

Evaluation of Public Works in Spain

Ports
2023



• The port network of Spain



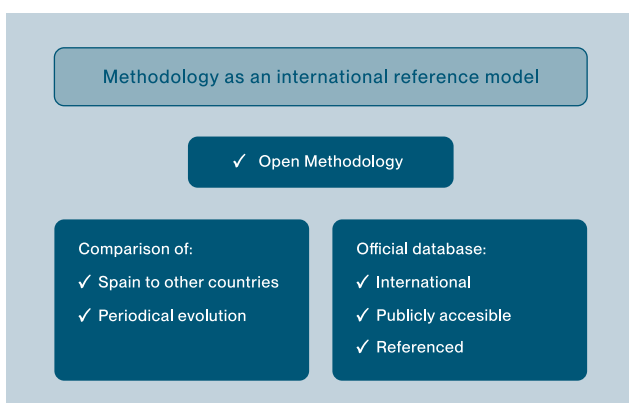
exports and 60% of imports were transported by sea, which represents 53% of Spanish foreign trade with the European Union and 96% with third countries.

The direct, indirect and induced activity of the Spanish Port System represents around 20% of the GDP of the transport sector, which represents 1.1% of the Spanish GDP.

The international perception of the Spanish port system is good. Analyzing the figures provided by EUROSTAT, it is safe to state that Spain's total traffic, in absolute figures, is higher than the European average and, specifically, it is higher than the German and French figures.

In GDP figures, Spain doubles the others, which means that the Spanish economy is more "port-dependent" than the rest of the economies in its area. To facilitate the assessment process, the data has been grouped into eight common indicators in all sectors, called "Criteria".

It is important to highlight the difficulties faced when gathering the necessary data for analyzing the port indicators. The port systems differ in each country so does the data they handle. As a result, it is extraordinarily complex to make an international comparison.



The **qualitative evaluation** focuses exclusively on Spain and is based on the responses obtained from a questionnaire which was sent to a selected group of experts in the sector.

Ports constitute an essential infrastructure of the transportation system of countries with access to seas and oceans. They promote and facilitate the economic development and are essential for the movement of people and goods. Countries with access to the sea have a good position, but it is not sufficient as it is necessary to have good port connections and an important support infrastructure which allows to load and unload, carry out logistical operations and connect with other modes of transport.

The fundamental particularity of ports is that they act like intermodal nodes, unlike roads or railways, in which their infrastructure extends throughout the territory. Therefore, the analysis by indicators must be based on maritime and land connectivity and on the existence of logistics activity areas. The assessment of ports must take into account two fundamental concepts: capacity and efficiency (the indicators must be based on these concepts).

The geographical location of Spain shapes the port system as it has some strategic enclaves on its maritime fronts which connect the Atlantic Ocean with the Mediterranean Sea. The privileged location of its coasts, which are located on the periphery of its entire territory, is a key element for the economic development of almost all productive sectors. The Spanish port system has 48 ports of general interest, which are managed by 28 port authorities. It also includes a significant number of port facilities of lesser importance focused on fishing and sports activities which are managed (directly and indirectly) by the regional administrations.

In 2019, more than 376 million passengers transited through Spanish ports on maritime transport (regular line) or in cruise ship. 11 million were cruise passengers, figures which have experienced a significant increase with respect to 2018, consolidating maritime tourism demand.

Regarding goods, almost 565 million tons were transported. Of the total merchandise that is imported or exported in Spain, 85% of

Ports indicators and evaluation by experts

The methodology designed by Asociación Caminos carries out an objective evaluation, it analyzes quantitative indicators of countries with similar economic and social environment. As well, it carries out as a qualitative evaluation, based on the opinions of a selected group of experts. The quantitative evaluation is developed carrying out a comparative study between the following countries (Spain, Germany, France, United Kingdom, Italy, Portugal, Netherlands, Belgium, Turkey, USA, Morocco, Japan, China, South Korea and India.) This **quantitative evaluation** takes into consideration the most representative indicators of the sector obtained from publicly accessible databases which are available in important multilateral organizations (like EUROSTAT, OECD, World Bank, UN, World Economic Forum, International Transport Forum, UNCTAD, etc.).



• Evaluation of Ports (6.5)

Indicators: **Very Good**
Experts: **Sufficient High**

Rating		
Spain	8.0	B
Germany	3.9	FX
France	4.2	FX
United Kingdom	4.1	FX
Italy	6.3	D
Turkey	5.0	E
Portugal	7.8	C
Netherlands	9.5	A
Belgium	7.5	C
USA	7.5	C
Morocco	8.0	B
Japan	7.3	C
China	9.5	A
India	4.6	FX
South Korea	8.7	B

Comparative analysis of Spanish ports in an international context

It is important to highlight the difficulties faced for obtaining the necessary data for selecting the port indicator as it is very difficult to find unified and homogenous databases which contain port information of different countries.

In the quantitative evaluation, eleven indicators were selected, and they were grouped in three criteria: Performance, Financing and Adaptability to the future and sustainability. The result of this evaluation with these three criteria has been included (with a weight of 50%) with the result of the experts evaluation in order to obtain the final assessment of the port sector.

Evaluation of Ports with indicators (Max 10)		
CRITERIA	RATING	
CAPACITY		
PERFORMANCE	8.2	B
FINANCING	9.1	A
ADAPTABILITY TO THE FUTURE AND SUSTAINIBILITY	6.7	D
OPERATION AND MAINTENANCE		
SAFETY		
RESILIENCE		
ENGINEERING AND INNOVATION		
Evaluation with Objective Indicators	8.0	B
Indicators Considered: 11		

Evaluation of Ports by experts (Max 10)		
CRITERIA	RATING	
CAPACITY	6.6	D
PERFORMANCE	6.7	D
FINANCING	5.3	E
ADAPTABILITY TO THE FUTURE AND SUSTAINIBILITY	5.7	E
OPERATION AND MAINTENANCE	6.1	D
SAFETY	6.3	D
RESILIENCE	6.1	D
ENGINEERING AND INNOVATION	5.9	E
Evaluation by experts	6.1	D
Responses Received: 33		

Key results of the study

Ports are key infrastructures for the transport system in countries with sea access. They encourage and facilitate the economic development and as well, they are essential for the movement of people and goods. The direct, indirect, and induced activity of the Spanish Port System represents around 20% of GDP of the transport sector, representing 1.1% of GDP of the Spanish GDP.

Internationally, the Spanish port system is strongly. According to the EUROSATAT figures, the total traffic in the Spanish ports is significantly higher the European average and, specifically, higher than in Germany and France. The Spanish port system includes 48 ports of general interest, which are managed by 28 port authorities. It also includes a significant number of port facilities of lesser importance who have fishing and sporting uses which are managed (directly and indirectly) by the Autonomic Administrations.

According to the experts, the main developments that port infrastructures require for the next 10 years are:

- Reduce the negative impact of climate change with measures addressed to purify and recycle rainwater, generate fresh water, generate renewable energy, and promote biodiversity in the coastal area which is near the ports.
- Create logistics activities areas in the vicinity of the terminals.
- Implement measures for achieving the decarbonization and automation in ports: electrical connection, new fuel supply systems, installation of renewable energy sources (photovoltaic panels, wind turbines), install beacons for assistance in manoeuvres and automatic mooring systems.
- In some ports, the following capacity expansions are required: (i) expand docking lines in congested ports and (ii) expand esplanades for storing goods, warehouses, and machinery.
- Measures for improving connectivity, resilience, digitalization, and intercommunication must be implemented.
- Analyze the group ports which share the same coastline.
- Promote train access and dry ports.
- Improve land connections and the non- intrusive inspection equipment.
- Install fast charging points for electric vehicles near the ports.
- Create space in the second line and make port taxes more competitive.
- It is necessary to build more modern terminals which are prepared for being automated and OPS. As well, the electrical substations must be renovated.
- Effective protection measures against pollution must be implemented.
- Electrical facilities and supplies for accommodating new alternative fuels and cabotage services must be adapted. Liquefied Natural Gas should be used as fuel.
- It is necessary to move forward to achieve digitalization and reduce bureaucracy through digital systems. It is required to have an effective and real digitalization of the port administrative processes.

Final evaluation of Ports (Max 10)		
CRITERIA	RATING	
CAPACITY	6.6	D
PERFORMANCE	7.6	C
FINANCING	7.2	C
ADAPTABILITY TO THE FUTURE AND SUSTAINIBILITY	6.2	D
OPERATION AND MAINTENANCE	6.1	D
SAFETY	6.3	D
RESILIENCE	6.1	D
ENGINEERING AND INNOVATION	5.9	E
Final Weighted Evaluation	6.5	D

• Capacity (6.6)

Experts: **Sufficient High**

Do the resources and capacity of the public works sector meet current demands?

• Evaluation by experts and comments

1.1. How do you assess the port infrastructure considering their access and the ship maneuvering areas?	7.1	C
1.2. How do you assess the port infrastructure considering the length and draft of docks and berths?	6.9	D
1.3. How do you assess the port infrastructure considering the esplanade area they have and the available storage areas?	5.7	E
1.4. How do you assess the port infrastructure regarding the available on land mechanical means (cranes, etc.)?	7.4	C
1.5. How do you assess port infrastructure considering land connections?	5.5	E
1.6. How do you assess the specialization which has taken place in the terminals of the Spanish ports?	7.1	C
Capacity Evaluation by experts	6.6	D

ports it's the type of access to the terminals. Furthermore, the development and implementation of new technologies (including energy technologies) contribute to the development and increase of boat traffic in port facilities. It is essential that all these developments are supported by a strategic legislative framework.

- In some ports, it should be studied to concession the terminals to regular users who request it.

- Most Spanish ports lack adequate connectivity. Only three or four large ports are well connected.
- To better address the port management, it is necessary to create a common management organization who will be in charge for all the ports which are located on the same port front.
- Generally, the land plot located next to the ports is insufficient, and expensive.
- In most ports there are old infrastructures that need to be renovated.
- Better road and rail connections to ports are necessary, as well as speeding up the agility and quickness of containers handling (entry and exit) at the terminals.
- Generally speaking, a key infrastructure for developing the

• Performance (7.5)

Indicators: **Very good**
Experts: **Sufficient High**

Are the current provision and physical conditions of the public works sector adequate for meeting users expectations?

• Evaluation with Indicators

Passengers boarded and disembarked at ports / Population
Passengers boarded and disembarked at ports / GDP (thousands of \$)
Container traffic (t) / Population
Container traffic (t) / GDP (thousands of \$)
Container traffic (TEU) / Population
Container traffic (TEU) / GDP (thousand \$)
Maritime Transport Line Connectivity Index (UNCTAD)

	Rating	
Spain	8.2	B
Germany	4.4	FX
France	3.1	FX
United Kingdom	3.9	FX
Italy	4.8	FX
Turkey	5.5	E
Portugal	5.6	E
Netherlands	9.0	A
Belgium	9.2	A
USA	5.0	E
Morocco	6.6	D
Japan	4.6	FX
China	9.0	A
India	2.7	F
South Korea	10.0	A

In the cruise passenger indicators, Italy stands out, and to a lesser extent, Spain. The indicators related to container traffic per population and GDP show the same trend as the previous ones: high values for Spain and, to a lesser extent, for Italy, although significantly lower values compared to those achieved by Belgium and the Netherlands. The 'UNCTAD Liner Shipping Connectivity Index' (indexed at 100 for China in the first quarter of 2006) rates Spain, Germany, the United Kingdom, the Netherlands, Belgium, the USA, China (with the maximum value of 152), and South Korea above 80.

• Evaluation by experts and comments

2.1. How do you rate the pilotage service offered in Spanish ports?	7.0	C
2.2. How do you rate the towing service offered in Spanish ports?	6.9	D
2.3. How do you rate the mooring service offered in Spanish ports?	7.5	C
2.4. How do you rate the passenger services offered at the ports?	6.8	D
2.5. How do you rate the services offered for container management?	7.1	C
2.6. How do you value the services offered for the management of liquid bulk?	7.5	C
2.7. How do you value the services offered for the management of solid bulk in the?	7.3	C
2.8. How do you value the services offered for the management of RoRo vessels in ports?	7.2	C
2.9. How do you value the services offered for the management of general cargo in ports?	6.8	D
2.10. How do you value MARPOL services in Spanish ports?	6.9	D
2.11. How do you generally value the port-rail intermodal connection?	4.6	FX
2.12. How do you value port traffic management in the Spanish Port System?	6.6	D
2.13. How do you rate maritime signaling?	7.1	C
2.14. How do you rate the water and electricity supplies at the berth?	5.7	E
2.15. How do you value the provision of bunker services in Spanish ports?	6.6	D
2.16. How do you value technological connectivity between service providers, Port Authorities, shipowners and shippers?	6.6	D
2.17. What degree of real competition do the various types of providers have in the Spanish port system? Do you consider it enough? How could the opening of the market to new competitors in each of the services be increased?	6.6	D
Performance Evaluation by experts	6.7	D

non-captive traffic (such as cruises) are being charged to the shipping companies which make these connections, forcing them to pay for availability when those services are not necessary for this traffic.

- Some experts believe that, in general, there is a tugboats and pilots monopoly. Large terminals (owned by shipping companies) should have their own tugs and pilots. This measure would speed up the traffic and increase the operational efficiency. The stevedoring service is, in practice, controlled by the CPE's (Port Employment Centers), because of the Stevedoring unions implication. It is advisable to harmonize scrubbers use regulations between ports.
- Also, it is necessary to lower port fees and optimize port structures (Port Authorities, Harbor Masters, National Police, Civil Guard, Rescue, Customs, etc.).

- Captive traffic (such as inter-island traffic) is the main clients of some Port Authorities, and they are being used to finance in a large extent the port services (such as mooring or pilotage). However, essential services for

• Financing (7.2)

Indicators: **Excellent**
Experts: **Sufficient**

Which investment is allocated for financing the public works sector? Which amount is allocated for creating infrastructure? And which is the investment for operation and maintenance?

▪ Evaluation with Indicators

Investment in port infrastructure / Population
% Investment in port infrastructure / GDP (\$)

▪ Evaluation by experts and comments

3.1. Taking into account that ports have different expansion stages and consolidation stages, do you consider sufficient the current public investment in port infrastructure which is made for maintaining the existing service levels?	5.3	E
3.2. How do you generally assess the investment made in the conservation and maintenance of Spanish ports?	5.5	E
3.3. How do you assess the level of private investment made in Spanish ports? Do you think the current system of concessions and the application of rates for occupancy and activity are adequate?	5.8	E
3.4. Do you consider that the investment which is currently being made in port infrastructure in Spain is adequate compared to the investment made in countries around us?	5.2	E
3.5. How do you assess the investment made for accessing and connecting ports with land transportation networks?	4.6	FX
Evaluación de la financiación por los expertos	5.3	E

Rating		
Spain	9.1	A
Germany	3.0	FX
France	2.3	F
United Kingdom		
Italy	8.1	B
Turkey	2.1	FX
Portugal		
Netherlands		
Belgium	6.6	D
USA		
Morocco		
Japan	8.5	B
China		
India	1.3	FX
South Korea	9.8	A

One of the peculiarities of this sector is that service management varies significantly. Each port authority determines its funding based on its revenue and applies different criteria, which are not always comparable between countries. Due to the different ways of operating and financing ports, conducting a rigorous international comparative study is complex. In this report, we have chosen to analyze the Financing criterion, taking into account the indicators of investment in port infrastructure per population and per GDP, extracted from 'Maritime port infrastructure investment (OECD) (€).

- Port Authorities should invest more in creating new connections between the Ports and the Hinterland. Also, an investment should be made for preparing ports adequately for facing climate change. Additionally, Port Authorities should invest massively in the ship's electrical connections. Finally, they should promote and encourage private energy companies investment, which should focus on renewable energies.

• Adaptability to the future and sustainability (6.2)

Indicators: **Sufficient High**
Experts: **Sufficient**

Is the capacity and performance of the public works sector prepared to meet future expectations and demands? Are the resources and investment adequate for coving the future sector needs? How are actions environmental sustainability actions being applied? Are measures being taken to meet the objectives established in order to decarbonize public works and transportation?

▪ Evaluation with Indicators

Index of accumulated year-on-year growth of investment in port infrastructure (Index 100 in 2015)
% growth in maritime transport line connectivity (2019/2015) (UNCTAD)

▪ Evaluation by experts and comments

4.1. Taking into account that ports have expansion stages and consolidation stages, do you consider the current public investment in port infrastructure sufficient to maintain existing service levels?	5.2	E
4.2. How do you assess the current maritime traffic management systems in ports?	5.9	E
4.3. How do you assess the actions that are being taken to reduce CO2 emissions in port facilities?	6.2	D
4.4. How do you assess the actions that are being taken to manage LNG in port facilities?	5.8	E
4.5. How do you assess the actions that are being taken in the field of combating climate change?	5.4	E
4.6. How do you value the port-city relationship?	5.8	E
4.7. How do you value the adaptation programs of port infrastructure, its management and operation to new technologies?	5.9	E
4.8. How do you consider the measures adopted to reduce the environmental impact and the treatment of waste in ports?	5.7	E
Adaptability to the future Evaluation by experts	5.7	E

Rating		
Spain	6.7	D
Germany	4.2	FX
France	7.2	C
United Kingdom	4.3	FX
Italy	6.0	D
Turkey	7.2	C
Portugal	10.0	A
Netherlands	10.0	A
Belgium	6.8	D
USA	9.9	A
Morocco	9.4	A
Japan	8.9	B
China	10.0	A
India	9.8	A
South Korea	6.3	D

The selected indicators (investment accumulated annual growth rate and % of connectivity increase) provide information on the national ports adaptability to investments and on the connectivity growth of thenational ports.

- Large ports, such as Valencia, Barcelona, Bilbao, Algeciras, Las Palmas, etc., should generate renewable energy in order to provide clean energy to homes.
- Port authorities and public administrations should create an appropriate environment to improve the preparedness of ports against climate change.
- Ports must facilitate the waste treatment with national regulations. Shipowners who invest in reducing

emissions must be financially incentivized.

- State Ports must grant greater participation to the different parties and should present a strong defined strategy with the SIMPLE program. Solid bulk areas are not sufficiently protected; emissions into the atmosphere and other port facilities must be avoided.
- The cleaning of traffic areas can be greatly improved; remains and residues on the floor that pose a risk to health and vehicles must be eliminated. Weekly cleaning of these areas should be organized.
- The port-city relationship must facilitate the operation of the port as an employment creator, a driving force of the economy and a gateway to and exit from commerce. It is a mistake in the medium and long term to give more port space to cruises, sailing, or leisure areas.

• Operation and maintenance (6.1)

Experts: **Sufficient High**

Are the public works being operated and maintained in accordance with the required needs? Is the necessary investment being made in order to ensure adequate conservation and maintenance?

▪ Evaluation by experts and comments

5.1. Do you consider that the technical, management and organizational means applied to the operation of port facilities are adequate for meeting the users demands?	6.1	D
5.2. Do you consider that the technical, management and organizational means applied to the conservation and maintenance of port facilities are adequate for meeting the users demands?	5.8	E
5.3. How do you generally assess the conservation and maintenance conditions of the shelter works in the Spanish ports?	6.7	D
5.4. In general, how do you assess the condition and maintenance of the docking and mooring infrastructure?	6.1	D
5.5. In general, how would you assess the state of conservation and maintenance of the service infrastructure at the port (electricity, water supply, sanitation, etc)?	5.9	E
Operation and maintenance Evaluation by experts	6.1	D

- Investments and resources allocated to the conservation and maintenance of ports must be measured in comparison with fixed assets. In many ports, the investment made is smaller than the required and yet the problems have been solved by using structures which degrade very slowly.
- Investment rates which are lower than the nominal (2% of fixed assets) indicate that little attention is being paid to the comprehensive maintenance, although that it is true that public infrastructure (dams, dredging, docks, etc.) does not require large maintenance investments for battling deterioration produced by day-to-day use. These assets only require investment when an extraordinary need happens. Infrastructure and equipment which deteriorate due to day-to-day use (pavements, cranes, etc.) generally are private and their maintenance does not depend on public investment.

• Safety (6.3)

Experts: **Sufficient High**

Are the public works sector safe for users? Are effective measures implemented for ensuring a safe performance and operation?

▪ Evaluation by experts and comments

6.1. How do you assess the security level in Spanish ports?	6.3	D
6.2. How do you assess the measures implemented for preventing accidents related to spills in Spanish ports and their reaction capacity?	6.5	D
6.3. How do you assess the available port facilities equipment for preventing or reducing the effects of accidents on large capacity ships?	6.3	D
6.4. How do you assess the available port facilities equipment for preventing or reducing the effects of accidents resulting from managing toxic and dangerous goods?	6.3	D
6.5. Do you consider that appropriate measures are being taken for increasing security in port facilities in the future?	6.0	D
Safety Evaluation by experts	6.3	D

accidents, spills, etc.

- The measures adopted by the different port authorities related to security are very unlike. It would be advisable to carry out audits for standardizing the security systems and procedures in the ports in which the State is interested.
- Experts believe that, in general, the level of security in ports can be improved.

- For carrying out an international quantitative port indicators assessment, it is necessary to have, the following data:
 - Number of emergencies that have taken place and number of emergencies attended.
 - Number of accidents and root causes analysis.
 - Number of fatalities and root causes analysis.
 - Percentages of ports with emergency and self-protection plans. As it was not possible to obtain this information, an assessment has been carried out exclusively by experts.

In general, Port Authorities do not inform users of the available resources for avoiding and solving

• Resilience (6.1)

Experts: **Sufficient High**

When threats and adverse incidents occur, which is the capacity of the public works for preventing, protecting, and minimizing its consequences for users, the environment, the economy and national security? Are the public works prepared to recover its initial state within a reasonable time when the threat or adverse incident has ceased? Are there alternatives to provide the service in these scenarios?

• Evaluation by experts and comments

7.1. How do you assess the capacity of port facilities to recover, within a reasonable time, to the initial state of service when temporary adverse situations occur?	6.3	D
7.2. How do you assess the capacity of port facilities to recover, in a reasonable time, to the initial state of service when spills occur?	6.4	D
7.3. How do you assess the capacity of port facilities to recover, in a reasonable time, to the initial state of service when a vessel hits?	6.5	D
7.4. How do you assess the measures that are being implemented in Spanish port infrastructure to address the effects of climate change?	5.4	E
7.5. How do you assess the knowledge about the level of resilience of port infrastructures?	5.9	E
7.6. How do you assess the contingency plans which are applied in ports for preventing infrastructure to suffer from natural or provoked incidents?	6.0	D
Resilience Evaluation by experts	6.8	D

the resilience of ports. Interested groups requested better information on these issues.

- Resilience is a new concept which is not deeply analyzed and developed by port authorities. It is important to consider all aspects and the implications that can arise, analyze the root cause and consequences of possible incidents and develop specific action plans for each situation and for each port.

- The resilience of a port allows to reduce the probability of disruption. In order to develop a quantitative assessment by indicators, the most important ports of the countries analyzed must have in place contingency plans for the situations raised (which have an important local component which is specific to each port).
- With this information and with a deep knowledge of the conditions of each port, a critical assessment of the actions contemplated in each situation could be carried out by experts. Nevertheless, like this information is not available for analysis, an international comparative quantitative assessment of this criterion has not been carried out. The assessment was done exclusively with the opinion of experts.
- In general, port users lack information on the measures that Port Authorities have adopted in order to improve these issues.

• Engineering and Innovation (5.9)

Experts: **Sufficient**

Are the resources allocated to engineering in the design, construction, conservation, management and operation of the public works sector considered adequate? Is investment in innovation appropriate? What new techniques, materials, technologies and operating methods are being implemented to improve public works? Is progress being made in digitalization, monitoring and sensorization during the complete cycle of public works? Is the information adequate for users?

• Evaluation by experts and comments

8.1. Are the resources allocated to engineering in the design, construction, conservation, management and operation of the port sector considered adequate?	6.1	D
8.2. How do you assess the knowledge and technical capability of current port engineers?	6.7	D
8.3. Do you consider the knowledge imparted in universities to port engineers to be adequate and aligned with new technologies?	6.1	D
8.4. How do you generally assess the Ports 4.0 Program?	6.0	D
8.5. How do you assess the measures adopted in the public tender to promote innovation in new construction port works?	5.8	E
8.6. How do you consider the level of digitalization of ports at the current time?	5.9	E
8.7. How do you value innovations in digitalization of port management and operations?	6.0	D
8.8. How do you assess the integration of digitalization measures in a general digitalization strategy at the port level?	6.0	D
8.9. How do you assess the level of digital integration of the logistics chains in which the port is integrated?	5.7	E
8.10. Do you consider that investments in innovation are being transferred to improving the efficiency of Spanish ports?	5.6	E
8.11. How do you value the research, development and innovation that is being developed in Spain in relation to ports?	5.4	E
8.12. How do you assess the current technology that is being applied in ports?	5.8	E
Engineering and Innovation Evaluation by experts	5.9	E

- To analyze the engineering and innovation of ports, it is necessary to know in depth the new techniques, materials and technologies that are applied, as well as the innovations implemented, the state of port engineering and the progress in digitalization and the resources allocated to engineering and innovation financing.
- However, although it has not been considered in the evaluation of the ports, in a first approximation the state of R&D&i in the different countries can be analyzed globally. To do this, it is suggested to review the databases and indicators contained in the report: Main Science and Technology Indicators, Volume 2021, published in 2022 by the OECD. This comprehensive report provides a set of indicators that reflect the level and structure of efforts made by OECD member countries in the field of science and technology.
- To obtain a global idea of the progress of digitalization, you can consult three indicators from various organizations: "Participation in new technologies" from the World Economic Forum; the Information and Communication Technology Infrastructure Index (from the University of Notre Dame in the USA) and the number of people who use the Internet (from the World Bank).



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