

The Four Discussed Topics:

1. **C-4a: Periphery issues**
2. **C-4b: Overcoming bottlenecks**
3. **C-4c: Overcoming the economic crisis**
4. **C-4d: New intermodal solutions combining containers and RO/RO**

In the following sections a brief introduction to each of the four topics will be given followed by the comments given for the papers during the Kristiansand workshop.

All papers are expected to be finalised by November 19th 2010.

C-4a: Periphery issues

Background and Challenges

The MoS funding scheme has two objectives: 1) To facilitate shift of cargo from road to sea, and 2) to improve accessibilty to peripheral areas. Up to this stage, there has been no application based on peripheral needs, and there are no criteria developed. Hence the Commission has no specific framework developed to assess the quality of future periphery based applications for MoS, and they have no criteria to weight a periphery based application up against cargo shift based application. The basis for for such criteria will be general objectives for terretorial cohesion and strengthening peripheral areas.

In order to arrive at functional criteria for assessing periphery based applications, peripheral challenges have to be more closely defined. One aspect is the issue of periphery within a country in contrast to periphery between regions in Europe. Another aspect is the periphery – centre relations. For the latter there is both a competion element where the peripheral areas receiveseconomic support felt as being on the expnese of central areas, but there is also a dependency element that asks for a win-win situation.

The key challenge is therefore to understand the potential benefits of improved accessibility to peripheral areas, and to develop criteria for good periphery based MoS applications.

Objectives of the sub-work package

The objectives of this sub-work package is two-fold:

- To justify support to peripheral regions in order to improve accessibility
- To develop criteria for periphery based MoS applications

Lead Partner: **Rogaland County**

Other partners participating in this task:

- Aberdeen City
- Vest Agder
- Hordaland
- Aberdeenshire Council
- Troms County
- Napier University

Comments given for C-4a: Periphery issues, during the workshop

Recommendations for future steps:

The presentation focused around key challenges, objectives and work plan of the sub-package.

1. Include limitations and define a focus of the paper (Marco Polo, TEN-T or both).
2. Consideration of short- and long-term outcomes from the paper and possible dissemination. Option: Submit to North Sea Task Force and focal point meetings with industry
3. Ranking of criteria. Definition of peripherality should be more evident from the paper.
4. Should the recommendations be incorporated in the old call or should be developed totally new one for peripheral regions?
5. It was suggested to extend focus from only encompassing NSR to include the BSR, East Mediterranean, etc. Learn from these areas, as there might be something useful.

Pim Bonne offered Monica Tetlow the opportunity to participate in the Meeting of the North Sea MOS Task Force on 8th Dec (if paper will be finalized).

Decision: *It has been decided that the presentation of WP C-4a results and ideas will be given at the North Sea Motorways of the Sea Task Force Meeting on the 8th of December 2010 in Bruges.*

C-4b: Overcoming bottlenecks

Background and challenges

The first three WP C reports have shown that there are vast opportunities in cooperation both between ports and with companies in the port hinterland, so why are companies within the transport industry so reluctant to share ideas and cooperate on e.g. shared intermodal solutions?

Analysis of bottlenecks – administration, information sharing systems

Lead Partner: **FDT**

Other partners participating in this task:

- Rogaland County
- Flemish Ministry
- Hafen Hamburg Marketing
- Norwegian Coastal Administration
- Port of Amsterdam

Comments given for C-4b: Overcoming bottlenecks

Recommendations for future steps:

1. Cost benefit analysis between the ports
2. Interfaces have different standards within EU (have one common interface as the first step)
3. Hard to implement from the technical perspective
4. Future solutions could be applied through the SafeSeaNet and Marnis
5. Recommendations come from the Authorities (first to organize internal administrative system)
6. Add up the Rogaland and Hamburg Port Information.

C-4c: Overcoming the economic crisis

Background and challenges

The economic crisis has an enormous impact on all European economies and has led i.a. to a distinct drop down of trade volumes in the North Sea Region. As a result sea ports and shipping lines recorded a dramatic decline of cargo turnover. Since in previous times during the boom years the main challenge was to face saturated capacities and to develop and expand these capacities at the same time, the economic crisis has been interpreted as a good anticyclical opportunity to develop administrative and organisational structures as well as infrastructure and suprastructure of port areas and their hinterlands in a strategic way outside the pressures of dealing with acute capacity constraints. The aim is to investigate what measures the main players in the North Sea Region have undertaken to use the recession as such an opportunity in comparison to the general advice formulated above. Among the players the focus will be on port authorities and terminal operators (in the ports and their hinterlands). The research approach will be based on a literature review in books, newspapers and journals. Depending on the results, there will be interviews with two or three players, if needed.

Lead Partner: **TUHH**

Other partners participating in this task:

- FDT
- Port of Amsterdam

Comments given for C-4c: Overcoming the economic crisis

Recommendations for future steps:

1. More explanations and limitations required
2. Recommendations (practical) needed. (Ports can't change type of cargo, but can change positioning – how this paper can help).
3. Assumptions for categorization and factor choice
4. Potential for further research: new factors, other ports.
5. Map with ports from green to red – for visualization.

C-4d: New intermodal solutions combining containers and RO/RO

Background and challenges

Background of the sub work package is the introduction of short sea traffic in the RoRo sector in North Sea ports. RoRo sea transport from and to the Baltic Sea in most of the North sea ports plays an under part role at the moment. One reason is the specialisation of the ports in containers. This had the consequences that many continental hinterland transports most of all railways are also specialized in containers. From the point of view in hinterland high frequented transport connections of containers from and to the North Sea ports exists but not for trailers and swap bodies. The hinterland transport frequency from and to the southern Baltic Sea ports for trailers and swap bodies is significant less. E.g. there exist 24 railway departures per week between Munich and Port of Hamburg but only three between Munich and Ports of Lübeck. The result is that many trucks from these regions go direct to e.g. Russia or Finland because the access frequency to the short sea transport possibilities is to less.

The aim of the sub work package is to develop competitive and sustainable sea transport, port and hinterland processes to combine container and RoRo cargo on one transport unit in North Sea ports. This new mode of transport can contribute a modal shift of trailers and swap bodies to short sea traffic via North Sea ports.

Lead Partner: **Hafen Hamburg Marketing**
Other partners participating in this task:

- FDT
- Hull University
- TUHH

Comments given for C-4d: New intermodal solutions combining containers and RO/RO

<u>Recommendations for future steps:</u>

1. Examples of State of the art within ConRo shipping - e.g. ship size or ports in the NSR with the right/sufficient equipment to handle the ConRo ships.
2. Delimitations - briefly explain why we mainly are focusing on Port of Hamburg and BSR in the case study.
3. Other cases presentation (best examples, worst example), including Lübeck case where several millions have been invest in berths for ConRo traffic.
4. Include available ConRo policies from EU

5. Overall Conclusions from the workshop

Future steps for all the partners

- Common executive summary for each project from every partner (a brief scientific one page abstract).
- Incorporations of the comments from other partners.
- The four papers will be seen as individual deliverables under WP C-4, with their individual conclusions.
- A short introduction to WP C-4 will be made by FDT after receiving the final version of all papers on the 19th of November 2010. The introduction will briefly explain the logic behind choosing the four topics under the overall heading of *"Analysis of organizational and administration issues in relation to MoS and SSS."*
- The approach with more individually lead activities has worked out satisfactory

6. Time Planning under C - 4

1. Create an abstract for each of the sub package by 19th of November 2010
2. Incorporate comments by 19th of November 2010
3. Final copies (with comments from workshop in Norway included) to be delivered by November 19th, 2010.

7. Closing Remarks

The WPC 4 Kristiansand Workshop brought together project partners to discuss the initial progress within the individual Work Packages and plan further activities.
In general, recommendations as well as the A&Q sessions will have a big contribution not only to the general final result of the individual Work Packages, but also cooperation between the individual Demonstration projects and Work Package C. We thank all the participants for their good contributions during the workshop. A special thank is also given to Vest Agder County for hosting the workshop.

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