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Deliverable 6.1
Port user perceptions measurement and indicators (typology)
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DELIVERABLE 6.1
PRE-SELECTION OF AN INITIAL SET OF INDICATORS TO BE INCLUDED IN THE “PORT USERS PERCEPTIONS” MEASUREMENT INITIATIVE

Abstract

The port industry is experiencing an ongoing transformation due to changes in the industry’s internal and external environment. Technological developments, especially in shipbuilding, the continuous development of supply chains in which ports are integrated, and the increasing participation of the private sector in the provision of port services, among others, alter the port industry. Nowadays port industry is characterised by the competition between ports that are mainly commercial and industrial entities, driven by the market conditions, seeking (among other goals) to increase related revenues and market shares.

In this vein, the customer/port user satisfaction is of increasing importance. Especially as several shipping markets are characterised by oligopolistic conditions due to the dominance of a small number of operators. One the one hand, among the factors that ports are interested in is to generate and provide value to their users by developing attributes that are appreciated by their users. On the other hand, port users aim at maximising the value they extract by the usage of a port.

The aforementioned environment means that port performance measurement emerges as an issue of high priority, notwithstanding the need for such measurement devoting attention to all different components of performance – including both efficiency and effectiveness.

The existing industry practices on port performance - and to a large extent academic research - are focusing mostly on the operational performance of a port, neglecting port users perceptions of their experiences when using any given port. Several methodologies are used to measure port performance taking into account various operational dimensions (for example, terminal productivity, environmental performance, operational performance, etc.). Yet, port users’ approaches on port performance could differ from the actual operational performance, and in that case users are looking for an effective process while the port industry remains preoccupied with the efficiency of port operations. Acknowledging that, the industry, scholarly research and some international institutions have in recent times pointed out that port performance measurement exercises should expand to integrate any missing components in the existing practices, with a most vital of such components being the measurement of port users perception.

The PORTOPIA Work Package 6 aims at filling this gap, by developing a framework for measuring port users perceptions on port performance. The first step towards the fulfilment of this aim is the development of a typology of indicators, based on previous research and industrial practices in use. The present deliverable addresses this issue via a literature review, and a review of practices from organizations and the port industry.
Summary Report

Port performance measurement is a challenging issue for the port industry, while it stands as a condition for deploying strategies that address the needs of port users (customers). Increased used of containerization, supply chains and the development of new production-distribution-consumption systems and markets, have all affected the way in which ports are organised, managed and operate. Efficiency is in the centre of the strategy of the ports so as to increase competitiveness and thus sustain and increase market shares.

Port performance is notably associated with operational issues, more specifically the efficient use of infrastructures, superstructures and other resources available. This has affected the structuring of port performance measurement frameworks; the majority of the indexes discussed, and the exercises applied by those responsible for managing ports or providing port services are constructs dealing with operational productivity of the assets, equipment and productivity factors available in a given port, or port system. Contrary to what is observable in other service industries, little, if any, attention has been paid on the demand side reflections, i.e. the users, point of view. Following the results of the PPRISM project (Port Performance Indicators- Selection and measurement) the PORTOPIA project aims to contribute in the development of a tool that will enable to assess in a meaningful and measurable way port users perspectives, allowing a more holistic approach of port performance monitoring.

Work Package (WP) 6 is dealing with this understanding of port users perceptions of port performance, specifically of the factors that affecting their perception. The identification and evaluation of these factors will allow the development of related indexes.

The present deliverable (WP 6.1) is based on a desktop review of relevant practices, review of previous related research, and on the outcome of several meetings with European ports and their association (ESPO), users associations (that participate at PORTOPIA as associated partners), and provides a typology of criteria having – in principle and in theory – the potential to be used for the formation of relevant indexes for the measurement of port users perception on port performance.

From the outset, the main concern of this exercise is that the criteria to be endorsed for testing, and in the long run applied, must be both meaningful and measurable. Also going beyond the PPRISM project, and following the outcomes of the meetings with port users the WP6 seek to extend the research beyond container markets. Due to the latter, it develops a typology of criteria for ro/ro and cruise ports as well.

The deliverable examines the importance of integrating port users perspectives in port performance measurements, presents the methodological framework followed, the findings of the review of relevant industrial practices and previous research efforts. Based on these, as well as on direct discussions with associated partners, it sets the scene for the steps forward by concludes on a typology of port users and a typology of the criteria having the potential to be used in frameworks aiming to measure port users perceptions of a port, or port system.
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1. INTRODUCTION

Following the results of the PPRISM project for the development of a monitoring mechanism for performance trends in the European port sector, the European Commission decided to co-finance research enriching the indicators suggested by PPRISM and addressing the additional aspects regarding port performance. One of the latter is port users perceptions of port performance. PORTOPIA (WP6) aims at developing and implementing a measurement tool measuring port effectiveness.

European Union started to focus on the port industry in 1997, when the Green Paper on sea ports and maritime infrastructure has been published (CEU, 1997) and more systematically after 2000 with a series of regulations and directives. Among the major strategic decisions of EU remains the increase of the EU’s port system competitiveness and efficiency. The principles of the efforts to open market access to port services (CEU, 2001; CEU, 2004) aimed at this direction.

The several suggestions have been put forward for the increase of port performance focus almost exclusively on the efficiency side. In 2007 the European Commission (CEU, 2007) mentioned that port users and their views are important elements in the whole process and deserve further attention. On these grounds, the PORTOPIA project has undertaken the task to develop and implement a framework for measuring the port user’s perception, in essence to measure port effectiveness.

The deliverable collects data from academic research as well as industry applications and concludes on a typology of relevant criteria that can be used for port user’s perception measurement tool.
2. SCOPE OF WORK PACKAGE 6.1

The ports are of vital importance for the international trade. In order to have efficient maritime transport systems and supply chains, seaports must be guaranteed to work efficiently and that is why port performance and its measurement is a key issue for any port (Brooks and Pallis, 2013). The vast interest on performance has been triggered also due to the increasing competition among ports (Tongzon, 1995) which implies for increasing quality for the port services.

The majority of the academic research as well as the industry practices regarding performance are mainly focused on the efficiency side, i.e. to do things right. Thus it is no coincidence that port performance has been associated with the operational efficiency alone (Brooks and Pallis, 2013). As Beresford et al (2010) mentioned, traditional measures of measuring port performance focus on servicing ships, cargo handling and equipment and assets utilisation, although several constraints may arise due to lack of up-to-date and reliable data (Tongzon, 1995).

An almost neglected issue in port performance studies is the port user’s point of view, i.e. how a port user experiences the port performance and how the user measures it. To make it more clear, Pallis and Vitsounis (2009) supported that the performance components are the efficiency and effectiveness. Effectiveness is the user’s perception on port performance. If we examine it from the port’s side of view, effectiveness is to do the right things, to respond to the user’s peculiar needs and expectations (see Brooks et al, 2011).

Based on the aforementioned distinction the deliverable is focused on port effectiveness and more specifically on the identification of the elements that constitute the effectiveness (typology). To conclude on such a typology we first have to link the PORTOPIA project with the PPRISM project results and then to analyse the reasons behind the importance of port users as a crucial element in measuring port performance.

2.1. The PPRISM Project

Port Performance Indicators: Selection and Measurement Project (PPRISM) was a first attempt to increase the awareness on the importance of the port industry not only outside the port industry but also inside it. The tool to respond to this challenge and moreover to establish a relevant culture in the European ports was the port performance measurement. A group of academic partners with the coordination of the European Sea Ports Organization (ESPO) moved forward in order to develop a set of feasible indicators for performance measurement that can be used in a future European Port Observatory.

Based on literature review and in cooperation with ESPO members plus a contribution from external stakeholders and an online assessment, the project concluded on five sets of indicators based on an equally number of fields related with the port industry which are:

1) Market Trends and Structure Indicators (8 indicators)
2) Socio-Economic Indicators (6 indicators)
3) Environmental Indicators (7 indicators)
4) Logistic Chain and Operational Indicators (7 indicators)
5) Governance Indicators (9 indicators)

In total 37 indicators have been chosen for the development of a European port performance dashboard. These indicators are dealing with port efficiency as the majority of them examine operational issues. PPRISM was a first attempt towards a holistic framework for port
performance measurement, thus the categories of indicators and the indicators were limited. It is evident that PPRISM project didn’t proceed into the examination of the effectiveness issue and the user’s perception measurement on port performance. This gap covered with the launch of PORTOPIA project which apart from the five categories of indicators of PPRISM project, examines two additional categories, the “User’s perspectives in port performance evaluation” and the Inland ports performance indicators”.

2.2. Why Port User’s Perception

Despite the importance of port performance measurement for ports and their users, the users themselves usually are participating in the evaluation of performance indexes developed according to the operational profile of a port and with the assumption that the researcher or the company that undertakes the exercise knows what is the best for the port user and what the port user is looking for. A risk in this approach is to confront port users as a unified entity with the same strategies and goals. The way to proceed with a holistic approach towards port performance is to bring into the exercise the port users in order to examine effectiveness apart from efficiency. Most port performance measurement schemes fail to include port’s effectiveness (Brooks et al, 2011) and this is evident especially by researchers who implicitly assume that efficiency is a proxy for competitiveness as they rarely incorporate user perception (Yeo et al, 2011). This is why port performance measurement is heavily relied upon operational efficiency measures (Pallis and Vitsounis, 2009) and might be the reason behind the gap between port performance and user expectation.

Roll and Hayuth (1993) in their study on comparing port performance with the use of Data Envelopment Analysis, make a reference to the term port user satisfaction without going deeper into their analysis. With the evolution of the related research and the active participation of ports in port performance exercises the port users came into the scene although this happened recently, in comparison with the research on port performance (Lirn et al, 2003; Ng, 2006; Tongzon, 2008; De Langen 2008).

The most comprehensive attempt on measuring port user’s perception of port performance started by Brooks (2007) who identified that the user satisfaction is a critical performance indicator that must be measured in an effectiveness-focused organization. Some years and several studies later, Brooks et al (2011) concluded on a systematic approach for measuring port’s effectiveness.

It is evident that port user’s perception plays a vital role for the development of a comprehensive framework for measuring port performance. Also it is clear that the port user approach must take into consideration the subjectivity that user’s perception entails as each user has its own assessment criteria to evaluate port performance. As such an identification and categorization of port users is needed in order to reduce subjectivity issues.

2.3. Methodology

To conclude on a typology of criteria for port user’s perception on port performance there are three variables that need to be examined. First there are the port markets that are going to be examined. Different port markets mean different attributes that shapes user’s perception on port performance. Second there are the port users. As port’s are embedded in supply chains (Robinson, 2002) the number of port users are increasing dramatically. To handle efficiently this issue, port users must be categorized based on coherent elements. Having identifying
markets and group of users the third and final variable is to identify the criteria shaping port user’s perception based on the port market and the user group they belong into.

The research for the aforementioned variables is based exclusively on literature review and on related good practices from the port industry. As port performance measurement is among the top research fields for the academics as well as for the industry itself, there are sources that can provide the necessary data for the typology of the criteria.

The project’s associated partners played also a significant role in the first phase of Work Package 6 and on the development of the deliverable. During December 2013 – February 2014 several meeting have been organized, among the WP6.1 research team and representatives from the associated partners aiming to provide updated information regarding the scope of the work package, the research process adopted, the findings regarding the criteria and their point of view on the process development. As the work package is about port users, their opinion and suggestions cannot be missing from exercise. The following figure (fig. 1) shows the methodological framework applied for developing the typology of the criteria.

![Methodological framework](image)

**Figure 1: Methodological framework.**

A contribution from the WP6 partners has been requested from the lead partner in order to collect data for port performance, user satisfaction or any other related exercise, undertaken by ports or any other organization. Based on an initial plan on how to proceed with the WP6.1, the lead partner participated in a series of meetings with associated partners. A major outcome derived from these meetings was the vast interest showed by some associated partners on a specific port market which has been included in the project. Following the
literature review the research team concluded on a list of criteria that will be included in the typology. Also following the results of similar exercises and with input from the literature review port users have been categorized. Regarding the port markets, the researchers concluded, with the input from associated partners, on three specific port markets that there is an interest going for their examination regarding port user’s perspectives on port performance. Port user groups, port markets and criteria conclude in a typology of criteria for each port user group and for specific port markets. By this way the project avoids into a large extent generality issues (i.e. that each port market has the same characteristics and that each user evaluate the port performance in the same way).
3. REVIEW OF LITERATURE AND BEST PRACTICES

3.1. Introduction

The discussion for port user’s perception on port performance has only recently come in the forefront of the academic research. At the beginning of the port performance measurement adventure, there were a lot of approaches on the issue. Performance has been linked with efficiency thus the majority of the related studies strived to identify the criteria that affecting efficiency and methods to measure them. In the course, researchers experimented with several perceptions of performance. In port performance factors, methods and outcomes researchers saw some elements of attractiveness (see for example Lirn et al, 2004 who identified a list of 47 criteria affecting port attractiveness). Others discovered particles of port performance, elements that can also be used for determining port competitiveness (see for example Yeo et al, 2011; Yuen et al, 2012) as researchers implicitly assumed that efficiency is a proxy of competitiveness (Yeo et al 2011). Also there were studies aiming at relating port performance measurement and port governance approaches (cf. Brooks 2007).

Significant work has been done also on the issue of measuring port performance with several methods being used for this purpose. In a general approach on performance measuring, Martilla and James (1977) described the pros and cons of Importance-Performance analysis with normalized pairwise estimation. Regarding port performance measurement the most widely used method, as Slack and Comtois (2010) concluded, is Data Envelopment Analysis (see for example the studies of Park and De, 2004; Lin and Tseng, 2007).

The port performance research has been redefined following the ascertainment that port performance is a function of efficiency and effectiveness, with the latter being neglected up then, although some thoughts have been put forward (i.e. Park and De, 2004; mentioned customer satisfaction as part of marketability in their approach).

The effectiveness concept has gained attention as a tool to develop a more holistic approach on port performance measurement. The port performance and its measurement is not an exclusive issue for ports which are the providers of the port product. For the whole picture someone has to know the perception of the consumer of this product, the perception of the port user. The work of Brooks, 2007; Brooks and Pallis, 2008; Brooks et al, 2011; Brooks and Pallis, 2013 developed the efficiency and effectiveness approach for port performance measurement, aiming at understanding how users evaluate the port they use. Beresford et al. (2010) also agreed on this approach as port performance measurement assumed to be multi-faceted and multi-dimensional.

The effectiveness or port user perception approach is also an issue for the European Union as the European Commission in a Communication on the European Port Policy (CEU, 2007), addressed the port user perception regarding European ports performance. It is evident that port effectiveness and the consequent port user perception measurement are of great importance for any study dealing with port performance. PORTOPIA project recognised this necessity and deals with it in an effort to develop a holistic framework for port performance measurement which will leads to a related European Observatory.
3.2. Literature Review

The port performance issue has been examined from several perspectives but mostly has been related with efficiency. Back in 1995, Tongzon tried to specify some factors that could influence port performance and efficiency. He focused on determinants of port throughput and included as parameters the location of the port, the frequency of ship calls, the port charges, the economic activity and the terminal efficiency (which is affected by container mix, the work practices, the crane efficiency and the vessel size and cargo exchange).

Dealing with efficiency, research on port performance examined mainly port operational parameters as well as the extent of port facilities exploitation. Marlow and Paixao Casaca (2003) in their study on measuring lean port performance they mentioned 15 criteria dealing with port performance (Table 1) having seen the port in a broader perspective, as part of supply chains. The “supply chain perspective” is useful as it will contribute in the criteria formation for the port user perspective measurement.

<table>
<thead>
<tr>
<th>Timeliness in picking up shipments and delivering them</th>
<th>Adaptability in existing processes to customer requirements</th>
<th>Responsiveness of transport suppliers in meeting customer requirements</th>
</tr>
</thead>
<tbody>
<tr>
<td>Flexibility of operations</td>
<td>Overall transport cost</td>
<td>Lead time to service delivery</td>
</tr>
<tr>
<td>Accuracy in processing information</td>
<td>Compliance with customer’s requirements</td>
<td>Value of money</td>
</tr>
<tr>
<td>Notification of any charges in the multimodal process</td>
<td>Level of damages in the equipment</td>
<td>Employee interaction with customers</td>
</tr>
<tr>
<td>Level of conflict with other processes</td>
<td>Accuracy of information regarding status of shipment</td>
<td>Reliability of transit time/transport availability</td>
</tr>
</tbody>
</table>

Table 1: Criteria for port performance – Source: Marlow and Paixao Casaca, 2003

De and Ghosh (2003) mentioned some port performance indicators and categorized them in three broad categories:

a) Indicators of Operational Performance
b) Indicators of Asset Performance
c) Indicators of Financial Performance

Beresford et al (2010) in a recent study mentioned performance criteria related with service quality (timeliness, reliability, lead time, cargo damages, accuracy of information) as well as criteria related with service price (total port charge, cargo handling charge, port related service charge, port facility usage charge). Mengying et al (2011) examines 15 factors in order to capture the port performance among Asian and European ports. Also Brooks and Pallis (2013) made a reference to some performance indicators and their categorization:

- Physical indicators (working time, overtime at berth, Ship turnaround time, waiting rate, berth occupancy rate).
- Productivity factors (tons per day-ship, tons per worked-hour, tons per crane hour, tons per berth or linear metre)
- Economic and financial indicators (operating surplus over GRT, total income per ton, charge per TEU)
As mentioned in previous sections, there are many studies examining port performance as an element of competitiveness. As such some competitiveness factors are directly related with performance. For example Yeo et al (2008) reviewed 25 studies and they listed factors related with port competitiveness (Table 2)

<table>
<thead>
<tr>
<th>Author (date)</th>
<th>Components identified</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pearson (1980)</td>
<td>Confidence in port schedules, frequency of calling vessels, variety of shipping routes, accessibility of port</td>
</tr>
<tr>
<td>Willingale (1981)</td>
<td>Navigation distance, hinterland nearness, connectivity to ports, port facilities, availability of port, port tariffs</td>
</tr>
<tr>
<td>Collison (1984)</td>
<td>Average waiting time in port, confidence in port schedules, port service capacity</td>
</tr>
<tr>
<td>Slack (1985)</td>
<td>Calling frequency, tariffs, accessibility to the port, port congestion, inter-linked transportation networks</td>
</tr>
<tr>
<td>Brooks (1984, 1985)</td>
<td>Port costs, frequency of calling vessels, port reputation and/or loyalty, ship direct calling, experience of cargo damage</td>
</tr>
<tr>
<td>Murphy et al. (1988, 1989, 1991, 1992)</td>
<td>Has loading and unloading facilities for large and/or odd-sized freight, allows for large volume shipments, has low freight handling shipments, provides a low frequency of loss and damage, has equipment available, offers convenient pickup and delivery times, provides information concerning handling, offers assistance in claims handling, offers flexibility in meeting special handling requirements</td>
</tr>
</tbody>
</table>
| Peters (1990)          | Internal factors: service level, available facility capacity, status of the facility, port operation policy  
                          | External factors: international politics, change of social environment, trade market, economic factors, features of competitive ports, functional changes of transportation and materials handling |
| UNCTAD (1992)          | Geographical location, hinterland networks, availability and efficiency of transportation, port tariffs, stability of port, port information system |
| McCalla (1994)         | Port facilities, inland transportation networks, container transport routes             |
| Starr (1994)           | Geographic location of ports, Inland railway transportation, investment of port facilities, stability of port labor |
| Tengku (1995)          | Port tariffs, safety handling of cargoes, confidence in port schedules                 |
| Chiu (1996)            | Custom service, rapidness, simple documents in port, cargo damage and skills of port |

*Table 2: Components of port competitiveness – Source: Yeo et al (2008)*

Following this study, Yeo et al (2011) listed 38 factors affecting container port competitiveness and a way for measuring them. Some factors are related with port
performance such as cost factors, inland transport networks, cargo damages, frequency of container ship calls, quality of auxiliary port services, port safety, skilled labour etc.

As port performance draws research attention, several studies reviewed related researches and their outcomes. Gonzalez and Trujillo (2009) proceeded with a comprehensive review of port efficiency literature with a focus on the methods used for its measurement. Also Beresford et al (2010) reviewed and presented port performance indexes and their categorization based on several studies (Table 3).

<table>
<thead>
<tr>
<th>Literature</th>
<th>Category</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>UNCTAD (1982)</td>
<td>Output</td>
<td>Berth output, Ship output, Gang output</td>
</tr>
<tr>
<td>Tongzon and Ganesalingam (1994)</td>
<td>Operational efficiency, Customer oriented measures</td>
<td>Capital and labour productivity, Asset utilization rates, Direct charges, Ship’s waiting time, Inland transport, Reliability</td>
</tr>
<tr>
<td>Tongzon (2001)</td>
<td>Cargo throughput, Efficiency</td>
<td>Location, Frequency of ship calls, Port charges, Economic activity, Terminal efficiency, Container mixture, Work practices, Crane efficiency, Vessel and cargo exchange</td>
</tr>
<tr>
<td>Talley (1998)</td>
<td>Cargo throughput</td>
<td>Ship/apron transfer capability, Apron/storage transfer capability, Yard storage capability, Inland transport processing capability (engineering approach)</td>
</tr>
<tr>
<td>Talley (1994)</td>
<td>Shadow price</td>
<td>Cargo handling rate, Average delay to ships waiting for berths, average delay to ships whilst alongside berths, truck turnaround time and queuing</td>
</tr>
<tr>
<td>Sachish (1996)</td>
<td>Port productivity</td>
<td>Input: labour, building, equipment, others, Output: Total tonnes of cargo handled</td>
</tr>
</tbody>
</table>


Following the literature review some major conclusions can be drawn. First of all port performance measurement studies are almost exclusively focused on port efficiency. Also based on the literature and the research applications, the indexes that have been developed are mostly related with container ports/terminals. Finally the port user’s perception on port performance is missing although some criteria can be identified, despite that stakeholders perception (the port users among others) are vital for correcting both operational and governance flaws (Brooks and Pallis, 2013).

Some researchers tried to access port user’s concept by analysing the port user satisfaction (see for example Ugboma et al, 2007; Pantouvakis, 2008). Yuen et al (2012) examined factors determining container port competitiveness from the user’s perspective. Brooks et al
(2011) and Schellinck and Brooks (2013) proceeded with a holistic approach to the measurement of port user’s perception (port effectiveness). The research describes the process for evaluating effectiveness. In general this process can be divided in three specific steps which are:

1) Define customer
2) Identify attributes (criteria) of importance to users
3) User evaluation of the particular port’s performance (both performance rating and importance rating of criteria)

The first step is to define the term port user which is a difficult task of each own, especially in a complicated operational environment for a port where it plays a commercial, even an industrial role and which is fully integrated in supply chains. Brooks et al (2011), overcame this difficulty by grouping port users and thus limiting the number of potential perceptions. In their research they used three groups of port users: a) Cargo interests (who purchase transportation services by themselves or they undertake the transportation part on behalf of another company), b) Shipping lines and c) Supply chain partners (warehouse operators, logistics service supplies, trucking/rail company).

The second step of their approach is to identify the criteria that shaping the port user’s perception. Based on an extensive literature review of more than 80 papers, the researchers formatted a list of criteria. Following an evaluation of those criteria through a field research and discussions with industry experts, the researchers concluded to a short-list of criteria. The short list included 12 general criteria (i.e. used for all groups of users), 9 criteria for cargo interests port user group, 13 criteria for supply chains partners group and 16 criteria for the shipping lines. The 12 common criteria can be examined also from the perception of satisfaction, competitiveness and effectiveness.

The third step evaluates the criteria through a survey to port users which are providing responses helping rate the criteria based on their importance and also to rate the criteria based on the performance of a specific port. Brooks et al (2011) tested the approach in three Canadian and two U.S.A. ports, measuring users perspective on port performance. Figure 2 shows the aforementioned approach.
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Figure 2: Evaluation of port user’s perception on port performance- Source PORTOPIA based on Brooks (2011).
3.3. Review of Existing Practical Approaches

Apart from the academic research on port performance and more specifically on port effectiveness measurement there are examples from the port industry and various organizations. The difficulty with these studies is their confidentiality as they rarely going public. This is true especially for assessment of performance by certain actors along the maritime supply chain (Bichou and Gray, 2004). Performance studies are a usual exercise from the industry side as the actors want to know where they stand and especially in comparison with their competitors. The majority of these performance measurement applications focus in the port operations.

UNCTAD, back in 1976, developed one of the first studies on port performance by providing 18 indicators divided in two broad categories: financial (7 indicators) and operational (11 indicators). The World Bank reported on port indicators (Chung, 1993) focusing also on operational issues as it proposed three broad categories of indicators: 1) Asset performance indicators, 2) Operational performance indicators and 3) Financial performance indicators.

As the performance measurement concept gained attention in the industry more studies have been undertaken. In 2008 Germanischer Lloyd launched the Container Terminal Quality Indicator which is a certification process for quality standards in container terminals. European Sea Ports Organizations implements a kind of performance measurement focusing mostly on quantitative data related with the ports throughput and operational issues.

As mentioned in the previous sections a critical input in performance studies is the user’s perspective. The airport and airline industries have accepted this necessity and they have turned to customers (passengers) for their evaluation (see Airport Service Quality Programm). In port industry this seems to be lacking although there are some studies aiming at port users perception. The Port Authority of Thailand conducted a survey on port customers satisfaction aiming at improving port services and efficiency. Port Authority of Rotterdam also undertakes a port user performance measurement study. Due to confidentiality no additional information are available for these studies. The following sections present studies on performance measurement for which more information are available and can provide a valuable input for the PORTOPIA project

3.3.1. Journal of Commerce study

On 2013, Journal of Commerce published a resume of the results of its study on port productivity. Focus is on efficiency as the study shows a specific interest on berth productivity. The study calculate a standard measurement unit (for all ports and terminals included in it) which is the gross moves per hour. Having a common point of reference the study is able to compare terminal productivity performance across countries and regions. In doing so, the study is supported from 17 ocean carriers representing the 70% of the global container capacity and which provides the input for the evaluation.

The study ranks the top-20 ports and terminals based on data from more than 100,000 port calls at 600 container terminals in 400 ports in three regions (Americas, Asia and Europe-Middle East Africa).
3.3.2. **World Bank’s Logistics Performance Index**

The World Bank’s study on Logistics Performance Index is not focused exclusively on the port industry but in logistics instead. On the contrary the study’s process is interesting as it includes port user’s evaluation on specific factors dealing with logistics performance as well as a framework on how to measure them. The Logistics Performance Index measures on-the-ground trade logistics performance based on six dimensions: 1) timeliness, 2) international shipments, 3) tracking and tracing 4) customs, 5) infrastructures and 6) services quality. In doing so, World Bank (2012) developed two standardized questionnaires as a mean to gather the data needed. The first one is the international questionnaire which request for an assessment of six key areas of logistics performance and more specifically:

1) Efficiency of the clearance process by border control agencies (including customs).
2) Quality of trade-and transport-related infrastructure
3) Ease of arranging competitively priced shipments
4) Competence and quality of logistics services
5) Ability to track and trace consignments
6) Frequency with which shipments reach the consignee within the scheduled or expected delivery time.

Indicators 1, 2 and 4 are mainly areas for policy regulation (input indicators) while indicators 3, 5 and 6 are related with the service delivery performance (outcome indicators). The respondent proceeds with an evaluation of the six performance factors for eight of the main overseas markets he deals with.

Apart from the international questionnaire there is also a domestic one in which the respondents are requested to provide qualitative and quantitative data on the logistics environment in the countries they work. The respondent has to provide data for 5 major categories of factors related with quality, cost and efficiency. Each category has some sub-indicators as shown in the following table (Table 4).
**Category** | **Elements included**
---|---
**Level of fees** | 1. Port charges
2. Warehousing/Transloading charges
3. Agent fees

**Quality of infrastructure** | 1. Ports
2. Roads
3. Rail
4. Warehousing/Transloading facilities
5. ICT

**Quality and competence of service** | 1. Road
2. Rail
3. Maritime transport
4. Warehousing/Transloading and distribution
5. Freight forwarders, customs agencies/brokers

**Efficiency Processes** | 1. Clearance and delivery of imports
2. Clearance and delivery of exports
3. Transparency of customs clearance
4. Transparency of other border agencies
5. Provision of adequate and timely information in regulatory changes

**Sources of major delays** | 1. Pre-shipment inspection
2. Compulsory warehousing/transloading
3. Maritime transhipment
4. Criminal activities (stolen cargo)
5. Solicitation of informal payments

*Table 4: Indicators of LPI’s domestic questionnaire. Source: World Bank, 2012.*

Answering the international and domestic questionnaire and evaluating the indicators is a process based on an online survey. For the completion of the survey, World Bank involves logistics professionals, practitioners as well as policy makers. The results provides an assessment of the logistic performance per country. In 2014 about 6.000 assessments by over 1000 freight forwarders and logistics professionals have been completed, which covered 160 countries, attributing a score in a range 1-5. Figure 3 shows a sample question of the domestic Logistic Performance Index. Due to the worldwide coverage of countries as well as the participants in the exercise, LPI is considered as a global benchmark to measure and compare logistics performance.
3.3.3. European Union’s Transport Scoreboard

In 2014 European Commission released a memo (CEU, 2014) on the EU transport scoreboard, which aims at identifying the performance of the EU member states regarding transport-related attributes. The scoreboard is based on existing data from several sources. Among them there are the EUROSTAT, the OECD and even the Logistics Performance Index of the World Bank, presented in the previous section. The scoreboard examines four modes of transport, road, rail, maritime and air transport and for eight variables which are:

- Single market
- Infrastructures
- Environmental impact
- Safety
- Transposition of EU law
- Infringements of EU law
- Research and innovation
- Logistics

Some variables can’t be attributes to some of the transport modes either because the data are insignificant or due to the lack of data or relevant indices. Scoreboard compares the performance data for the EU member states and conclude on a matrix table with the score that each country achieves for each one of the combinations between transport mode and transport-related variables. From the matrix the scoreboard derives the top-5 and the bottom-5 performers. The final ranking of the member states is based on the difference between the number of cases where the country is included in the top-5 with the number of cases where the country is included in the bottom-5.

Although the European Commission’s scorecard provides an insight to the transport performance of EU member states, the lack of ability in using its own data and indices, the dependence on data from other sources and the lack of data in some cases, reduces the innovativeness of this scheme. EU transport scoreboard need to develop its own integrated framework on data collection and their elaboration.

Figure 3: Question of the domestic LPI. Source LPI survey 2014.
3.3.4. PricewaterhouseCoopers/Panteia study

In 2013, the European Commission received the results of a study in order to support the preparation of an impact assessment by the Commission services on measures to enhance efficiency and quality of port services in the European Union. The study (PwC and Panteia, 2013) proceeded in two surveys with the first aiming at defining the problem and at assessing a baseline scenario regarding forecasts for European ports traffic, while the second aiming at collecting opinions on the impacts of regulatory interventions by the Commission. In brief the study focused on the productivity and the efficiency of the port sector and it had three goals:

1. To highlight policy options for the EU port industry
2. To examine performance within the sector
3. To unveil problems of inefficiency and quality of service in the port sector

The study addressed six categories of stakeholders (Port Authorities, Port Customers on the shore side, Port Workers, Service Providers, Shipping Companies and Terminal Operators) plus EU Member States and Public Authorities in order to provide to the research consortium suggestions and opinion on the assessment of the impact related to the various possible policies that the European Commission might intend to implement. The selection of measures for assessment was based on a consultation between the European Commission of the PwC/Panteia.

Based on the outcomes, the study unveils issues that constitute weaknesses for the ports. The majority of these weaknesses are related with price and quality elements. More specifically, causality of inefficiency and quality in ports are:

- Common minimum quality requirements for port services providers
- Existence of restrictive regimes (i.e. labour pools)
- Need for more secure and environmentally sustainable port services
- Lack of clear rules governing market access to port services and concessions at EU level
- Lack of financial transparency for port authorities providing port services
- Lack of rules guaranteeing that port charges are set in a transparent and non-discriminatory way and at an appropriate level reflecting the cost of infrastructure and of the service provided

The study moves forward and presents the role that a different policy packages (proposed by EC) would have in achieving the desired objectives. These packages are related with economic impact, social impact and environmental administrative burdens on business and public sector. There isn’t any clear indicator regarding port user’s perception on port performance except a part dealing with user satisfaction on proportionality (cost based) transparency and non-discrimination of port dues.

3.4. Preliminary Outcomes

Based on the previous review of the literature and of the industry practices some first outcomes can be drawn. The majority of the related studies are neglecting the port user’s perception in their attempt for measuring port performance. Having the estimations of the port authority the port services providers and other stakeholders regarding the port performance is a partial exercise on port performance. Port users have knowledge about port
performance directly through port usage. Secondly the studies are focused mainly in the port itself (as a sum of infrastructures, superstructures and services provision) or they extent up to the port-sea interface (i.e. services related to the facilitation of the ship prior her arrival etc). They neglecting the port-hinterland interface where there are also port users, using port facilities and consuming port services.

From the industry practices the Journal of Commerce exercise focus exclusively only on shipping lines and rely only on their data. The exercise of World Bank although is about the logistics industry can provide useful elements for the PORTOPIA project. Finally the PwC/Panteia study examined port performance although there are some major drawbacks at the aims and on the process of the examination of port performance measurement. These drawbacks had a direct impact in the European port industry which saw with skepticism this exercise and increased its awareness on similar attempts. The following table resumes the major points of the studies of World Bank and Panteia/PwC and also includes potential adjustments and characteristics needed for the Work Package 6 of the PORTOPIA project.
<table>
<thead>
<tr>
<th>General Characteristics</th>
<th>World Bank</th>
<th>PwC/Panteia</th>
<th>PORTOPIA approach (WP6)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Aim:</strong> Efficiency and effectiveness measurement</td>
<td>Impact of policy scenarios</td>
<td>Effectiveness – User’s perception on port performance</td>
<td></td>
</tr>
<tr>
<td><strong>Why:</strong> The study provides the ability for policy regulation input</td>
<td>The study had a specific goal, to produce policy regulation</td>
<td>No policy implication are foreseen in the PORTOPIA project framework</td>
<td></td>
</tr>
<tr>
<td><strong>What:</strong> Examines the logistic chains environment</td>
<td>The study focus mostly on the port area and on the port-sea interface.</td>
<td>PORTOPIA focus on every aspect of port operations as port performance is affected by everyone who has a direct contact with port users</td>
<td></td>
</tr>
<tr>
<td><strong>How:</strong> Online survey for gathering the data</td>
<td>Online survey for gathering the data</td>
<td>Online survey</td>
<td></td>
</tr>
<tr>
<td><strong>Who:</strong> Practitioners, users and policy makers</td>
<td>Member States, Public Authorities, Port Authorities, Shipping companies, port customers, port service providers, port terminal operators, port workers</td>
<td>Port Authorities, Port terminal operators, port services providers, port users (both from the port-sea interface and the port-hinterland interface.</td>
<td></td>
</tr>
<tr>
<td><strong>Outcome:</strong> Country ranking</td>
<td>Policy impact assessment Disclosure of problems in the EU port industry</td>
<td>Port performance measurement Ranking of ports (each port can access its own rating and only)</td>
<td></td>
</tr>
</tbody>
</table>

**Points of Interest**
- The study provides a holistic approach for logistics performance measurement
- Users have a significant role to play
- Various services providers are included in the performance measurement
- Categories of elements (criteria) for logistics performance
- The study is not about port performance measurement itself
- Port Authorities perception seems to be neglected by the study
- Port examined as a whole (which is the role of other port players in the formation of the performance?)
- How data were gathered (sensitivity issues)

**Table 5: Comparison of WB and PwC/Panteia studies.**

Based on table 5, PwC/Panteia study tried to approach the port performance issue through an impact study of port-related regulation adjustment. This is the main disadvantage of the approach as the port industry was reluctant in participating in the study and moreover in providing the necessary data. Also the study was focus on unveiling the inefficiency problems in ports by asking port authorities, terminals and shipping lines. This is far from being considered as a performance study because:

- Port users are not only the shipping companies. We have to confront the port as a central node in the supply chains and as such we have to examine also the port users on the port-hinterland interface area.
- The study unveiled inefficiency problems of the port industry and moreover made ports being more suspicious on similar studies.
- It was focused on estimating the impact of port-related policies in the industry.
- There was an absence of clearly stated performance elements to be examined by the study.
- It didn’t examined inefficiency problems in other port related authorities (i.e. customs) which affected the perception on total port performance. On the contrary the study approached the issue by examining the port as a whole, thus for inefficiency problems it seems to target the port authorities and only.

The focus on the PwC/Panteia study is due to the fact that is the most recent study, related with the issue that WP6 examines.
4. IDENTIFYING PORT MARKETS AND PORT USERS

To proceed in the typology of the criteria that are going to be used for the measurement of port users perception on port performance we have to identify, first of all, who are the users of a port. As mentioned in previous sections the criteria that formatting the perception of port users on port performance (and even the port users themselves) are differ according to the port markets in which they participate in (operate). Based on this assumption we have also to identify the port markets that are going to be examined by the WP6.

4.1. Identification of Port Markets

The majority of academic and industry studies on port performance measurement are dealing, almost exclusively, with the container port market, although there are some exceptions (see for example Pantouvakis et al. 2008 for the quality of the port passenger market). Especially the academic studies show a vast interest on container ports (Vaggelas and Pallis, 2010), amongst others due to the growing trade volumes of this cargo and its potentials.

Following the PPRISM project results, the PORTOPIA WP6 study has the potential to go beyond the “classic” container port market. A market segment with increasing interest (both from the industry and the academic) and potentials is the cruise port market. Additionally another market for which there is an interest, unveiled in meetings between the lead partner and project’s associated partners, is the Ro-Ro market.

Regarding cruise ports, there is an increased interest from the port industry and the cruise industry on issues related with port performance. It is no coincidence that cruise companies increased their participation in the development and operation of cruise terminals. They are doing so in order to proceed with a vertical integration of their operation and thus being able to provide added value to cruise passengers. Moreover cruise is an industry focusing heavily on users (cruise passenger) satisfaction so the companies are looking for ports with increased performance and more important for performance focused in the port user peculiar needs. In the PORTOPIA case the examination of cruise port market should exclude cruise passengers from the exercise. The reason is that although port passengers are port users they don’t have a significant experience from a port as they visit it only for few hours. Moreover is difficult to reach cruise passengers and to collect the necessary data.

For Ro-Ro ports an interest has been expressed from associated partners of the PORTOPIA project. The WP6 leader along with the project leader had formal meetings with associated partners during December 2013. A meeting has been held in Brussels with the European Community Shipowners Association (ECSA) in order to inform the Association on the project, its goals and how the associated partners can contribute. During the meeting the General Secretary of ECSA informed the PORTOPIA representatives that the Association and its specialized groups have an interest in Ro-Ro market. As such the PORTOPIA partners decided to examine the inclusion of the Ro-Ro market in the project’s scope because, apart from a requirement from an associated partner, Ro-Ro port market has some common characteristics with the container port market, the most important being the handling of unitized cargoes, and as such it will give added value to the project with limited effort.

Other major port markets have been excluded from the study for reasons related with the ability to collect the necessary data and their characteristics. For example the dry bulk port market is not concentrated exclusively in efficiency and effectiveness, among others due to the low value of dry bulk cargoes. Also bulk market (dry and liquid) has a diverse nature of
goods (different goods, with different facilitation needs) and as such diverse port users that are difficult to be grouped. Slack and Comtois (2010) mentions that there are various cargo handling methods in the ports facilitating bulk cargoes, thus it’s difficult to access and moreover to benchmark efficiency and effectiveness. They are adding also seasonality of cargo flows in many cases and the variety of vessel types as additional burdens for port performance measurement.

4.2. Identification of Port Users

The term port user can have as many definitions as the different perspectives someone can have on port operations, the port area, the port cluster and various other variables. The simplest thought is that port user is anyone who uses a port. But in this case comes the problem to define port. There isn’t any definite answer on this question, which became even harder with the port regionalization (see Notteboom and Rodrigue, 2005). Pallis and Vitsounis (2009) narrowed the number of potential port users by defining port user as an entity that uses (consumes) services associated with the transportation of freight within the port. Brooks et al (2011) in their research surveyed three types of port users. Those related with cargo interests, the shipping lines and the supply chain partners (which includes warehouse operators, logistic service suppliers, trucking/rail companies).

For the purpose of this study the term port user is examined under two perceptions on the port:

1) The port is not only providing port services to port users but also it can provide infrastructures. As such a port user is an entity that consumes port services or uses the port infrastructures.
2) The port is embedded in supply chains. As such port users can be identified in: a) the port-sea interface, b) the port area and c) the port-land interface.

Based on the aforementioned assumptions, port user perception on port performance can be examined at port or terminal level, depending on user’s experience and is not about port authority evaluation. Based on the supply chain concept, users can be traced in the port-land interface. This concept brings under evaluation other important supply chain players (custom authorities for example). Also the consideration of the supply chain concept is the most appropriate for the study as the user-perceived value is achieved by tangible and managerial aspects of the total user value chain (Barber, 2008). In this case the port user perception on port performance must takes into account the part of the supply chain that interacts with the port.

As already explained, the number of port users, especially in the contemporary port environment can be numerous. For the purpose of this study, port users are grouped into major categories and for each of the port markets that can be potentially examined. In this way the study reduces the number of port users, making data collection and elaboration a feasible task while at the same time it safeguards the diversity of port users as each group might rate port effectiveness service delivery differently according to Brooks and Pallis (2013). According to this concept the project identifies four major categories of port users. From the port-sea interface we have the “Shipping Lines”. From the supply chain point of view and the port-land interface we recognize the users who are “Cargo Owners / Cargo Agents” and the users acting as “Hinterland Transport Service Supplier”. Based on the concept of the port infrastructures use, we have the “Port Services Providers”. Through a deeper analysis we can identify subcategories of port users in each category. The following
matrix table (Table 6) presents these subcategories per category of port users per port market.

<table>
<thead>
<tr>
<th>Port Users Categories</th>
<th>Container Market</th>
<th>Ro-Ro Market</th>
<th>Cruise Market</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Shipping Lines</strong></td>
<td>- Container Shipping Lines (deep sea)</td>
<td>- Ro-Ro Shipping Lines (deep sea)</td>
<td>- Cruise Lines</td>
</tr>
<tr>
<td></td>
<td>- Container Shipping Lines (feeder)</td>
<td>- Ro-Ro Shipping Lines (feeder)</td>
<td></td>
</tr>
<tr>
<td><strong>Cargo Owner / Cargo Agent</strong></td>
<td>- Companies Purchasing transportation services for goods they sell/make/buy</td>
<td>- Companies Purchasing transportation services for goods they sell/make/buy</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- Companies Purchasing transportation on behalf of exporters/importers</td>
<td>- Companies Purchasing transportation on behalf of exporters/importers</td>
<td></td>
</tr>
<tr>
<td><strong>Hinterland Transport Service Supplier</strong></td>
<td>- Trucking Companies</td>
<td>- Trucking Companies</td>
<td>- Warehouse Operators</td>
</tr>
<tr>
<td></td>
<td>- Barge Companies</td>
<td></td>
<td>- Logistics Service Providers</td>
</tr>
<tr>
<td></td>
<td>- Rail Companies</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>- Warehouse Operators</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>- Logistics Service Providers</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Port Services Providers</strong></td>
<td>- Towage</td>
<td>- Towage</td>
<td>- Towage</td>
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<tr>
<td></td>
<td>- Pilotage</td>
<td>- Pilotage</td>
<td>- Pilotage</td>
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<tr>
<td></td>
<td>- Port Reception Facilities</td>
<td>- Port Reception Facilities</td>
<td>- Port Reception Facilities</td>
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<tr>
<td></td>
<td>- Mooring</td>
<td>- Mooring</td>
<td>- Passenger Services</td>
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<td></td>
<td>- Bunkering</td>
<td>- Bunkering</td>
<td>- Mooring</td>
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<td></td>
<td>- Dredging</td>
<td>- Dredging</td>
<td>- Bunkering</td>
</tr>
<tr>
<td></td>
<td>- Ice-breaking</td>
<td>- Ice-breaking</td>
<td>- Dredging</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>- Ice-breaking</td>
</tr>
</tbody>
</table>

**Table 6: Port users per category and port market. Source: Authors**

For the category of Shipping Lines no further explanations are needed as port users are the shipping companies. The cargo owners/agents includes the companies that purchasing transportation services for their own goods and companies that purchasing transportation on behalf of exporters and importers. Further analysis of this category will cause difficulties in the data collection and process as the cargo owners especially in the container shipping market can be very differentiate. For the category hinterland transport service suppliers, for the containers can be truck/rail/barge companies (these transport modes are used for transporting containers to and from hinterland), warehouse operators and logistics service providers. For the Ro-Ro market this category is slightly differ as the train and barge companies are missing due to the fact that these transport modes are rarely used for
transporting Ro-Ro unitised cargoes (trucks). For cruise companies we didn’t include any port user as cruise passengers are either staying in the port-city during their visit or they take shore-excursions. In the latter case there is again the problem of numerous and casual port users. Regarding the port services providers we relied upon the eight services included in the proposal of the European Parliament and the Council regarding the market access to port services and the financial transparency of ports (CEU, 2013) with the exception of the cargo handling services as these are provided either by the port authority or a terminal operator which have been taken into account in this study. In these services we added the ice-breaking services and we excluded the passenger services from container and Ro-Ro market.
5. SETTING THE SCENE-TYPOLOGY OF CRITERIA

Having identified the port markets that are might be considered in the study as well as the identification of the port users, the final step is the development of a typology of criteria that can be used for measuring port user’s perception on port performance. The criteria must be meaningful as well as measurable (to be examined in the second phase of the project. Based on the port users needs and their aims regarding port performance the criteria must reflect some specific characteristics. The criteria should relate with:

- Availability
- Accessibility
- Connectivity
- Quality
- Timeliness of services
- Adequacy
- Cost

For the container market the study focuses mostly on the work of Brooks et al (2011) for unveiling the potential criteria. Also based on the review of the related literature and industry studies additional criteria have been added in order to adjust the whole process according to the various port markets as well as on the port users characteristics and needs. For the Ro-Ro market the criteria are similar to those of the container market due to similarities among the two markets with the major one being the unitized cargo. For the cruise market the research team used elements from the studies of Vaggelas and Pallis (2010) who examined passenger ports (services provision) and Lekakou et al (2009) whose study presents the criteria that a cruise port needs to fulfil for becoming a homeport.

Apart from port user’s an additional group of criteria might be used, criteria that can be evaluated by the port authorities and the terminal operators. Following a holistic approach, the study requires also an input from the ports themselves. This addition eliminates any bias that could occur in the case where only port users provide evaluations. Also port authorities and terminal operators have the opportunity to express their views on how the port user’s evaluate port performance. The following figures (figure 4, 5 and 6) shows the selected criteria per category of port user’s per port market, thus consisting the typology of the criteria that can be used for measuring port user’s perception. The next step should be the evaluation of the criteria by the port users as well as by port authorities and terminal operators in order to conclude on a limited number of criteria and on their importance as its criterion will affect (through a weight factor) the formation of the final port user perception index.
Deliverable 6.1

PRE-SELECTION OF AN INITIAL SET OF INDICATORS TO BE INCLUDED IN THE “PORT USERS PERCEPTIONS” MEASUREMENT INITIATIVE

Port Authorities and Terminal Operators

- Ability to develop/off load tailored services to different cargo interests
- Access to port premises for pick-up and delivery
- Availability and capability of dockworkers
- Availability of cargo handling equipment
- Availability of direct service to the cargo’s destination (land transport)
- Availability of direct service to the cargo’s destination (sea transport)
- Availability of storage capacity at the port
- Choice of rail/road/warehousing serving the port
- Connectivity/operability to rail / truck / warehousing
- Connectivity to road networks
- Incidence of cargo damage
- Incidence of delays
- Invoice accuracy
- Port authority responsiveness to special requests
- Port authority/terminal operator incentives to shipping companies
- Port security
- Provision of adequate, on-time information
- Quality of maritime services (pilotage, mooring, etc.)
- Quality of rail / truck / warehousing
- Speed of stevedore’s cargo loading/unloading
- Sufficiency of size of hinterland
- Terminal operator responsiveness to special requests
- Timely vessel turnaround
- Transparency of charges

1. Availability of cargo handling equipment
2. Availability of storage capacity at the port
3. Availability of cargo handling equipment
4. Availability of direct service to the cargo’s destination (land transport)
5. Availability of direct service to the cargo’s destination (sea transport)
6. Availability of storage capacity at the port
7. Choice of rail/road/warehousing serving the port
8. Connectivity/operability to rail / truck / warehousing
9. Connectivity to road networks
10. Incidence of cargo damage
11. Incidence of delays
12. Invoice accuracy
13. Port authority responsiveness to special requests
14. Port authority/terminal operator incentives to shipping companies
15. Port security
16. Provision of adequate, on-time information
17. Quality of maritime services (pilotage, mooring, etc.)
18. Quality of rail / truck / warehousing
19. Speed of stevedore’s cargo loading/unloading
20. Sufficiency of size of hinterland
21. Terminal operator responsiveness to special requests
22. Timely vessel turnaround
23. Transparency of charges

SHIPPING LINES

1. Access to port premises for pick-up and delivery
2. Ability to develop/off load tailored services to different cargo interests
3. Availability and capability of dockworkers
4. Availability of cargo handling equipment
5. Availability of direct service to the cargo’s destination (land transport)
6. Availability of direct service to the cargo’s destination (sea transport)
7. Availability of storage capacity at the port
8. Choice of rail/road/warehousing serving the port
9. Connectivity/operability to rail / truck / warehousing
10. Connectivity to road networks
11. Incidence of cargo damage
12. Incidence of delays
13. Invoice accuracy
14. Port authority responsiveness to special requests
15. Port authority/terminal operator incentives to shipping companies
16. Port security
17. Provision of adequate, on-time information
18. Quality of maritime services (pilotage, mooring, etc.)
19. Quality of rail / truck / warehousing
20. Speed of stevedore’s cargo loading/unloading
21. Sufficiency of size of hinterland
22. Terminal operator responsiveness to special requests
23. Timely vessel turnaround
24. Transparency of charges

CARGO OWNERS/AGENTS

1. Access to port premises for pick-up and delivery
2. Ability to develop/off load tailored services to different cargo interests
3. Availability and capability of dockworkers
4. Availability of cargo handling equipment
5. Availability of direct service to the cargo’s destination (land transport)
6. Availability of direct service to the cargo’s destination (sea transport)
7. Availability of storage capacity at the port
8. Choice of rail/road/warehousing serving the port
9. Connectivity/operability to rail / truck / warehousing
10. Connectivity to road networks
11. Incidence of cargo damage
12. Incidence of delays
13. Invoice accuracy
14. Port authority responsiveness to special requests
15. Port authority/terminal operator incentives to shipping companies
16. Port security
17. Provision of adequate, on-time information
18. Quality of maritime services (pilotage, mooring, etc.)
19. Quality of rail / truck / warehousing
20. Speed of stevedore’s cargo loading/unloading
21. Sufficiency of size of hinterland
22. Terminal operator responsiveness to special requests
23. Timely vessel turnaround
24. Transparency of charges

HINTERLAND TRANSPORT SERVICE SUPPLIERS

1. Access to port premises for pick-up and delivery
2. Ability to develop/off load tailored services to different cargo interests
3. Availability and capability of dockworkers
4. Availability of cargo handling equipment
5. Availability of direct service to the cargo’s destination (land transport)
6. Availability of direct service to the cargo’s destination (sea transport)
7. Availability of storage capacity at the port
8. Choice of rail/road/warehousing serving the port
9. Connectivity/operability to rail / truck / warehousing
10. Connectivity to road networks
11. Incidence of cargo damage
12. Incidence of delays
13. Invoice accuracy
14. Port authority responsiveness to special requests
15. Port authority/terminal operator incentives to shipping companies
16. Port security
17. Provision of adequate, on-time information
18. Quality of maritime services (pilotage, mooring, etc.)
19. Quality of rail / truck / warehousing
20. Speed of stevedore’s cargo loading/unloading
21. Sufficiency of size of hinterland
22. Terminal operator responsiveness to special requests
23. Timely vessel turnaround
24. Transparency of charges

PORT SERVICES PROVIDERS

1. Access to port premises for pick-up and delivery
2. Ability to develop/off load tailored services to different cargo interests
3. Availability and capability of dockworkers
4. Availability of cargo handling equipment
5. Availability of direct service to the cargo’s destination (land transport)
6. Availability of direct service to the cargo’s destination (sea transport)
7. Availability of storage capacity at the port
8. Choice of rail/road/warehousing serving the port
9. Connectivity/operability to rail / truck / warehousing
10. Connectivity to road networks
11. Incidence of cargo damage
12. Incidence of delays
13. Invoice accuracy
14. Port authority responsiveness to special requests
15. Port security
16. Provision of adequate, on-time information
17. Quality of maritime services (pilotage, mooring, etc.)
18. Quality of rail / truck / warehousing
19. Reasonable free time at port for the cargo
20. Risk of downtime due to special circumstances (unforeseen, etc.)
21. Speed of customs procedures
22. Speed of stevedore’s cargo loading/unloading
23. Sufficiency of size of hinterland
24. Terminal operator responsiveness to special requests
25. Timely vessel turnaround
26. Transparency of charges

Figure 3: Portopia Logo (example).
Deliverable 6.1

PRE-SELECTION OF AN INITIAL SET OF INDICATORS TO BE INCLUDED IN THE “PORT USERS PERCEPTIONS” MEASUREMENT INITIATIVE

Port Authorities and Terminal Operators
1. Ability to develop/off er tailored services to different cargo interests.
2. Access to port premises for pickup and delivery.
3. Availability and capability of dockworkers.
4. Availability of cargo handling equipment.
5. Availability of direct service to the cargo’s destination (sea transport).
6. Availability of storage capacity at the port.
7. Connectivity to port with other SS5 routes.
8. Choice of rail companies/truck/warehousing companies.
10. Connectivity/operability to rail/truck/warehousing.
11. Continuous operation of custom service.
13. Incidence of cargo damage.
15. Invoice accuracy.
16. Ocean carrier schedule reliability/integrity.
17. Port authority responsiveness to special requests.
18. Port security.
19. Provision of adequate, on-time information.
20. Quality of maritime services (pilotage, mooring, etc).
21. Quality of rail/truck/warehousing companies.
22. Speed of stevedore’s cargo loading/unloading.
23. Sufﬁciency of size of hinterland.
24. Terminal operator responsiveness to special requests.
25. Timely vessel turnaround.

Shipping Lines
1. Availability of cargo handling equipment.
2. Availability of storage capacity at the port.
3. Ability to develop/off er tailored services to different cargo interests.
4. Availability and capability of dockworkers.
5. Connectivity to port with other SS5 routes.
6. Connectivity/operability to rail/truck/warehousing.
7. Connectivity to road networks.
8. Incidence of cargo damage.
10. Invoice accuracy.
11. Port authority responsiveness to special requests.
12. Port authority/responsiveness to special requests.
13. Port authority/responsiveness to special requests.
14. Provision of adequate, on-time information.
15. Quality of maritime services (pilotage, mooring, etc).
16. Quality of rail/truck/warehousing companies.
17. Speed of stevedore’s cargo loading/unloading.
18. Sufﬁciency of size of hinterland.
19. Terminal operator responsiveness to special requests.
20. Timely vessel turnaround.

Cargo Owners/Agents
1. Access to port premises for pick-up and delivery (gate congestion).
2. Ability to develop/off er tailored services to different cargo interests.
3. Availability and capability of dockworkers.
4. Availability of cargo handling equipment.
5. Availability of direct service to the cargo’s destination (sea transport).
6. Availability of storage capacity at the port.
7. Connectivity to port with other SS5 routes.
8. Choice of rail companies/truck/warehousing companies.
10. Connectivity/operability to rail/truck/warehousing.
11. Continuous operation of custom service.
13. Incidence of cargo damage.
15. Invoice accuracy.
16. Ocean carrier schedule reliability/integrity.
17. Port authority responsiveness to special requests.
18. Port security.
19. Provision of adequate, on-time information.
20. Quality of maritime services (pilotage, mooring, etc).
21. Quality of rail/truck/warehousing companies.
22. Speed of stevedore’s cargo loading/unloading.
23. Sufﬁciency of size of hinterland.
24. Terminal operator responsiveness to special requests.
25. Timely vessel turnaround.

Hinterland Transport Service Suppliers
1. Access to port premises for pick-up and delivery (gate congestion).
2. Ability and capability of dockworkers.
3. Availability of cargo handling equipment.
4. Availability of storage capacity at the port.
5. Choice of rail companies/truck/warehousing companies.
6. Connectivity to road networks.
7. Connectivity/operability to rail/truck/warehousing.
8. Efficiency of documentary processes.
9. Incidence of cargo damage.
10. Incidence of delays.
11. Invoice accuracy.
12. Ocean carrier schedule reliability/integrity.
13. Port authority/responsiveness to special requests.
14. Port authority/responsiveness to special requests.
15. Port security.
16. Provision of adequate, on-time information.
17. Quality of maritime services (pilotage, mooring, etc).
18. Speed of stevedore’s cargo loading/unloading.
19. Sufﬁciency of size of hinterland.
20. Terminal operator responsiveness to special requests.
21. Timely vessel turnaround.
22. Transparency of charges.

Port Services Providers
1. Access to port premises for pick-up and delivery (gate congestion).
2. Availability and capability of dockworkers.
3. Availability of cargo handling equipment.
4. Availability of storage capacity at the port.
5. Choice of rail companies/truck/warehousing companies.
6. Connectivity to road networks.
7. Connectivity/operability to rail/truck/warehousing.
8. Efficiency of documentary processes.
9. Incidence of cargo damage.
10. Incidence of delays.
11. Invoice accuracy.
12. Ocean carrier schedule reliability/integrity.
13. Port authority/responsiveness to special requests.
14. Port security.
15. Provision of adequate, on-time information.
16. Quality of maritime services (pilotage, mooring, etc).
17. Quality of rail/truck/warehousing companies.
18. Reasonable free time at port for the cargo.
19. Risk of downtime due to special circumstances (aboriginal disputes, weather, etc).
20. Speed of customs procedures.
21. Speed of stevedore’s cargo loading/unloading.
22. Sufﬁciency of size of hinterland.
23. Terminal operator responsiveness to special requests.
24. Timely vessel turnaround.
25. Transparency of charges.

RO-RO MARKET

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Deliverable 6.1

PRE-SELECTION OF AN INITIAL SET OF INDICATORS TO BE INCLUDED IN THE "PORT USERS PERCEPTIONS" MEASUREMENT INITIATIVE

**Port Authorities and Terminal Operators**
1. Ability to handle peak traffic
2. Accessibility to passenger terminal building (for passengers)
3. Accessibility to passenger terminal building (for vehicles)
4. Adequate bus/train connections to/from the port
5. Cooperation of port authority/terminal operator with other transport modes (for example airport)
6. Effective Port authority/terminal operator marketing of the port
7. Incidence of baggage damages
8. Invoice accuracy
9. Networking of port authority/terminal operator with other transport operators
10. Operability of a berth allocation system
11. Parking facilities
12. Port authority/terminal operation cooperation with the city
13. Port authority/terminal operator environmental policy
14. Port safety
15. Port security
16. Quality of maritime services
17. Shore-side amenities in the port for cruise passengers
18. Speed of customs/immigration/passenger handling etc. procedures
19. Surface of the passenger terminal building
20. Terminal operator responsiveness to special requests

**Cruise Lines**
1. Ability to handle peak traffic
2. Accessibility to passenger terminal building (for passengers)
3. Accessibility to passenger terminal building (for vehicles)
4. Adequate bus/train connections to/from the port
5. Cooperation of port authority/terminal operator with other transport modes (for example airport)
6. Effective Port authority/terminal operator marketing of the port
7. Incidence of baggage damages
8. Invoice accuracy
9. Networking of port authority/terminal operator with other cruise ports
10. Operability of a berth allocation system
11. Parking facilities
12. Port authority/terminal operation cooperation with the city
13. Port authority/terminal operator environmental policy
14. Port safety
15. Port security
16. Quality of maritime services
17. Shore-side amenities in the port for cruise passengers
18. Speed of customs/immigration/passenger handling etc. procedures
19. Surface of the passenger terminal building
20. Terminal operator responsiveness to special requests

**Port Services Providers**
1. Ability to handle peak traffic
2. Accessibility to passenger terminal building (for passengers)
3. Accessibility to passenger terminal building (for vehicles)
4. Adequate bus/train connections to/from the port
5. Cooperation of port authority/terminal operator with other transport modes (for example airport)
6. Effective Port authority/terminal operator marketing of the port
7. Incidence of baggage damages
8. Invoice accuracy
9. Networking of port authority/terminal operator with other cruise ports
10. Operability of a berth allocation system
11. Parking facilities
12. Port authority/terminal operation cooperation with the city
13. Port authority/terminal operator environmental policy
14. Port safety
15. Port security
16. Quality of maritime services
17. Shore-side amenities in the port for cruise passengers
18. Speed of customs/immigration/passenger handling etc. procedures
19. Surface of the passenger terminal building
20. Terminal operator responsiveness to special requests
5.1. Consultation process – the way forward

The previous section presented a typology of criteria that can be used for measuring port user’s perception on port performance and for various port markets. This typology and the proposed port markets have been disseminated to the WP6 partners and have been presented to ESPO committees in order to have a feedback on the proposed criteria. Through an interaction with the port industry, member of the WP6 research team tried to exploit the way forward that best match the needs of the port authorities and their users. The WP6 progress and the formation of the typology presented at the following ESPO committee meetings:

- Economic Analysis and Statistics Committee – October 2013
- Economic Analysis and Statistics Committee – March 2014
- Port Governance Committee – March 2014

Also the typology has been discussed internally, among the WP6 members and especially between the University of the Aegean research team, the ESPO and the Project leader. Following this consultation and based on the input from ESPO committees the proposition from ESPO side was that the final list of criteria should:

- Be limited in number in order for port authorities to feel comfortable with the exercise.
- Not be “sensitive” for port authorities in the essence that: a) they should not dealing only with port operations issues (but also with other players in the port area, such as customs) and b) dealing with business sensitive issues like port costs.

Based on the outcomes of these meetings, the way forward chosen is that of a World Bank approach. The aim is to develop a set of indexes, each one including some sub-criteria/elements covering a large extent of a contemporary port’s performance characteristics that shapes a port user’s perception on port performance. The indexes are going to be assessed by the port users already identified with the mediation of the ports, which are going to participate in the next phases of the research. Moreover it has been agreed among the project partners that the exercise will be focused exclusively on container ports.

Following the proposal of WP6 leader, on a World Bank like approach, the WP6 members gathered during the ESPO conference in order to discuss on the way forward. In this meeting it has been decided that the WP6 exercise must:

- built on trust among the PORTOPIA project members and the port industry
- conclude on a scheme that will work
- be flexible enough in order to encourage and increase the participation of the ports.

Based on the above outcomes it has been decided that the criteria must be decreased to a limited and manageable number. Also they must be meaningful and must cover the most important aspects of a port from a port user point of view. Finally flexibility must be in the centre of the exercise. As such the criteria included in figure 4 have been processed to a limited number based on eight (8) variables, i.e. quality, accessibility, availability, connectivity, efficiency, responsiveness, adequacy and cost. Based on this elaboration a list of 12 criteria emerged. Each criterion has been divided into sub-criteria for providing more flexibility and more options for the participating ports.
<table>
<thead>
<tr>
<th><strong>Criterion</strong></th>
<th><strong>Sub-criteria</strong></th>
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<tbody>
<tr>
<td>1</td>
<td>Quality of port infrastructure</td>
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<td>9</td>
<td>Efficiency of documentary process</td>
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<td>Responsiveness</td>
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<td>Provision of adequate information</td>
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Table 7: The criteria for port user’s perception measurement on port performance. Source: Authors

The criteria included in table 7 will be used in the exercise. Following the preconditions described by the ESPO committees and the outcomes of the PORTOPIA meeting on May 2014, the sub-criteria will be excluded from the exercise in order to increase flexibility and to make it easier for ports to participate. Having in mind the fact that the exercise must be “attractive” to ports, there is the potential to allow participating ports to make a selection from the twelve criteria based on conditions that allows the application of the exercise and the development of reliable and robust results.
6. REFERENCES


