



Port Performance I Port Performance Indicators Selection and Measurement indicators

Grant Agreement No TREN/09/SUB/G2/170.2009/S12.552637

Start date of project: 1st January 2010

Duration: 25 months

January 2012

Coordinator: European Sea Ports Organization (ESPO)

Partners:

University of Antwerp – ITMMA

Vrije Universiteit Brussel (VUB)

Cardiff University

University of the Aegean

Technical University of Eindhoven



PPRISM

Port PeRformance Indicators: Selection and Measurement

Project Executive report (PPRISM WP4 D4.2)

1. Introduction

Port authorities and port community stakeholders take pride in the important contribution seaports deliver to European trade and welfare. But is anyone outside the industry aware of this? And what does the port sector really know itself about its overall performance, apart from the number of tonnes and passengers handled? Unlike other transport sectors, ports do not have a proper set of indicators at European level, beyond the well-known volume statistics.

With the PPRISM project, ESPO has taken a first step in establishing a culture of performance measurement in European ports. The two year PPRISM project (Port PeRformance Indicators: Selection and Measurement, co-funded by the European Commission) aims to identify a set of relevant and feasible performance indicators for the EU port system. These indicators allow the port industry to measure, assess and communicate the impact of the European port system on society, environment and economy.

PPRISM delivers a shortlist of indicators that form the basis of a future European Port Observatory which will take the form of a Port Sector Performance Dashboard. The proposed Dashboard contains well defined indicators, that are accepted by stakeholders and measure performance trends in the European port sector. The Dashboard will not publish or compare the performance of individual ports or terminals, but focus on the performance of the port system as a whole.

ESPO has developed five categories of indicators and has teamed up with renowned academic partners that have a track record for each of these categories:

- University of Antwerp (ITMMA) for the market trends and structure category;
- Technical University of Eindhoven for the logistic chain and operational performance category;
- Cardiff University for the environmental performance category;
- University of Brussels (VUB) for the socio-economic impact category;
- University of the Aegean for the governance category.

ESPO members, in particular the ESPO Technical Committees, have actively participated in the project by providing expert advice, assessing the suitability of potential indicators and by providing data to test the feasibility of the proposed indicators. Thus, the final list of indicators has been tested, with a positive result. ESPO is most grateful to all members for the efforts and time devoted and looks forward to the follow-up of PPRISM.

2. PPRISM Methodology and Work packages

PPRISM was launched in February 2010 during a kick off meeting with the PPRISM consortium and the Commission in Brussels. The first Work Package (WP1) delivered an initial pre-selection of port performance indicators based on a literature review and industry current practices. Deliverable 1 (PPRISM -WP1-D1) details the selection and filtering process undertaken by each academic partner. (See Annex 1, Table 2: Academic pre-selection)

From September 2010, as part of Work Package 2 (WP2), the academic pre-selection of indicators went through the assessment of ESPO members. To this end, ESPO organised four special workshop sessions in combination with its Technical Committee meetings. During these sessions, ESPO members screened and discussed with the academic partners the list of indicators and the proposed definitions and calculation methods. Feedback was also provided in terms of data availability and relevance at EU level. In addition, ESPO members assessed each indicator on feasibility and acceptability on a scale from 1 to 5 following the Delphi methodology. A second round of assessment with modified indicators was undertaken in November and December 2010 with the involvement again of the ESPO Technical Committees. The assessment resulted in additional indicators, adjustments of the definitions and calculation formulas, and renamed indicators.

Work Package 2 also sought feedback from external stakeholders (i.e. non ESPO members). As from January 2011 business and societal stakeholders with a direct or indirect interest in the performance of ports were invited to participate in the assessment process through an on-line tool that was developed for this purpose. An easy-to-use on-line questionnaire allowed stakeholders to ‘pick and choose’ the category within their own expertise or interest, and assess the acceptability and feasibility of the proposed indicators. The online assessment was available from February until May 2011. In total, 338 questionnaires were completed, a sufficiently high number for a sound assessment. The results of the internal and external assessment guided the final choice of indicators to be tested in the pilot phase. Deliverable 2 (PPRISM –WP2-D2) details the assessment process and the results obtained.

Work Package 3 consisted of an EU-wide pilot project to test the feasibility of the final list of indicators (see Table 1: List of indicators piloted). The pilot was a crucial test on the availability of data and the willingness of port authorities to provide data. The pilot was launched in July 2011. Port authorities associated with ESPO received an electronic form with data requirements which had to be completed by mid September. To encourage participation, an explanatory letter from ESPO Secretary General Patrick Verhoeven accompanied the pilot form and a personal message was available on the [ESPO YouTube channel](#). In total, 58 forms were returned fully or partially filled out. The response rate was considered to be satisfactory given the resources required and the availability of data across European ports. The response profile was considered to be acceptable and representative because it included all the EU maritime Member States and was balanced in terms of port size. The pilot revealed problems with data availability, unclear data requests and led to suggestions to make the data request more user friendly.

Participation of ports and a user friendly process to collect data are major challenges for the next steps towards the development of a Port Sector Performance Dashboard. In addition, given that data provision is on a voluntary basis, the number of ports submitting data may fluctuate from year to year. In this context, at least for the early stages of any port performance dashboard, reporting trends rather than absolute values is the best way forward to overcome data comparability issues and variations within the sample of participating ports. In conclusion, in the short term, efforts should be made to develop a culture of monitoring and reporting port performance within the sector while developing common guidelines and definitions for reporting data to populate the Dashboard. Deliverable 3 (PPRISM WP3 D3) summarises the pilot results.

The output of the last Work Package (WP4) consists of a proposal for a ‘European Port Observatory’, addressing crucial elements such as the Observatory’s mission, scope, users and main functions. As defined by the PPRISM Consortium, the European Port Observatory will provide insight into the overall performance of the European port system and, notably, the environmental, socio-economic and supply chain performance. In addition, it will provide an updated picture of the port sector in terms of governance models and market structure. To achieve this goal, the Observatory will collect data to populate a series of indicators which will be presented in the form of a publicly available, online Dashboard. In 2012, a first Dashboard, still in a printed form, will be produced and presented at the ESPO Conference in Sopot (Poland).

Given the experience with PPRISM, the partners propose a phased development of the European Port Observatory, starting small, based on the lessons learnt and the data from PPRISM, and expanding the Dashboard over time, as the sector gains, and exchanges, experience. This approach will enable the European Port Observatory to grow in content, sophistication and participation from the port sector, but also ensures a low financial and data provision burden on the port sector. Deliverable 4.1 (PPRISM WP4 D4.1) sets out a first concept on how to set up and implement the European Port Observatory and provides the data to populate the first Dashboard in 2012.

Deliverable 4.3 (PPRISM WP4 D4.3) compiles the partners’ expertise and knowledge generated during the PPRISM project into an educational, training and dissemination module for each performance field explored by PPRISM.

3. Summary of findings

PPRISM delivers a set of indicators within five different fields aimed to monitor performance trends in the European port sector. The next sections summarise the findings for each performance field.

3.1. Market Trends and Structure

The “Market trends and structure” indicators are relevant given the changing nature of the competitive environment and market structures in seaports. These create a need for performance measurement that depict market trends.

The performance indicators on market trends and structure have a high practical relevance as a large percentage of them is already used by the industry, in particular by port authorities. However, in practice there are differences in collection methods and the definition of data. Therefore, in the pilot project we opted for two representative indicators: *Maritime Traffic* and *Call Size*. The *Maritime Traffic* is the most widely used indicator for the port and shipping industry. The *Call Size* forms a combination of two basic indicators: *Maritime Traffic* and *Vessel Traffic* which are both widely used by port professionals. The *Call Size* is the ratio of *Maritime Traffic* indicator and *Vessel Traffic* indicator.

In line with the expectations, the analysis of the results of the pilot revealed that although the culture of measuring, monitoring and reporting indicators on Market Trends and Structure in individual ports is well established, standardizing at an EU level is missing. Different “language” and definitions on cargo throughput and vessel capacity prevail among EU ports.

PPRISM provided an opportunity to fine-tune the reporting format and the specification of the indicators on Market Trends and Structure. For a successful implementation, the development of specific instructions and guidelines is needed in order to achieve harmonization of tools, methodologies and techniques.

3.2. Socio-Economic Impact

From an historical perspective, socio-economic impact indicators such as employment and value added have been important to justify and show the economic contribution of port development, locally, regionally and nationally. The indicators are relevant, both to create societal acceptance of port activity, and for budget allocation of public infrastructure funds as well as the granting of permits allowing the port authority and the port firms to operate. *Employment* and *value added* are selected as indicators, as they are most relevant to convince stakeholders of the necessity of port development and operations in their region or country.

The PPRISM project demonstrates that in many ports, these indicators are missing. On top of that, the variety of methodologies used to calculate these indicators is large. The PPRISM project has provided new insights that assist ports who wish to implement these indicators. Furthermore, PPRISM provides a first estimate of the direct employment impact of European ports. Finally, PPRISM has established a sample of ports with annual employment and value added data. This sample can be used to monitor the evolution of both indicators. The main objective in the short run is to increase the participation of ports to the sample.

3.3. Environmental Performance

Port operations and activities may impact on air, water, soil and sediment of the terrestrial and marine environment. As environmental awareness is increasing throughout society, effective environmental management is essential if stakeholders are to continue their support for port operations. Nowadays, the burgeoning growth and impact of environmental directives and associated legislation is largely increasing while renewable energy and Carbon Footprint are becoming issues of priority for ports. In addition, ports have to demonstrate compliance and continuous improvement with substantive evidence from science-based quantified measures.

A substantive number of ESPO ports have achieved recognized standards of Environmental Management Systems (EMS) for purposes of compliance, cost and risk reduction. This can be largely attributed to the long standing cooperation between ESPO and EcoPorts, the sector's most significant environmental initiative over the past 15 years. In this context, a growing number of ports are actively implementing appropriate standards such as Port Environmental Review System (PERS) and ISO 14001.

Environmental Performance Indicators (EPIs) are fundamental components of any system that is set up to establish the effectiveness of an authority's EMS. Environmental Performance Indicators (EPIs) concern an organization's impacts on living and non-living natural systems, including ecosystems, land, air and water. EPIs can show clearly how the organization is performing, and provide a firm basis for future targets and improvements.

EPIs should be significant sector-wide but also relevant to individual ports. Within Europe, there is a wide range of port types in terms of their statutory duties, governance, operations and activities, liabilities and responsibilities. EPIs need to reflect this fact. Similarly, EPIs need to be applicable to inland ports, small ports, major, international ports, and of relevance to their operators and tenants where landlord interests prevail.

An initial list of 125 potential EPIs was reduced to 7 proposed indicators. This followed assessment feedback, discussions and advice from Members of the ESPO Sustainable Development Committee and 289 port and marine professionals. The final proposal identifies three quantitative measures, namely *Carbon Footprint*, *Waste Management* and *Water Consumption*; and a *qualitative measure of a port authority's capability to deliver effective environmental protection and sustainability through appropriate Environmental Management Systems (EMS)*.

3.4. Logistic Chain and Operational Performance

In this category, shippers' interests are central. Shippers are mainly interested in connectivity, transport costs, reliability and ease of transactions. That provides the basis for identifying performance indicators. As the result of the PPRISM project, three indicators were selected. Two indicators express the connectivity of the EU ports. *Maritime connectivity* indicates how well the EU port system is connected to destinations overseas.

This connectivity provides access to and from other regions. The indicator is based on schedule information for container shipping. Likewise, *intermodal connectivity* expresses the quality of intermodal connections from the EU ports. This indicator is gathered by port authorities and also focused on container services. Finally, regarding the ease of transactions, the *quality of customs procedures* indicator is based on publicly available data from the World Economic Forum. This indicator shows how users rate customs procedures, a crucial procedure for efficiency in ports. Note that two of the three indicators in this category do not have to be provided by port authorities, but are derived from external sources.

3.5. Governance

Over the last years, port governance issues have become increasingly relevant. The changing economic and political environment has led to changes in port governance structures. There is still an ongoing debate regarding appropriate port governance models. Thus, it is relevant to identify and monitor particular aspects of the governance models in place.

Since the 1970s, ESPO and its predecessor the Community Port Working Group have been producing a series of “Fact-Finding” reports which aim to provide insight in the way in which European ports are governed. Throughout the years these reports have become leading reference tools both for port practitioners and policy-makers at all levels. In 2011, ESPO published a new version of its ‘Fact-Finding Report’ on port governance based on an extensive survey that was held among ESPO members in 2010.

The governance section of the PPRISM project draws on the latest ESPO Fact-Finding report and attempts to develop and measure a number of port governance indicators. These can be interpreted on a stand-alone basis. In addition, analysis of the relation between the port governance indicators and other port performance indicators may provide meaningful insights. Due to their novelty, governance indicators touch upon basic functions of port authorities adopting an evaluation of a number of relative criteria on a binary (True, False) basis. Yet, it is expected to become more demanding and sophisticated once a culture of monitoring and reporting develops on a European level and governance indicators reach sufficient levels of maturation.

Three governance indicators are considered as the more appropriate for the first version of the European Port Performance Dashboard. The indicator *Integration of port cluster* expresses the extent of port authorities initiatives that aim towards the integration of various stakeholders composing a port cluster. *Reporting corporate and social responsibility* touches upon a port authority’s activities that enhance corporate responsibility and *Autonomous management* provides information on whether port authorities maintain features that enable it to develop vital initiatives. The absence of significant methodological problems justifies the adoption and use of the aforementioned indicators. Data needed for the calculation of governance indicators are readily available, should be collected annually and derive solely from port authorities. Finally, a revision of the components and definitions used is advised.

4. Conclusions

The findings and conclusions for each field are summarised in the following table:

TABLE 1: FINAL LIST OF INDICATORS PILOTED WITHIN PPRISM.

Indicators	Pilot result	Next steps
1. Maritime traffic	Relevant and feasible	Building a “time series” mainly focusing on the relative changes in traffic volumes over time. A three dimensional approach is suggested with respect to the dimension of ‘time’, (quarterly figures), of ‘commodity’[total throughput plus 5 categories of cargoes plus passenger traffic (7 in total)] and ‘geography’(all European ports)
2. Call size	Relevant and feasible	Building a “time series” mainly focusing on the relative changes in traffic volumes over time. A three dimensional approach is suggested with respect to the dimension of ‘time’, (yearly figures), of ‘commodity’[total throughput plus 5 categories of cargoes plus passenger traffic (7 in total)] and ‘geography’(all European ports)
3. Employment (Direct)	Relevant and feasible	Getting data from a larger number of ports
4. Added value (Direct)	Relevant and feasible	Getting data from a larger numbr of ports
5. Carbon footprint	Relevant and feasible	Make Tool available to port associations and authorities. Provide training support where requested.
6. Total water consumption	Relevant and feasible	
7. Amount of waste	Relevant and feasible	
8. Environmental management	Relevant and feasible	Promote using Tool (see above) and populate from SDM and PERS responses.
9. Maritime connectivity	Relevant and feasible	Building a ‘time series’ to monitor maritime connectivity over time.
10. Intermodal connectivity	Relevant and feasible	Getting data from a larger number of European ports.
11. Quality of customs procedures	Relevant and feasible	This indicator can be substituted by something more detailed in the medium run. Until then, this is the best available indicator.
12. Integration of port cluster	Relevant and feasible	Revision of criteria used. The need to reduce the number of criteria is already anticipated. More detailed info for each criteria will be asked. Efforts to standardize and collect quantitative data as well. In the long run the objective is to measure the efficiency of a PAs initiatives related to the respective indicators. .
13. Reporting Corporate and Social Responsibility	Relevant and feasible	
14. Autonomous management	Relevant and feasible	



5. PPRISM project documentation

The public website for the EC co-funded project PPRISM will still be operational in 2012 making all information from the project available.

For more information please contact the ESPO secretariat.

ANNEX

1. Academic pre-selection of indicators

The process followed for the selection of indicators and the complete definitions of the indicators for each category can be found in Deliverable 1:

TABLE 2: FINAL LIST OF INDICATORS TO BE EVALUATED FOR INCLUSION IN THE PPD.

Market Trends & Structure Indicators
1. Maritime traffic
2. Herfindahl-Hirschman Index (HHI)
3. Vessel Traffic
4. Market Share
5. Load Rate
6. Container dependency
7. Call size
8. Modal Split
Socio-economic Indicators
9. Employment (Direct & Indirect)
10. Added value (Direct & Indirect)
11. Direct Gross added value per FTE
12. Financial health
13. Training per FTE
14. Investment
Environmental Indicators
15. Total energy consumed
16. Carbon footprint
17. Total water consumption
18. Amount of waste
19. EMS standard
20. Existence of Aspects inventory
21. Existence of monitoring programme
Logistic Chain and Operational
22. Maritime connectivity
23. Intermodal connectivity
24. On-time performance (Sea-going)
25. On-time performance (Inland waterways, Rail, Road)
26. Mean-time customs clearance
27. Availability of Port Community Systems
28. Ship turnaround time



Governance Indicators
29. Integration port cluster
30. Extent of performance management
31. Existence of Performance Measurement
32. Formal reporting CSR
33. Market openness
34. Port authority investment
35. Safety/Security
36. Port authority employee productivity
37. Autonomous management