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DELIVERABLE 2.2

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DELIVERABLE 2.2

Other Socio-Economic indicators

1 INTRODUCTION

WP 2 addresses the socio-economic performance indicators of ports. Socio-economic indicators built around the following question: "To what extent do ports impact economic households?" In the first place this relates of course to employment (for people) and added value (for firms) which were key to this work package. The first aim of this work package is therewith: to develop a harmonised, top-down calculation tool for the basic socio-economic indicators **employment and added value** with the aim to:

- Incorporate these indicators in a European Port Observatory;
- Provide individual ports with a tool for calculating basic socio-economic performance indicators;
- To lay the foundations to expand the domain for socio-economic indicators to inland ports;
- To combine these basic indicators with other indicators to develop more customised indicators;
- To extend the basic set of socio-economic indicators based on practical value and feasibility criteria (e.g. private investments).

During the execution of the project it became clear that although the socio-economic indicators certainly have their value and are developed and used by a couple of ports already, it is not yet possible to develop a valuable and reliable set of harmonized socio-economic indicators (employment and added value) for all European core ports (see deliverable 2.1 for further explanation). This is due to:

- Only a few ports do develop and report on socio-economic indicators
- Methods and definitions differ too much to enable integration, comparison and extension to other ports
- Statistics needed for a harmonized top-down approach based on known methodologies of Dutch and Belgium port monitors lack at the European level (thus for example available with Eurostat for all members states at the right level of detail, both geographically as in terms of economic activity).

Attempts to use proxies instead of actual numbers to at least provide ports that do not report at all with estimates on their socio-economic impacts have led to the following conclusions:

- Developing proxies that estimate employment related to the transport node function of ports is quite well possible
- Such proxies do not incorporate and represent well the logistics and industrial functions that ports as well have and are thus not sufficiently accurate and reliable
- Improving the proxies by taking land use as an explanatory variable for the employment related to logistical and industrial activities is a very time consuming effort that finally did not result in high quality outputs.

Other indicators

Although much time was spent on work package 2.1 because the initial strategy for developing the indicators had to be changed and new strategies ended up in very time consuming but non-resulting outputs, we also developed alternative socio-economic indicators that could have value and may be developed in the future. This document describes the approach we have followed and proposes a set of indicators that may be of interest.

2 OTHER SOCIO-ECONOMIC INDICATORS

2.1 Other socio-economic indicators: reasoning

Socio-economic indicators built around the following question: "To what extent do ports impact economic households?"

In the first place this relates of course to employment (for people) and added value (for firms) which were key to this work package. But there are more impacts that can be *measured* and that are *of interest to the public and to policy makers*. In the external context of ports, trends are continuously developing that impact the way in which we look at the performance of ports. Aspects that have gained importance are for example sustainability, equal chances for people of different backgrounds, i.e. diversity in work forces. But also the whole trend of automation and robotisation has raised socio-economic questions: what will be the impact on employment and income distribution of these trends. To be able to develop policies related to such trends a good insight in the impact of such trends is needed, asking for a good set of indicators.

Way of working

In this section we discuss a structured set of alternative/additional valuable socio-economic indicators. We derive this set from:

- Assessment of relevant academic literature
- Looking at the actual debates around ports with respect to the social-economic impact
- Search through the business plans and strategic visions of a selected set of ports
- Assessment of the relevant policy documents on ports, merely the various Communications from the European Commission
- Earlier work done in PPRISM

2.2 Approach

Criteria for the selection of indicators

Derived from the Port Performance Indicator selection work, that have already been done in the previous project PPRISM, we use the following criteria for selecting the indicators:

P: Policy relevance - Monitor the key outcomes of strategies, policies and legislation and measure progress towards policy goals. Provides information to a level appropriate for policy decision – making.

I: Informative – Supplies relevant information with respect to the port's socio-economic impacts.

M: Measurable – Is readily available or made available at a response cost/benefit ratio. Updated at regular intervals in accordance with reliable procedures.

R: Representative – Gives clear information and is simple to interpret. Accessible, publicly appealing and therefore likely to meet acceptance.

F: Feasible / Practical - Requires limited numbers of parameters to be established. Uses existing data and information wherever possible. Simple to monitor.

Grouping/ordering of indicators

In principle socio-economic indicators either relate to companies or to individual persons (labour), which together form the households: it is the port activities that generate socio-economic impact for the companies and the people living in a country or region.

Socio-economic indicators can be static or dynamic. As such every indicator can be made dynamic by calculating change over time. However there are also indicators that have only meaning in a dynamic way: for example replacement of labour with capital, replacement of elder by younger people.

Below figure gives the structure for the classification of the potential alternative socio-economic indicators and provides an example for each category.

Figure 1 structure for grouping of indicators

	Static	Dynamic
Individual persons related	Educational level	% change Age development
Company related	Private investments per year	% change innovation

Our work that consisted of a literature review (academic papers, port policy documents, port authority business plans), brainstorm discussions within the project team and discussions with the industry, while taking the mentioned criteria into account has led to a set of selected indicators that are related to the individual person and indicators that are company related. Note that some of these indicators may be confronted with a difficult access to the right data, however we included those indicators for the reason that they are valuable and the complexity of their collection should not be seen as a criteria for not selecting them

Company related indicators

- Private investments
- Public investments
- Financial health
- Strategic value through connectivity
- Innovation

Individual person related indicators

- Income level (mean, median and distribution)
- Diversity (gender distribution per job class / multi-nationality per job class)
- Safety and health level (number of accidents, illness)
- Educational level (division in secondary school, vocational, bachelor, university master)
- Work satisfaction
- Replacement of labor with capital (automation and robotization)
- Age development of employees

2.3 Description, calculation methods and data requirements

In this section we will present possible calculation methods to make meaningful indicators out of socio-economic data.

2.3.1 Company related indicators

Private investments

Private investments by companies in seaports is one of the key indicators in the Dutch port monitor. By using this data the strategic value of a seaport and vitality of the port can be measured. In order to measure this indicator (aggregated) investments in fixed assets by companies located in seaports should be known. This requires investment data to be attributable to port areas and specific (industry) sectors in the port. For the Dutch port monitor private investment data is acquired from Statistics Netherlands who can produce aggregated investment numbers based on geographic location and specific sectors. For the Belgian port monitor data is collected by the Belgian National Bank. Another possible source of data are port authorities who also might collect investment data of companies located in the area they govern.[1] Other member states might have

[1] See for instance the Facts and Figures brochure by Port of Rotterdam Authority on investments in the petrochemical cluster https://www.portofrotterdam.com/en/cargo-industry/refining-and-chemicals/facts-figures-brochure

different government bodies or methods to keep track of private investment. For making use of this indicator a dataset with investment data over several years should be collected.

Method	Data collection and processing
Data requirements	Investments per port related company per year
Calculations	Extract port related (location and sector) % growth over year

Public investments

Public investments in seaports might also be an indicator of the socio-economic performance of seaports. Public investments in seaports by port authorities and / or governmental bodies are relatively easy to find yet hard to compare. As these organisations are public bodies there is a relatively large freedom in disclosing information and public accountability.

For European Union wide comparison public investment data should be comparable in scope and nature. This might for instance apply to the different tasks port authorities might have. An example of differences might be who is responsible for maintaining publically accessible bridges in a port city.

Method	Assessment of budgets of governments Assessment of accounting report of governments Assessment of annual reports of port authorities
Data requirements	Public investment per type per port per year
Calculations	Count numbers obtained

Strategic value through connectivity & innovation

Indicators on strategic value are relatively new. This approach was for instance used in the Van Den Bosch et.al 2011 study on the strategic value of the port of Rotterdam.[2] In this study bridges were laid between (socio-economic) port performance and the value of the port for the wider economy. It was estimated that the port of Rotterdam contributed another six billion euros to the Dutch GDP on top of the quantifiable direct and indirect economic value added. Applying these methods to other ports in Europe might be interesting yet this method requires at least knowledge of the direct and indirect socio-economic impact of the port.

[2] See http://www.erim.eur.nl/smartporterasmus/publications/books/detail/2604-the-strategic-value-of-the-port-of-rotterdam-for-the-international-competitiveness-of-the-nethe/ for this study

Method	Qualitative analysis, ranking or weighted scorecard
Data requirements	Interconnections/transactions of port related port companies with companies outside the port per type
Calculations	

Financial health

A port is a collection of economic actors that together form the port complex. If the companies in the port are financially healthy, that means that they are able to develop and continue an effective and efficient business, i.e. that they can attract sufficient customers for their business (which have to pay a right price), and that they are able to offer the product or service in a cost-efficient way. This also has to do with the configuration and working of the whole port cluster. If all companies in the port are financially healthy that means that the port cluster is configured and working as such that it provides the right business context for the companies. In addition, the financial healthiness of the port companies is an indication for the longer term stability and economic sustainability of the port.

A financial health indicator can be developed by taking the profits as stated in annual accounts of the ports and also taking solvability ratios. Such information is collected by companies as Company Info, Orbis (Bureau van Dijk). If such data providers do not offer sufficient data, a more time consuming way via the public annual reports of the port related companies (like the National Bank of Belgium does already for the Belgium port monitor) is needed.

Method	Data collection via Company Info or ORBIS Assessment of annual reports of port companies
Data requirements	Profit figures Solvability ratios
Calculations	Counting number of companies in certain profit and solvability ranges

Innovation

Innovation is in each and every sector of the economy of great importance. Innovation in ports is to a large extent focused on efficiency improvement (see automation of terminals, new communication techniques, sensoring in order to improve processes). At the same time, changes in the external environment increasingly ask for innovation aiming at the renewal of business (both the business itself as its underlying business models). To stay competitive and to be able to fulfil the function of a catalysator of the economy, innovation in ports is crucial. And, it is not the port itself that is innovative, but the companies in the port. An indicator for innovation is not easy to establish. Simply counting the number of patents does not deliver the picture. It is rather in new businesses and new business models that the innovation is expressed. We propose to start with an

indicator on port related start-ups that are located and develop in the (vicinity) of the port. Ideally real innovations and new business models and new intercompany regimes or connections are counted, this can only be done by time consuming qualitative research.

Method	Qualitative analysis and survey
Data requirements	Number of start-ups that are port related New innovations New business models New intercompany regimes
Calculations	Counting, classification

2.3.2 Employment related indicators

For the employment related variables (aggregated) data on individual employees is needed. This information is often only aggregated available via Eurostat or national statistics offices. Detailed information should be obtained from the companies to isolate characteristics and operationalize metrics that are determinants for social performance in seaport environments.

Income level

Income level of workers employed tells something about the job level in the port. In general port work has always been and is relatively simple and low-wage work. Technological development changes this. Jobs become more complex, requiring different types of skills and educational levels.

What is part of the social dialogue is whether people employed take sufficiently part in economic growth. If added value and profits of companies increase, while wage levels stay the same, it is the companies and not the people employed that benefit from economic growth.

Income level data is available at national statistics offices and can be gathered. To isolate the port out of this data is not an easy job. Depending on the availability of data additional surveys at the company level may be required.

Method	Survey at company level
Data required	- Total wages paid (per job class) - Number of workers (per job class)
Calculations	- Total wages / Total number of workers - Per job class: total wages / total number of workers

Diversity (gender distribution per job class / multi-nationality per job class)

Data on for instance diversity is most often known but the importance placed on these metrics hugely differs between member states or stakeholders. Gender diversity is however seen as one of the main topics of the Sector Social Dialogue between labor unions and employer associations in the European ports sector[3]

Data on this variable will probably come in absolute numbers. For comparison percentagewise figures should be calculated. If we know a standardized classification method for the type of work (job class) we can run an effective benchmark on this variable and compare it with other sectors of the economy and other member states.

Method	Survey at company level
Data required	- Gender division per job class - Nationalities per job class
Calculations	- % male, female - % nationalities

Educational level

Educational level is known at regional level and is easily comparable thanks to harmonization of diplomas within the European Union. Data collection should be done at sector level however. In this way performance within the port can be observed. To make proper use of this variable not only level of education but also type of education should be included if possible. With level of education we mean for instance only secondary school, vocational, bachelor, university master. Type of education might be of interest to see the development of the educational level as to assess the match with the existing labor force in the region and to see the future potential of the workforce. Knowing the skill set of employees within the port industrial cluster enables better policy making made to foster the resilience of the workforce within the port.

The educational level should be presented as the percentagewise division of employees within a company or companies in the same sector per different level of education. A division by percentage allows for comparison among other sectors, seaports and member states.

Method	- Survey at company level - Structural collection of job vacancies
Data requirements	- Educational level per worker - Educational level per vacancy
Calculations	- Totaling number per educational level per sector

[3] Please see http://ec.europa.eu/social/main.jsp?catId=480&intPageId=2311&langId=en for more information on the dialogue and current status of the discussions.

Safety level (number of accidents) and health

Workforce safety and time lost to accidents is a very important metric in (port) and industrial environments. Data on workforce safety is often collected on national level and harmonised through Eurostat.[4] Eurostat publishes data on the main categories of employment. For seaports various categories are of importance. Terminal safety is most likely captured via category H (TRANSPORTATION AND STORAGE). Interest bodies of both employers and employees (e.g. terminal operators or labor unions) can also be important in the process of data collection. In the sectoral social dialogue between the port sector and the unions worker safety is one of the topics to discuss.[5]

The safety level is most often given as number of hours lost due to accidents or number of accidents with casualties. For proper comparison these numbers should be made into averages per specific unit of throughput. This allows for control of the different sizes of seaports among the ports involved. Safety and health were already researched intensively in work package 3 of PORTOPIA under environmental indicators.

Method	Assessment of accident databases
Data requirements	Accidents per level per time period per sector Throughput number
Calculations	Totaling accident numbers/throughput number

Work satisfaction

Work satisfaction is among the harder to quantify variables. Required data that can be compared European Union wide is available via several Eurostat reports. Work satisfaction is measured by a low, medium and high scale at Eurostat[6]. Applying this method allows for a relatively easy comparison as long as surveys have been harmonized among member states / sectors. This data cannot be linked specifically to seaports however. Still this indicator might lead to interesting results. In order to develop such an indicator it is therefore required to set out surveys among the employees in the port area.

Method	Survey at employee level
Data requirements	Levels of satisfaction
Calculations	Averaging satisfaction level per sector

4 http://ec.europa.eu/eurostat/statistics-explained/index.php/Accidents_at_work_statistics for an overview of harmonised data on the matter

5 See http://ec.europa.eu/social/main.jsp?catId=480&intPageId=2311&langId=en for more information on this Social Sector Dialogue

6 http://ec.europa.eu/eurostat/statistics-explained/index.php/Quality_of_life_in_Europe_-_facts_and_views_-_employment#Employment_in_the_European_Union

Replacement of labor with capital (automation and robotization)

Among the most relevant strategic developments for the European seaports and logistic sectors are automation, robotisation and other forms of digitalisation.[7] If one wants to capture the effects of these developments on the socio-economic performance of the European Union ports industry several sources of data can be used.

Both employment, investment and productivity should be known at site specific level. As seen in the aforementioned exercise where employment per hectare of port area was measured there are huge differences in relative employment per type of activity in seaports. The (petro) chemical industry has a relatively low employment when compared to for instance breakbulk terminals. Therefore the data requirements in order to properly calculate this variable are quite high. We know that in some member states data on private investment is collected by the central bank and in other countries by statistics agencies. Further complicating the data collection is the often not known breakdown of private investments. Investment in fixed capital goods is known as a total but most likely a detailed breakdown is not available. A last note would be that software is not seen as a fixed investment.

To calculate this indicator a smart metric on the relation between growth in output/production and development in number of employees must be developed. This should then be corrected with the investments in fixed capital. As written in the data requirements section the results of such an indicator will vary greatly between industrial sectors. If we compare for instance the petrochemical sector and breakbulk terminals we see a large degree of variation both in productivity per person but also in the size of investments. Hence for container and breakbulk terminal activity this indicator is both easier to calculate as to understand.

Method	Data-collection
Data requirements	% growth in production/output per sector % growth in number of employees employed per sector
Calculations	Ratio production growth/number of employees growth

Age development of employees

This indicator is easy to set up as the age of employees is known to every employer and not considered extremely sensitive commercial information. In most annual reports by individual companies the age distribution of the workforce is reported. Collection of the aggregated data could be done by the port manager.

[7] See for instance *Digitalization of Seaports - Visions of the Future* by Fraunhofer Institute (2017)

This indicator should be made relative with the total workforce divided among several age categories. The exact division into the different categories should be made based on expert judgements in studies on healthy ageing and employability in the ports sector.

Method	Assessment of annual reports
Data requirements	Number of workers in age classes per sector
Calculations	Share of each class, % of share over time

3 RATIO-INDICATORS

Socio-economic indicators in many cases can be enriched in meaning if they are related to each other or to other performance indicators. Below we propose a set of ratio-indicators that are relevant for the assessment of the socio-economic impact of port operations. We consider briefly the potential use and meaning of these ratio-indicators.

Based on the analysis of indicators expressed in absolute terms, a number of indicators, expressed in relative terms, could also be useful for a variety of purposes (e.g. benchmarking):

- Value added per ton (per goods category)
- Value added per FTE employment
- Value added per unit of land
- Employment per unit of land
- Value added per invested euro by the public sector
- Employment per invested euro by the public sector

These relative indicators require specific attention due to a large number of methodological issues in terms of comparison between ports and port ranges.

Value added per ton

This ratio-indicator links the added value that is generated in a port in a particular sector to the throughput. It actually says something about whether the cargoes handled are just in transshipment for ongoing transport or that activities related to the cargo is done in the port. This indicator can well be used to assess the very local economic contribution of the ports' transshipment activities. It can however not be used as an indicator to assess the value of the port for the economy: activities related to the cargo can and increasingly do take place in the hinterland. For a better indication of the value of handling cargo for the wider economy at least both direct and indirect added value should be calculated, with a wider geographical scope.

Value added per FTE employment

This ratio in absolute terms says something about the division of labor and capital in the ports' industries (capital intensity). Taken over time it is an indicator for the development of efficiency, but also potentially on the replacement of labor by capital.

Value added and employment per unit of land

Efficient and effective land use is increasingly an important KPI for governments and policy makers. Land and especially also port land becomes scarce and development of new sites is expensive or goes at the expense of nature or civil area. The generated added value in the port divided by the ports' land area could say something about the efficiency of the land use. However whether the land used really generates its value, asks again for a wider geographical scope: if in-port land generates a lot of added value and employment outside the port, which is done in a much higher land-efficient way, in total

the port's land can still be evaluated as being highly valuable and having a positive impact in terms of added value and employment generating.

Value added and employment per invested euro by the public sector

Public money spent into facilitating economic activities (f.e. by means of infrastructure), should indeed lead to a positive economic output in terms of added value and employment. Governments have to make trade-offs about where to spend their money on. Being able to compare the added value and employment of a euro spent in one industry with another industry may be a first step in this decision making. Again, such ratio's provide information but should be placed in a wider context of decision making: looking also at the more strategic function of a particular industry, within its local context or rather in a wider geographical context.

4 CONCLUSION

In this task we considered alternative socio-economic indicators on top of added value and employment (direct and indirect) as were already considered in workpackage 2 of PORTOPIA.

Such socio-economic indicators can be individual person related or company related and should be relevant, informative, measurable, representative and feasible. The feasible criterion has been stretched a bit for this exercise as difficulties in gathering data may be overcome by additional effort agreed and allocated.

We stress that using dynamic indicators that give insights in developments over time in many cases is more valuable than looking at the absolute outcomes for a particular year. In addition, although an extended set of socio-economic indicators may provide a better base for evaluation port performance and results of policy making and strategic decision making, the outcomes still needs to be used with care. Aspects that should be taken into account while interpreting the indicators are:

- The specific characteristics of the port and its function and goals
- The specific characteristics of the region in which the port is located: its resources, but also its goals, requirements and conditions.
- The geographic scope: as the port's impact goes beyond the borders of the port and may reach far into the hinterland (port regionalization)

Lastly the relevance in the development and use of socio-economic indicators is rather in being able to show the relevance of the port in the wider economy, i.e. the 'licence to operate' discussion; in monitoring the developments over time within the port in terms of changes in economic development and relative economic importance of segments, this with the aim to signal challenges for policy and managerial actions for the own port. Using the indicators for benchmarking between ports from an EU port policy perspective should be done with the highest care as ports are not comparable and many time have different specific goals.

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