DOCKSTHEFUTURE

defining the concept of "Port of the Future"

Port of the Future Road Map 2030

Deliverable 5.7

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Executive summary

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EXECUTIVE SUMMARY

The present document relates to task 5.7 Port of the Future Road Map 2030 on the basis of validated project results of WP5 – Exploitation of results under the DocksTheFuture H2020 Project. The aim of the document is to guide stakeholders towards 2030 objectives related to the Port of the Future. It also aims to define what a Port of the Future should be and what to do to become one.
This document reflects the results of the analysis of differentes inputs, such as project deliverables, reports, papers, guides and respond the problem of how the Port of the Future shoulb be, the constraints, opportunities and trends to a near and long future.

The document is divided into 6 chapters. In chapter 1, begins highliting the importance of the sector in European trade market and the position to the world, introduce Docks the Future project, objectives and the response to the identified issues. How Port of the Future is defined and how got there is presented through Chapter 2.

In order to become a Port of the Future, it is necessary to consider 5 stages, here with the new tools built in this project that serve to support decision making in order to improve ports, in Chapters 3 & 4 a guide is presented on how to achieve this goal. Chapter 5 & 6 show principes and factors to consider having success in the process.

To support the information and add value the document contains annexes where can be consulted information on new trends, including for example autonomous vessels; the importance and constraints in Port-city relation and the results of stakeholders consultation; also relation with Med & Neighbouring countries; New skills & competences for the future and finally, te clustered projects during one of the project tasks.

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Content

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Document Info

ACRONYMS LIST

AI	Artificial Intelligence
AIVP	Association Internationale Villes et Ports
BRI	Belt and Road Initiative
CO2	Carbon dioxide
DGs	Directorates-General
DSS	Decision Support System
DtF	Docks The Future
EP	European Parliament
ESPO	European Sea Ports Organisation
EU	European Union
EU GD	European Green Deal
GA	Grant Agreement
GHG	Greenhouse Gas
ICC	International Consultancy Committee
IMO	International Maritime Organization
ITF	International Transport Forum
LNG	Liquefied Natural Gas
LPG	Liquefied Petroleum Gas
MASS	Maritime Autonomous Surface Ships
MEPC	Marine Environment Protection Committee
MPF	MEDports Association Forum
MSR	Maritime Silk Road
NoE	Network of Excellence
NOx	Nitrogen Oxides
OPS	On Shore Power Supply
PCI	Project Common Index
PM	Particulate Matter
SDG	Sustainable Development Goals
SOx	Sulphur Oxides
TA	Transferability Analysis
TEN-T	Trans-European Transport Network
TVET	Technical and Vocational Education and Training
UN SDG	United Nations Sustainable Development Goals
WPSP	World Ports Sustainability Program
YEP-MED	Young Employment in Ports of the Mediterranean

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1. Introduction

Shipping sector plays a major role in connecting the European market with its trade partners since 75% of European external trade transits through EU ports also contributes to the development of a competitive and resource efficient transport system in the EU. In 2020, shipping accounts for around a third of intra-EU exchanges, and annually 400 million passengers embark and disembark at EU ports.

Obviously, exist challenges that is limiting to reach the potential of the sector and EU has put in in place the most extensive and successful framewotk for safety, environmental protection and quality shipping covering the entire chain. These rules are made to protect ships, coasts and citizens. EU ports due to innovation, changing business, economics and technological development need to adapt to ensure high standards for safety, security, environmental protection, global competitiveness and an efficient internal market.

The world changes every day although there are problems that are common in many areas and that need to be anticipated to mitigate their damage. Maritime sector will need to face real demographic, technological and sustainability trends. To have an idea of some concerns that ports will have to deal with will be around greening the shipping sector associated to sustainability as competitive advantage in a tremendous competitive sector, digitalisation for also support autonomous vessels or changes in supply demand.

Aware of the issues that a port has to deal with on a daily basis, the Dock the Future project has brought together experts from the sector from all over the world to address all these problems to what has been called the "Port of the Future".

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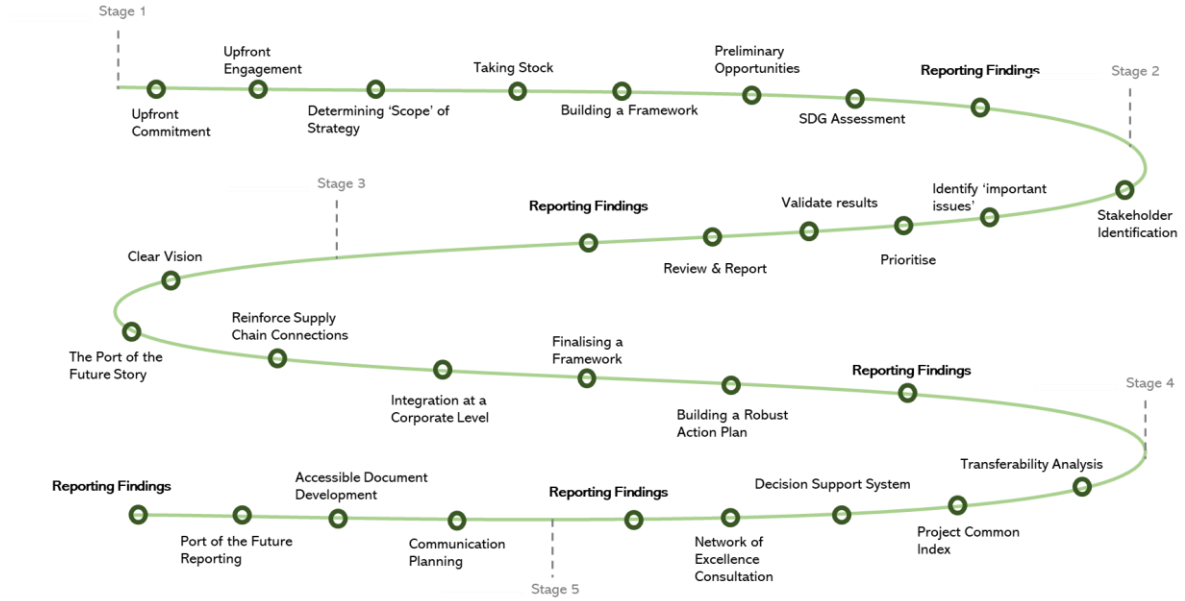

This "Port of the Future" is accompanied by a roadmap divided in 5 stages created during the project with the purpose of following the evolutionary trends and transforming a port into a port of the future.

The DocksTheFuture (DtF) project ran between January 2018 and November 2020 has been an immensely successful project with several outputs generated during the project that can be used after by project partners or stakeholders.

DocksTheFuture (DtF) aims at defining the vision for the ports of the future in 2030, covering all specific issues that could define this concept including among others, dredging, emission reduction, energy transition, electrification, smart grids, port-city interface and the use of renewable energy management.

For tackling the most demanding global issues of our time United Nations set 17 goals for 2030, known as United Nations Sustainable Development Goals (UN SDGs). DocksTheFuture project focus in 5 WPSP areas categorised for ports:

- Climate and Energy
- Community outreach and Port-City dialogue
- Governance and Ethics
- Resilient Infrastructure
- Safety and Security

Each related with several UN SDGs[1] and with 35 strategic objectives defined for Port of the Future, thus defining a robust Environment, Social and Governance (ESG) framework that can be used for public and private financial instruments.

A preliminary research has been done on the Port of Future concept, the definition of several Port of the Future topics to be addressed and their related targets in 2030 and a preliminary list of projects that could be potentially clustered together with the RIA retained proposals.

The role of this project was very important as from its inception it has brought together experts in the field with the latest information on the subject to create a future vision in line with existing requirements. To achieve these goals, an International Consultancy Committee was created where themes about the MEDport contribution, EU Green Deal, current problems in EU ports were discussed bringing together experienced professionals from Circle, ESPO, PortExpertise, AIVP, WestMED Initiative, EcoPorts.

[1] e.g. SDG 5.5; SGD 8.1; SDG 8.2; SDG 8.5; SDG 8.8; SDG 9.1; SDG 10.3; SDG 11.3.1; SDG 11.3.2; SDG 11.6; SDG 12; SDG 13; SDG 13.2; SDG 15.9; SDG 16.1; SDG 16.5; SDG 16.6

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2. Vision forward: the vision of the port of the future 2030

DtF Port of the future definition

The DocksTheFuture Project aims at defining the vision for the ports of the future in 2030, covering all specific issues that could define this concept.

Without having a clear definition of a port of the future work was carried out to define the concept starting to the desktop analysis based on the initial list of topics defined in the grant agreement that gave structure and the list of potential inputs to be assessed, at the end of the analysis the information gathered formed a "knowledge base "of the ports of the future domain that forged the information model.

A long list of over 340 inputs was established based upon the feedback of all project partners, and the subcontractors from these 297 have been processed and analysed as potentially relevant for Docks the Future, whilst currently 43 have been fully assessed. Although a total number of fourteen main topics were identified, two main topics are omnipresent and the shape of the port of the future by 2030: sustainability and digitlisation.

Desktop analysis processes	
Preliminary "Port of the Future" concept	An initial definition of the Port of the Future concept
Port of the Future Topics	A definition of entity topic
	Updates of the topic list compared with the topic list of the proposal
	A description topic by topic
	A detailed list of topics
	This is given a general name "Inputs" to be assessed
Preliminary Projects and Initiatives of Interest	A definition of the entity Input
	A definition of the entity Assessment
	A summary of the results
	The complete list of inputs and assessments

The information model set up allowed to refine the definition containing 2 elements: (i) "What is the port?", and (ii) "The change dimension". For the first element we focused in maritime ports and extend 3 core elements included in the definition being a) the physical boundaries and

infrastructure; b) the means of transport; and, c) the services. The second element, it was important identifying what was changed and not by looking at the value chain, the future that we were talking, what trends and external conditions affect that future, what "gaps" need to be closed to come to a desired future situation, the "to-be", what "tools" the port of the future should dispose of and how the transition from the current situation, the "as-is" to the "to be" can be managed.

Finally, port of the future can be defined as:

"*The port of the future delivers value to its customers by deploying managed services. These services have with minimum negative impact on the society and are compliant with all applicable legal instruments. The port of the future delivers these services by running lean business processes supported by maturing technology. These processes can be tailored to the needs of the customers and can be adapted to ever changing circumstances.*"

EU Green Deal

On November 28, 2019, the European Parliament announced a state of climate crisis through a special resolution (EP, 2019). In this document, Parliament called on the European Commission to act decisively in the area of climate and environmental protection. EU should cut emissions by 55% by 2030 to become climate neutral by 2050 as well as reduce global emissions from shipping and aviation.

To achieve these goals, it will be necessary, among others, to reduce the emission of the energy sector, thermo-modernization of buildings, supporting the development of the green economy (through investments in ecological technologies, such as renewable energy sources, recycling) and the introduction of clean forms of transport (e.g. electric vehicles). The implementation of this strategy will entail huge financial outlays, which may be difficult for many national economies to bear.

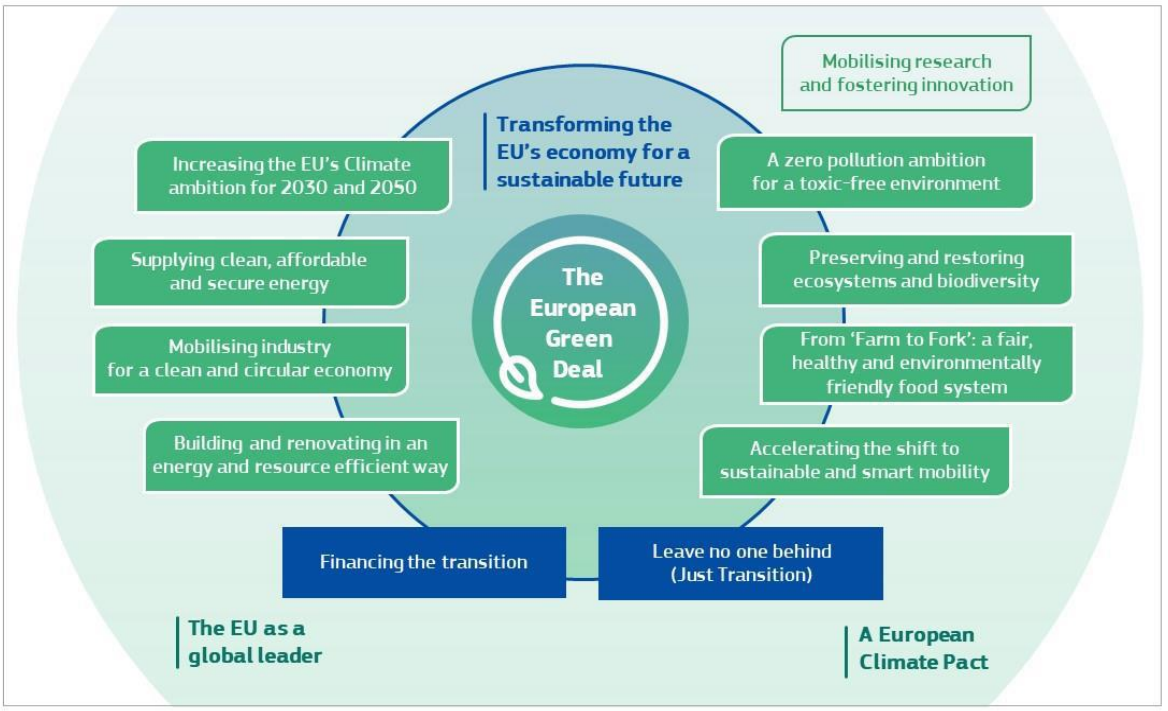

Figure 1. The European Green Deal

The EU GD is to be a new European Union development strategy. However, its implementation from the beginning of 2020 was unexpectedly interrupted by the outbreak of the coronavirus epidemic. Due to the necessity in lockdown, it has a significant impact on the global economy, which falls in crisis. EU New Green Deal discuss issues like coronavirus pandemic impacts but also other aspects that are very actual topics. However, we should begin to prepare the necessary means to return to the normal functioning of our societies and economies and sustainable growth, taking into account ecological and digital transformation and learning all lessons from these times. This will require a coordinated and strong recovery strategy, a comprehensive recovery plan, and unprecedented investment for a smoother recovery

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Green deal goals:

- Net-zero by 2050
- 50 to 55% by 2030
- 75% of inland freight by road should shift onto rail and inland waterways
- 90% CO2 emission reduction by 2050 for transport
- New Climate Law: enshrining carbon neutrality by 2050 into law

The European Green Deal main points for Maritime and Ports:

- Strategy for Sustainable and smart mobility in 2020
- Extended EU's Emissions trading to the maritime sector by June 2021
- Review the Alternative Fuels Infrastructure Directive and the TEN-T regulation in 2021
- Proposal for a revision of the Energy Taxation Directive by June 2021
- Regulate access of most polluting ships to EU ports and oblige docked ships to use shore-side electricity – Fuel EU Maritime (Commission Work Programme 2020)

Europe's ambition to be the world's first **net zero emission** area by 2050 was welcomed by ESPO, this ambition must be delivered in the most effective way while the competitiveness of Europe's economy must be safeguarded. It should be noted that achieving this objective will require an unprecedented **level of cooperation** across all policy departments and stakeholders nevertheless EU Ports are a key strategic partner in making the Green Deal happen at crossroads of supply chains, clusters of energy, and clusters of industry clusters of blue economy.

Port of the Future definition was reached in 2018 meaning that everything related to the European Green deal came after the definition, taking into account the green deal the definition could be updated and defined as:

"*The port of the future delivers value to its customers by deploying smart managed services in an ESG approach, embedded in a connected open innovation ecosystem that develops new business hubs in digital, logistics, energy and blue economy clusters. These services have with minimum negative impact on the society and are compliant with all applicable legal instruments. The port of the future delivers these services by running smart lean business processes supported by maturing technology and circular economy business models that deliver robust financial, environmental and social return. These processes can be tailored to the needs of the customers and can be adapted to ever changing circumstances.*"

3. Developing a Roadmap towards the Port of the Future objectives

As ports have different needs it's important to be felixble about contents for each port trying to highlight the importance of the port for the community and explaining the future key themes. Here, is advisable to articulate content, vision, achievements in a clear form for an external audience supported by internal documents whenever its needed.

The following table present the important/suggested elements to be port of the future and the guidance

ROADMAP DEVELOPMENT CONTENT	
Port of the Future Commitment	Port Authority should demonstrate clear commitment
Port Background	Overview of the port operations
Supply chain – local and global connections	Important to show how local products ate connected to throughout the world
Sustainability Performance and plan	Sustainaility performance to date and future plan
Stakeholder consultation	Feedback from both internal and external stakeholders
Action plan	Demonstrate your plan including short-term and long-term goals
Reporting & continuous adapatation and improvement	Monitoring and communicating on the progress made

Around the world there are excellent projects and initiatives, during the lifetime of the DtF project an important work was carried out for the clustering of related projects and Initiatives based on the methodology also set during the project for experts, stakeholders, covering **each Port of the Future topic** according to the following framework:

- Definition of the topic and related tactical objectives
- Definition of possible solutions (measures)
- Identification of needed researchers and further developments

In a nutshell, for a better understanding of on how the clustering was done. First, a list of projects and initiatives has been made per each one of the five WPSP areas (Climate and Energy; Community outreach and Port-City dialogue; Governance and Ethics; Resilient Infrastructure; Safety and Security). Then, the number of the projects/initiatives per each specific Strategic Objectives was

calculated and the Strategic Objectives which have been addressed with highest and lowest numbers of the projects/initiative were analysed. In total, 136 projects and initiatives were clustered (see annex VI).

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4. Port of the Future 2030

To be a port of the future 2030 implies several characteristics to be fulfilled, among them the ambition to be the 'smartest port' embracing energy transition, digitisation and innovation as an opportunity. This section serves as a guide where you can find a set of necessary indications where the results of the DtF project are included. A five stage guide was developed.

Our **five stages** to be Port of the Future:

1. What is the 'present status'?

2. Assessment Process

3. Mapping a forward pathway

4. Using the project tools: KPI, training packages (TA, PCI, DSS)

5. Communicating and reporting

Stage 1 - Present Status

In stage 1 is important to **identify** where your organisation is now and where wants to go (future vision), aligning with the concepts of sustainability. The importance of this stage of to determine the current level of **understanding and commitment to sustainability** helping to determine an initial vision in regard to how the organisation would like to be looked upon also gather good work examples and initiatives from all areas across the organisation to define a collective 'current status' and try to raise sustainability 'awareness' including benchmarking sustainability performance to similar operations.

Key tasks

There are key tasks like **Upfront commitment** from the Port Authority and **Upfront engagement** to provide consistency, support and advocacy for the project. The organisation's communication and public relations teams should be engaged early. Critical to the success of the strategy will be determining **'Scope' of Strategy** and reach, depending the model of the port operation each port need to determine the scope as a part of this initial stage. **Taking Stock** with the identification of current 'good work' examples across the organisation (face-to-face interviews with organisation's personnel, for example). Meanwhile it is worth looking at the 17 SDGs and their 196 targets for an **SDG Assessment** to determine which are relevant for your port and compared them with what you are currently doing. It is useful **Building a Framework** to determine an initial structure for port of the

future including sustainability themes (eg. people, planet, prosperity, partnerships) and their descriptions. By knowing the organisation's sustainability vision and leading practices, it is a time to set **Preliminary Opportunities**. For closing this stage, it is important to **Reporting Findings** to be review in the Sustainability working group and the information disseminated to all teams involved.

SDG Assessment process (4 steps):

1- Relevance Test for SDGs & Targets	2- Alignment Test of Current Work
Strategically test the relevance of each SDG and its associated targets to the particular port business.	How well aligned is the current organisation work, policies and activities against the relevant SDG targets

3- Analysis of Future Opportunities	4- Test for 'meets', 'not meets' or 'partial meets'
Determining opportunities for future strategic, long-term actions to progress against the relevant SDG targets	Qualitative assessment is considered to determine if the port business 'meets', 'partially meets' or 'does not meet' the relevant SDG targets. Factors to be considered should include asking if the examples are best practice, strategic, long-term, ongoing or on par with organisations leading in that SDG

Stage 2 - Assessment Process

Assessment process occur (stage 2) is used to capture stakeholder feedback and identify what are the most important issues for a business to consider in strategy and corporate reporting. The value of this stage is for early engagement of stakeholders in the project and discuss the port intention to become port of the future, in addition to internal and external views capturing valuable insights on the port from various perspectives to finally, deliver a validated list of important issues as a quantitative data set.

Key tasks

Before start assessment process a **Stakeholder Identification** list is needed to determine key stakeholders (internal and external) who will be invited to participate.

The process will be divided in four steps with the first one beginning for **Identify** with determining a list of 'important issues' for testing with stakeholders. Second step involves the **Prioritisation** of the important issues (through online surveys, f2f interviews). Qualitative and quantitative data is captured to determine the 'most important issues' and presented in a 'materiality matrix'. After this the result should be **Validated** in the third step by internal teams to ensure that they reflect the business, that no unexpected issues have been identified (or incident or events that affected the results). **Review & Report** is the final step and a final report should be prepared in order to capture the results and the relevant processes.

External stakeholders have an important role with their knowledge and contribution and time spent it is suggested to involve them in and after the process (**Continued Engagement**). For closing this stage, it is important to **Reporting Findings** to be formalised into a 'Assessment Process', presented internally and shared publicly.

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Stakeholders ranking and port examples

People	Planet
1- Workplace Diversity	19- Climate Change Resilience
2- Ongoing Learning	20- Biodiversity/Habitat Enhancement
3- Talent Attraction & Retention	21- Efficient Use of Resources
4- Employee Wellbeing	22- Renewable Energy Transition
5- Workplace Health & Safety	23- Water Management
6- Positive Organisational Culture	24- Port Impacts
7- Proactive Leadership	25- Biosecurity
	26- Sustainable Building Design
	27- Management of Port Buffers

Prosperity	Partnerships
8- Trade Growth & Diversity	28- Port Communication
9- Port Efficiency	29- Port Education
10- Robust Governance	30- Community Partnerships
11- Asset Management	31- Industry Partnerships
12- Effective Financial Performance	32- Indigenous Partnerships
13- Efficient Supply Chains	33- Research & Educational Partnerships
14- Protect Transport Networks	34- Government Relationships
15- Technology & Innovation	
16- Cyber Security	
17- Tourism & Cruise Operations	
18- Customer Focus	

Stage 3 - Mapping a forward pathway

In this stage clearly articulate the Port of the Future issues of your port to date and outline the Action Plan that will be crucial to ensure short- and long-term actions are developed. The benefit of this stage in to set the pathway with a robust action plan based on the results from stages 1 and 2 and map them to actions also with a creation of your port of the future story.

Key tasks

Commitments from Port Authority add value to finalise a **Clear Vision** for transform in port of the future and what it means to your por business. Scene setting and a background on the port (**The Port of the Future story**) is important to demonstrate the port's unique value this can come together with the result from stage 1 (e.g good work examples and initiatives). It will be important to **Reinforce Supply Chain** Connections (local and global) as well as the strategy is developed with stakeholders feedback (**Demonstrated Engagement**).A view for **Integration at a Corporate Level** should be given whether will be stand alone or integrated with an existing Corporate Strategy. The structure for a port of the future framework (**Finalising a Framework**) might be better with styled graphics its important that accurately reflects the vision.

Building a Robust Action Plan proves to be difficult and caution is needed. To achieve port of the future vision and work towards leading practice a robust plan should be set out. For a clear vision, meticulous mapping work must be conducted to align activities to the important issues and SDGs, in an ESG approach. This will be significance for feedback stakeholders and future sustainability reporting. It's very important for the action plan to set short-term activities (must include additional support for project already in preparation or projects that have a high level of support and will have a huge impact) and long-term activities (that will extend the organisation to focus on emerging areas or make investments). For a greater impact, activities have balanced focus to provide opportunities to deliver consistent processes across the organisation. To fortify commitment to the strategy, targets, metrics and timeframes allocated to each activity is recommended. Also, the ports should consider **Reporting Commitment** and can be used to continuously test strategy equilibrium. Some **Reporting Findings** should emerge from this stage throughout a draft port of the future strategy to be reviewed for the teams for produce and disseminate the final version.

Stage 4 - Using the project tools

In this stage stakeholders in port area interact and build synergies being essential for allowing planning towards the feasibility and in-deeply analysis for transferability of projects promoting the implementation of projects with an innovative concept and for the solution to be transferable.

Keys tasks

Available in Docks the Future website are three courses that are correlated among them. Begin checking innovativeness and transferability (**Transferability Analysis - TA**) requiring qualification and quantification of transfer objectives through identified risks, challenges, constraints / barriers and success factors involved in such a solution in order to transfer them from their current "niche" position to a mainstream application. **Project Common Index (PCI)** is based identification of stakeholders' preferences/needs different KPIs are selected generating an aggregated KPI (approach known as the standard Ports-of-the-Future-weighing) combined with costs of the action. Finally, after merging the output of several tasks to better understand the optimal solutions for solving their future challenges in order to find out details of potential initiatives aiming at achieving specific users influenced by TA and PCI emerges the key outcome of the project **(Decision Support System – DSS)**. For document the outcomes **Reporting Findings** should after smart tools usage.

Additionally, an existence of **Network of Excellence** (NoE) built during the project could be accessed. This network gathers the most innovative ports willing to team up and take actions to support the maritime community through opportunities given by International funding programmes such as the ones set by the EU GD.

Stage 5 - Communicating and reporting

In this stage Communicate Port of the Future Strategy and Reporting in effective and successful way will be dependent on a well targeted stakeholder communication this will help to send a clear message on the way the port will do business and their expectations. The importance of this stage will not only demonstrate the commitment to stakeholders about as critical is sustainabilityto the business but also enhance the level of understanding of port of the future and that the strategy is effectively communicated with stakeholders.

Key tasks

Communication Planning should be developed to respond to what/how/who, identifying stakeholder and communicate through social media[2], media outlets, industry and technical associations[3] and/or through online publications. In order to reinforce commitment and correctly communicate the strategy to internal and external stakeholders an **Accessible Document Development** should be followed with clear and concise styled. Perform **Port of the Future Reporting** for the purpose to communicate progress on performance, how the organisational work contributes to the SDGs or the WPSP themes and which objectives will be contributed to in the future. Report Finding effectively communicated a clear commitment with and well designed and structure port of the future strategy document for circulate both for internal and external stakeholders.

[2] Twitter, Facebook, Instagram, LinkedIn and more
[3] Conferences, Workshops, National and International Forums

5. Leading principles

Leading originally comesfrom lead meaning “to guide”; principle in plural means “elements” from *principes* “chief leader”. Blending, guiding elements are suggested. With each port having its own specific needs, each should determine the areas of focus that best fit the port's activities and its vision of sustainability Serving this only as a guide, has been divided into 4 major themes with 9 focus areas each.

	People	Planet
Focus area	1. Leadership 2. Culture 3. Communication 4. Innovation 5. Learning 6. Diversity and Equality 7. Talent Attraction and Retention 8. Well-being 9. Safety	1. Biodiversity 2. Climate Action 3. Renewable Energy 4. Water and Waste Management 5. Resource Efficiency 6. Alternate Fuels/Electrification 7. Minimise Impacts 8. Air Emissions/Quality 9. Clean and Safe Shipping

	Prosperity	Partnerships
Focus area	1. Trade Diversity 2. Supply Chain Efficiency 3. Circular Economy 4. Change Management 5. Shipping Channel Management 6. Sustainable Procurement 7. Operational Efficiency 8. Equipment Efficiency 9. Asset Optimisation	1. Stakeholder Engagement 2. Joint Project Investment 3. External Communication 4. Public Reporting 5. Public Education 6. Industry Partners 7. Community Partners 8. Indigenous & Cultural Partners 9. Research Partners

6. Key success factors

In every business does who pay attention and correctly implement successful strategies into all aspects of the business are closer to succeed. Implementation requires a strategic approach that need to be intentionally integrated into core business over time. Some key factors are listed below for examination

- **Leadership**

Active leadership in become Port of the Future is needed to drive success and move towards an integrated business model, incorporating sustainability at all levels and aspects of the business. Commitment and leadership on Port of the Future begins from the top of the organisation throughout all organisation.

- **'The Winner Strategy'** among everyone

A cross-divisional group/team should be encouraged, not only onle person. This group should make progress to incorporate relevant team member changes.

- **Employee Engagement and Culture**

All collaborators in the organisation should have the opportunity to be engaged in the strategy implementation. In order to build a pathway to a positive culture, the organisation may consider provide education and awareness on advantages to ensure positive change with some focus areas[4]; build corporate values to support and foster transformation; and encouraging a culture of empowerment, learning, diversity and innovation

- **Port of the Future 'Integration'**

Port of the Future should be integrated at all levels of an organisation (culture, business practices and operations). At a corporate level, should be integrated at the core of business aligned to the corporate vision, mission and values reflecting a port of the future focus, which sets the foundation for building a positive organisation culture. At a business process and operational level, should target change to 'whole of business' processes and practices.

[4] e.g value of sustainability, project examples both in-house and external, demonstrating how sustainability impacts all areas of the business

- **Stakeholder Engagement**

Ports should continue to interact with stakeholders, seeking regular engagement (internal and external stakeholders is central for permanent success) and work together to identify solutions and potential partnership opportunities.

For understanding port operations and impacts, engagement with stakeholders is crucial, including supply chain collaboration for understand the roles, risks and expectations. There are greater opportunities to work towards shared values to support related goals that might lead to unlock opportunities to support innovative systems and processes, optimising business and operational efficiency and improving 'business as usual' practices.

- **Hubs for Industry Clusters Open Innovation and Collaboration**

A key for transforming the business into port of the future is assuming the role of hubs for clusters' open innovation, collaboration and partnerships within the port sector, across various industries and the supply chain, will ensure understanding and clarity for the successful implementation of actions. For example, the EC's Atlantic Action Plan 2.0 Pillar 1 has the policy objective of Ports as Gateways and Hubs for Blue Economy.

Ports presents limitless opportunities to collaborate and partner with stakeholders: from governments, startups, local community and environment groups, suppliers, customers to research institutions.

- **Resource Planning**

A dedicated person (senior management resourcing) should be anticipated to create a plan for human and financial resources clearly articulated to enable a transition to a port of the future.

- **Adapting to a Changing Agenda**

Preparing to be able to anticipate and respond to unexpectable issues and trends in the port of the future agenda and the port industry, in an ESG approach. Organisations with capacity to faster adapt will have a greater competitive advantage.

- **Engagement with Global Sustainability Platforms and ESG initiatives for creating a new generation of Sustainable Port Managers**

Global supply chain is connected, expanding global connections and developing global learning partnerships will be important and ports are well positioned to positively contribute to global sustainability platforms and ESG frameworks

Evidence shows that not only public policies, but also private sector mega and micro trends are forcing towards the adoption of a management-business model that delivers triple value : Financial, Environmental and Social. In the limit, People, Planet and Profit.

This is why implementing an ESG approach for fostering the Ports of the Future concept is the way to go. ESG private funds remunerate their managers for their contratualized financial return, environmental performance, social well-being and good governance compliance. This impact investment trend from the private sector is in fact in line with the EU Taxonomy framework, a tool that will be used to assess the ESG impact of public and private funds/instruments that will operate in EU market in the present new decade, under the EU Green Deal strategy.

In this way, a Ports of Future model can be successfull if its financial architecture integrates ESG private funds that are available to build co-investment, blended and/or hybrid finance solutions with EU public funding (based on EU Taxonomy) – this approach will accelerate the creation a new generation of sustainable ports managers that will design and operationalize a business model capable of delivering profit, meeting climate change targets and increasing social well-being.

- **Monitoring and Reporting in an ESG approach**

A well-developed suitable ESG reporting framework of port business is appropriate align with a consistent, open and transparent approach which reports with clarity and accuracy on material matters without overreaching.

Ports should consider setting relevant financial and ESG targets and defining performance metrics (compare them with activities from the strategy set) for communication and tracking performance.

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ANNEXES

ANNEX I – New trends and technological drivers

International Maritime Organization

Help achieving these objectives the International Maritime Organization (IMO) strategy includes a target to cut total GHG emissions from international shipping by at least 50% by 2050 (compared to 2008) regardless of maritime trade growth. The strategy will be further revised in 2023 to ensure a pathway to full decarbonisation for international shipping as quickly as possible.

Also, the IMO underlines that shifting to smart and safe zero-emission shipping is possible but it requires a radical change throughout the whole maritime industry and its supply chain, from fuels producers to the engineers on board.

One of the many solutions, shore-side electricity, as foreseen by 2025 in the Directive 2014/94/EU on the deployment of alternative fuels infrastructure. In its Green Deal, the Commission proposes "[…] to oblige docked ships to use shore-side electricity."

European Sea Ports Organisation

European Sea Ports Organisation (ESPO) an important organization in ports matter with the role to ensures that seaports have a clear voice in the European Union representing the common interests and promotes the common views and values of its members to the European institutions and its policy makers set some port related measures to implement the objectives of the European Green Deal:

i) welcome Europe's ambition to be the world's first net zero emission area by 2050. This ambition must be delivered in the most effective way and competitiveness of Europe's economy must be safeguarded.

ii) European ports are at the crossroads of supply chains, are clusters of energy, industry and blue economy. They can be a **key strategic partner** in making the European Green Deal happen.

iii) The greening of the shipping sector is a priority for European ports and Europe's ports are committed to playing their part in helping the shipping sector to make this transition. Close cooperation between ports and shipping lines is required. This cooperation is also largely dependent on decisions of energy producers, energy providers and cargo owners.

iv) European ports are diverse and there is no one approach which can be mandated for all ports. Instead, **each port should develop a roadmap** appropriate to its particular circumstances to prepare for the energy transition of shipping.

v) Technology neutral approach is needed to ensure the uptake of clean fuels for shipping, support innovation and avoid stranded assets.

vi) A gradual approach should be developed to reduce emissions at berths. By 2030, **CO2 emissions** from ships at berth and in ports should be **reduced by 50%** on average and across all segments of shipping.

vii) **Onshore Power Supply** (OPS) should be encouraged as an **important part of the solution**. However, alternative solutions which achieve the same objectives should be encourages and allowed.

viii) LNG's role as a transition fuel should be recognised and certainty is needed about the support for investments made from 2021 to at least 2027.

ix) Review of the Energy Taxation Directive.

x) Motorways of the Sea and Short Sea Shipping can however be just as effective as rail and inland waterways in providing an alternative to road transport. In addition, pipelines can play a crucial role in the transport of certain modalities and the implementation of certain decarbonisation technologies.

xi) Many European ports are important clusters of energy and industry. These ports are players and partners in achieving the energy transition - greening "the port". All industry players in the port should have their agendas, goals and plans and the port managing body must support them to a more sustainable future.

xii) Seaports and waterborne transport should be seen as a priority in ensuring resilience to climate change.

xiii) **Digitalisation** must be seen as an additional instrument to meet the Green Deal objectives since will increase the transparency in every process of supply chain. By improving the communication, gathering and exchanging real-time information among different parties, logistics processes can be optimised and transport infrastructure and means (avoiding empty trucks, trains and ships) can be used in a better way.

Updated trends 2030

Delloites' report highlight that the **ports of today is not the port of tomorrow** identifying eight individual trends, and three broader trends (demographic, technological and sustainability) discussing the most important maritime trends and what they might mean for the port industry in the future.

Demographic drivers include population growth, urbanisation and politics, technological drivers will be influenced by increasing innovation and reducing its cost, environmental drivers are related mainly to global temperature and regulation.

Although the exact future of ports is uncertain it is major to consider trends and to prepare with appropriates policies and strategies for the future for what Delloite pointed port trends for 2030 and possible solutions in order to be better prepared:

a) Increased focus on spatial strategy

Space productivity:

Urban ports demand to increase the space productivity within a port. **Successful ports**: increase their spatial productivity. **Unsuccessful ports**: will lost their reason to exist and be swallowed by their city

Waterfront redevelopment:

More **mixed type of land use**, with the creation of ecosystems that **combine social and economics aspects**. Will the future ports build synergies between successful existing clusters in both city and port and, will be even larger drivers of innovation and revenue for their cities.

b) Increased protectionism

Reshoring of industries:

Protectionism will therefore **affect global trade**, as well as goods trade. Smaller ports benefit from the increasing in nearshoring.

Port infrastructure:

Ports will need to make investments and develop plans.

c) Relation with Asian countries

Changes in supply and demand:

Growth of the middle-class in Asia is expected to result in **different trade routes**. Production processes are expected to be **more technological driven**, with focus on more raw material and semi-fabricates than on finalized products, with supply chains expected to become shorter, as well as smaller ships.

Impact on trade:

European ports are expected to react by **strengthening their clusters** (e.g. by improving their digital supply chains). Criteria such as efficiency, speed to market, visibility and control, gain importance.

Shorter trade routes, use of new resources and increased trade:

It is expected that could **reduce voyage distances**, in some cases **more than 30%,** for example if Northern Sea Route for maritime freight between Northern Europe and Asia is used.

Natural resources are increasingly **easier to access** – Artic region.

Increased trade and new resources are expecting to arise **new opportunities** and leading to new businesses opportunities due to **lower costs**.

d) Belt road and impact on maritime trade

International Transport Forum (ITF) works for transport policies that improve peoples' lives with a discussion paper they discuss the Belt and Road Initiative (BRI) and impacts. The Belt and Road Initiative aims to achieve greater economic integration and development through better connectivity and could be easily extended to a global around-the-world transport system. The BRI concept promotes connectivity as the main enabler of trade growth and trade-driven prosperity. This initiative intends to establish a transport network consisting of a "Belt", i.e., overland transport connecting China to Europe through Central Asia; and a "Road", i.e., a maritime return route to southern Europe through the Suez Canal and back to Asia, with a stopover in East Africa (alternatively known as the "Maritime Silk Road" - MSR).

The geographical scope of the BRI is huge. In Beijing 26 July 2018 was announced that China has signed a total of 38 bilateral and regional maritime agreements, covering 47 countries along the BRI. The internet portal for BRI of the Chinese government lists 129 countries that have signed some type of cooperation agreement which China on the BRI.

There are examples of maritime infrastructures that have certainly had positive effects on trade. For example, the construction of the Suez Canal has reduced travel time and transport costs in the trade between Asia and Europe, thus stimulating more trade between the two continents.

Port infrastructure accounts for 40% of predicted transport costs for coastal countries, and various studies indicate a link between port infrastructure and maritime transport costs. There is always a risk of duplication of infrastructures and consequent overcapacity so It would be amiss not to point out that infrastructure does not necessarily have trade-inducing effects.

Possible effects on maritime trade flows

The impact of the BRI on global maritime trade flows distinguish four relevant transport-related orientations:

- control of existing maritime routes
- establishment of alternative routes
- infrastructure to generate new trade
- possible modal shifts.

Control of existing maritime routes, that is: securing trade flows whatever the circumstances (e.g. conflicts, turmoil etc.), is a major pre-occupation of trading nations. In parallel, BRI attempts to mitigate the risk of over-reliance on existing routes, by developing alternative routes that could circumvent potential chokepoints

Transport and its infrastructure do not only facilitate trade but also promote it. Technological developments in ship design and construction, and the ensuing economies of scale of larger ships, have reduced trade and transport costs, thus promoting trade by making the transportation of goods over long distances affordable.

It is also possible that the BRI could lead to some degree of modal shift. The Belt (land) part of BRI consists of a multitude of rail freight corridors, connecting China with Central Asia and Europe. For certain goods (high-value and relatively time-sensitive) this form of transport could be an attractive alternative to ocean transport, which will of course remain cheaper, but with considerably lengthier transit times. For certain destinations – such as inland China to central Europe – the train might be a cheaper option than ocean transport and the hinterland transport needed to get the cargo to and from the seaports.

Different categories of ports in the Belt Road

An assessment of the trade effects of the BRI needs to include a distinction between gateway and trans-shipment, or hub ports. The characteristic differences between these port categories are relevant, as they will provide different support measures to the initiative.

Gateways are the ports where a large share of the cargo reaches its destination or has its origin. These are generally places with or connected to large concentrations of populations or manufacturing production. Examples are the ports of Rotterdam and Antwerp, serving the heartland of North-West Europe. In contrast, hub ports are points of transit - usually centrally located along major maritime routes, so as to minimise transport distances - but where the cargo generally does not go to an inland destination. The essential characteristic of a hub port is its proximity to main shipping routes. Most hub ports are not connected to large population or production centres.

Examples of pure transhipment hubs in Europe include Malta, Gioia Tauro (Italy) and Algeciras (Spain).

Objective	Port Category	Effect on Maritime Trade	Examples of different projects within the BRI
Control of existing routes	Hub ports near maritime routes/chokepoints	None	Malacca, Djibouti, Port Suez, Tanger-Med, Piraeus, Panama Canal
Alternative routes	Hub ports to support new routes	Different configurations of flows	Kra Canal, Nicaragua Canal, Arctic routes, Kyaupyu, Gwadar
New trade	Gateway ports near untapped export markets or strategic commodities	More maritime trade	Mombasa, Dar es Salam
Modal shift	Ports connected by rail	Less maritime trade	New Silk Road

Table 1. Possible trade effects of the Belt and Road Initiative and examples

e) Optimisation and collaboration

Collaboration between carriers and collaborations at ports:

Carriers have showed **willingness to collaborate horizontally and vertically**, trough alliances and with terminal operators in the form of designed terminals, respectively.

Successful ports: optimization of supply chains and increase transparency; create cluster synergies; and, companies that adapt their operational processes to this new transparent and connected environment.

Sustainability as a competitive advantage:

It is expected that the flows of renewables, and the focus on **renewable clusters will become more important**, this involves significant investments in the supporting infrastructure.

Technology as a competitive advantage:

Data analytics and data exchange are becoming a new competitive advantage for port players.

Successful ports: ports that switch focus to smart.

Co-funded by the Horizon 2020 programme
of the European Union

Autonomous vessels

Autonomous vessels should be mentioned. Accepted by the maritime community and the general public for a needed shift envolving technology, considering maritime alternatives fuels and, safer, greener and efficient vessels. Autonomous vessels are supported by Artificial Intelligence (AI) and due to the complexity of navigation and the limitations of remotely operating are expected to implement a dynamic type of autonomy depending on the currents conditions and the parameters of the mission. Most predictions are that autonomous or semi-autonomous operation would be limited to short voyages, for example from one specific port to another, across a short distance.

IMO's Strategic Plan (2018-2023) present a key Strategic Direction to "*Integrate new and advancing technologies in the regulatory framework*".This involves balancing the benefits derived from new and advancing technologies against safety and security concerns, the impact on the environment and on international trade facilitation, the potential costs to the industry, and finally their impact on personnel.

Interim guidelines for Maritime Autonomous Surface Ships (MASS) trials were approved saying that trials should be conducted in a manner that gives at least the same level of safety, security and protection of the environment.

ANNEX II – Port-city relation and AIVP survey conclusions

This topic on port-city relations has been an issue for a number of decades when ports and cities started to lose their mutual interdependence and their developments since then has influenced each other.

The maritime transport sector, i.e. shipping and ports evolved like e.g. in terms of vessel developments, transport and ICT technologies, required terminal infrastructures and stacking areas, increasing volumes in port handling and pre- and on carriages, sea-side access, hinterland infrastructures, and port adjacent logistic services. The developments have been necessary to maintain ports' competitiveness in a fast-changing environment which has been heavily influenced by the demand side for port services. In addition to these factors which have driven ports' development in the recent past, a consequence of advanced ship and port technologies has been a decline in jobs for port workers.

In the meantime, urbanisation in port cities advanced. Populations in cities have grown and thus more living space has been required. Here, revitalisation of non-used older port areas has been only a part-solution to create new modern living quarters but also leisure facilities and commercial services, which only partly have links to the port business. Hence, port-city developments can be characterised as an increasing rivalry for limited land resources and in parallel by a decrease in benefits from ports for their port cities (e.g. in terms of employment) and an increase in negative consequences from port operations like environmental impacts and traffic congestions.

The importance of the port function for the city may be different in each situation, allowing to identify three situations in which:

- Port's functions dominate the urban functions (e.g. Rotterdam)
- Port's and urban functions have equivalent importance (e.g. Amsterdam)
- Urban functions dominate the port functions (e.g. New York), the port holds a secondary role in the city.

Port-city developments can be characterised as an increasing rivalry for limited land resources and in parallel by a decrease in societal benefits from ports to their port cities (e.g. in terms of employment, revenue, establishment of international companies in city) and an increase in negative consequences from port operations like environmental impacts and traffic congestions.

Environmental impacts from port operations on cities have become essential issues in the past which will even enhance in the future. The reduction of exposures from emissions and noise is a key issue here - particularly the reduction of emissions like SOx, NOx and PM as these emissions have

strong local impacts on health, well-being and thus on quality of life of populations in and around port cities.

Relocations of port areas or terminals and settling of new terminals outside urban areas is an ongoing trend to relieve port cities from pollutions and other inconveniences caused by port operations.

Additional measures will be required here to reduce local emissions in port areas also affecting port city populations. Besides the aim to tackle the issue of local emissions, port-city relations will have to cope also in the future with challenges deriving from climate change. Predicted increasing number of natural disasters like e.g. extreme rainfalls, high floods, winds, and a rising sea level will affect also ports and port cities and needs joint measures to develop the required port infrastructures. Hence, developments to reduce environmental impacts from ports will be also crucial drivers for port-city relations.

The development of economic clusters taking advantage not only of the ports but of the overall adjacent maritime business provide the chance to create mutual benefits between ports and cities and will be essential for port-city relations. Tourist activities like event tourism, leisure sailing, historical museums and gastronomy or new marine business-like offshore wind farms with production site and adjacent logistic services using benefits that port areas provide are examples for economic clusters benefiting ports and cities.

As environmental impacts from port operations, the provision of efficient port infrastructures and traffic systems, revitalisation of port areas or the development of new economic clusters and the balancing of interest and needs of ports and cities are complex issues and often interfering with each other, a good governance structure involving port authorities is key for sustainable port-city relations.

To reinforce port city relations subject, in 2018, AIVP done a survey to understand the priorities of port-city actors inviting 3500 organizations worldwide. The questions that were formulated reflect on the dominant topics that have been considered crucial for the port-city relationship either by AIVP or by experts.

- 17 questions concerning **spatial organization**
- 13 questions about **social interaction with the local community**
- 14 questions for **environmental challenges**
- 11 questions for **economic issues**
- 13 questions about **port city governance**

Structured in **five key topics** considering relevant for port-city relationships, the survey has a total of 68 questions.

The survey demonstrates that there is a common ground in issues as waterfront organization, port expansion, energy or mobility. Cooperative approach to develop hybrid waterfronts preparing the local economy to answer to global companies. Reduce port externalities is a clearly identified problem. To reduce the environmental impact of port operations on por city, and to save resources through the adoption of green technologies (LNG, Eolic Off-Shore energy, Wave energy, Cold ironing).

Mobility was considered an important problem where was added challenges of port generated traffic (cargo or passenger) with preferences for improving public transport, supporting multimodality, coordinating traffic plans and using smart tech is a top priority, but ports **prioritize a sectorial approach**, insisting on dedicated infrastructure.

Port and city actors are aware of the problems, know they are important and show willingness to cooperate and find solutions. The central question is then how this cooperative spirit can be translated into concrete actions.

Rely only on technological innovation to address all challenges related to sustainable development and sustainable port-city relationships it's not advisable. It is necessary that the "smart" tech is accompanied by new mindsets and governance structures that can profit from the new tools.

Although port city actors recognize the importance of several key topics such as sustainability, energy transition, circular economy, or protecting biodiversity emphasized the **economic focus of ports remains dominant**.

ANNEX III – Relation with Med & Neighbouring Countries

1. Introduction to Mediterranean Basin

The ports have always been the «lungs» of trade across the Mediterranean, and meeting points for culture, diaspora and crossbreeding. At a time when «internationalisation» and «globalisation» are becoming the key terms in the development of the economy and modern civilisation, it has become appropriate to examine the way in which these Mediterranean ports are evolving, and to see whether they still preserve the quality that is peculiar to the Mediterranean, as sites not only of a rich medley of encounters, but also of conflicts that have often been hard to smooth over.
The ports of the Mediterranean are areas of trade between the countries along its coasts, but they also play an increasingly important role extending toward the continents that surround the Mediterranean basin, or even on an international scale, and their significance is particularly emphasised in the trade between Europe and Asia.

For a long time, the ports of the Mediterranean have had an almost complete monopoly of reciprocal trade in the Mediterranean region, even though the networks constructed by the Romans traced out alternative overland routes. Today this monopoly of Mediterranean trade seems to be increasingly disputed: in the countries of Southern Europe, trade between France, Spain and Italy is generally overland, which contributes to making the crossing of the Alps and the Pyrenees even more difficult.

Trade with Greece has also developed a great deal by road, although the period of the war in Yugoslavia led to the successful promotion of a veritable sea «thoroughfare» across the Adriatic Sea, particularly active between Patras and Igoumenitsa on one side, and Bari, Brindisi, Ancona,Venice and Trieste on the other. The truth is that it we must distinguish between different types of Mediterranean trade, to which different ports are suited to a greater or lesser degree.

Along with the Suez Canal, the Straits of Gibraltar and the Bosporus Straits, the Mediterranean once again occupies a centre position in world trade. The rise of the countries of Asia has further strengthened its strategic position on the route between Asia, Europe and America. Ship-owning companies drew their own conclusions long ago, and made the Mediterranean region a transit zone that has world-scale importance. But the location of their hubs was often outside the Mediterranean, in the «northern area» of Europe, in regard to the organisation of their services.
Over the past ten years or so there has been a rapid turnaround in this trend, in favour of the Mediterranean. If we leave aside the trafficking of bulk goods, for which it is only possible to observe the existence of very specific port centres linked to «specialised» maritime and port chains, and concentrate on the new trade in miscellaneous products and in particular in completed goods, we have no choice but to observe how widespread container transport has reached a worldwide level.

1.1 What makes the Mediterranean Sea and its basin unique?

The Mediterranean Sea is the largest of the semi enclosed European seas: its basin area covers almost 2.6 million km2 , 0.82 % of the world's ocean surface. Surrounded by 22 countries and territories from Europe, Africa and the Middle East that share a coastline of 46 000 km, it is connected to the Atlantic Ocean through the narrow Strait of Gibraltar, to the Red Sea by the man-made Suez Canal and to the Black Sea via the Bosphorus Strait. The Mediterranean region is home to around 480 million people living across three continents: Africa, Asia and Europe. Often called the 'cradle of world civilization', the Mediterranean basin has a long history, and an extremely rich natural and cultural heritage.

It provided an important ancient route for merchants and travelers, allowing for trade and cultural exchange between people in the region. It is still one of the world's busiest shipping routes: about one third of the world's total merchant shipping —or ~ 220 000 merchant vessels of more than 100 t —cross the sea each year.

In addition, over the last few years Mediterranean ports have begun to compete with one another in the strive to increase their share of traffic. The strongly fluctuating nature of the maritime shipping sector and the increasingly narrow profit margins make this tendency extremely threatening for the future of the Mediterranean Sea.

The Mediterranean basin, with a recorded history of more than 5 000 years, is home to some of the world's oldest cultures. The Mediterranean region is a hub of a past civilizations whose heritage and cultural landscapes give added meaning to the sense of belonging in the Mediterranean. For thousands of years, strong bonds have existed between the people of the Mediterranean, due to the region's geography and history, which are linked together by a common sea.

The Mediterranean today is not a quasi-independent network as it was in antiquity but a major link in the global trade system. The maritime networks in the Mediterranean are structured according to the sea's internal geography and the locations of the main hubs and gateways.

The huge number of ships transiting through the Mediterranean heavily influences the shipping routes in the Mediterranean. The route toward the Suez Canal is not the biggest for the Mediterranean. Around 70,000 ships a year pass through the Strait of Gibraltar, compared with about 18,000 through the Suez Canal, underlining the large number of ships from the Mediterranean to, for example, the Americas, Northern Europe, and West Africa.

In 2018, the Suez Canal, which connects the Red Sea to the Mediterranean Sea, handled over 18,500 vessels accounting for over 963 million tons. In between these iconic chokepoints lies a vast network of ports and trade routes linking more economies than any other sea region Due to its position in global trade, the Mediterranean indeed remains a laboratory of the global hub-and-spoke network pattern. It hosts the port of Tanger Med and the now expanded Suez Canal on the southern rim, two examples of the massive investments in transport and logistics infrastructure that we have seen in the 21st century.

Today trade connectivity in the Mediterranean combines lessons from the past identified by economic historians with 21st century approaches. The Mediterranean is no longer a world economy in itself but a link in the global chain of trade, a place of transit for global container shipping organized around China, Singapore, the Panama Canal, the Strait of Gibraltar, and the Suez Canal. Its sea routes no longer operate on a point-to-point system within the rim but as a hub- and-spoke system where local shipping links transhipment hubs to regional ports. Such hubs are at the eastern and western ends of the Mediterranean (the Arab Republic of Egypt, Morocco, and Spain), and at the pivot between the east and west (around Sicily).

Maritime capacity is being built in Southern Mediterranean countries, massively so in Morocco and Egypt, but because of limited financial resources, these countries are highly concerned with their investment returns and the resulting benefits. Major initiatives from farther afield are re-enforcing the need to get these policy options right, such as China's One Belt, One Road, whose investments in main trade routes include the Mediterranean.

The role of the Mediterranean has strengthened gradually over the last twenty years to become the focal point for international maritime shipping. The drivers of this change can be attributed chiefly to three main factors:

1. The change in round-the-world routes due to the ever-increasing size of ships, which has resulted in ships bypassing the Panama Canal, has made the trans- Mediterranean route via the Suez canal the privileged freight route for trade with the Far East;
2. The economic growth in the Far East and the emerging countries along the North African shores has resulted in an increase in maritime trade along the routes from/to Europe and between the two Mediterranean shores.
3. The incentives granted by EU to short sea shipping, in an endeavour to ease congestion on the roads.

The competitive advantage of Mediterranean ports lies primarily in their geographic position. In terms of transit time this means that supply to European markets from Suez competes very favourably with the North European ports. Thus the Mediterranean basin represents an essential port of call for reaching destination markets as quickly and economically as possible.

Notwithstanding this, only 40% of trade volumes for Europe passes through Mediterranean ports, the remainder being bound for North European ports via the Atlantic routes.

The future trend in maritime trade in the Mediterranean over the medium-to-long term will be determined and significantly influenced by a number of factors, that have led to the formulation of more or less prudential estimates, for the different traffic segments. But the general consensus points towards an increase. These factors are:

- the constant increase of the population along the southern Mediterranean shores, estimated to reach 420 million by 2020;

- the growth of Eastern European countries and the role of the Black Sea for connections with them;
- the growth of Far East countries and the new trade routes to Europe via the Suez
- Canal; (iv) the coming into effect of the Mediterranean free trade area.

1.2 The Components of Maritime Transport in the Mediterranean

There are several dimensions of maritime traffic in the Mediterranean, which can be considered on three levels:

• As a 'maritime route' that, as such, is one of the world's major trade routes, through which nearly a third of world trade 'passes', from the mouth of the Suez Canal to the Straits of Gibraltar or the Bosporus, from the Atlantic to the Black Sea.

• As a 'crossroads 'of continents –European, Asian and African– whose trade is growing with globalisation.

• As a 'landlocked sea' through which coastal countries develop their trade.

The Mediterranean: A World Trade Route

In this ensemble, there is naturally maritime trade between Mediterranean countries and the rest of the world, but above all trade takes place between the entire EU and countries of Asia and the Middle East via the Mediterranean Sea.

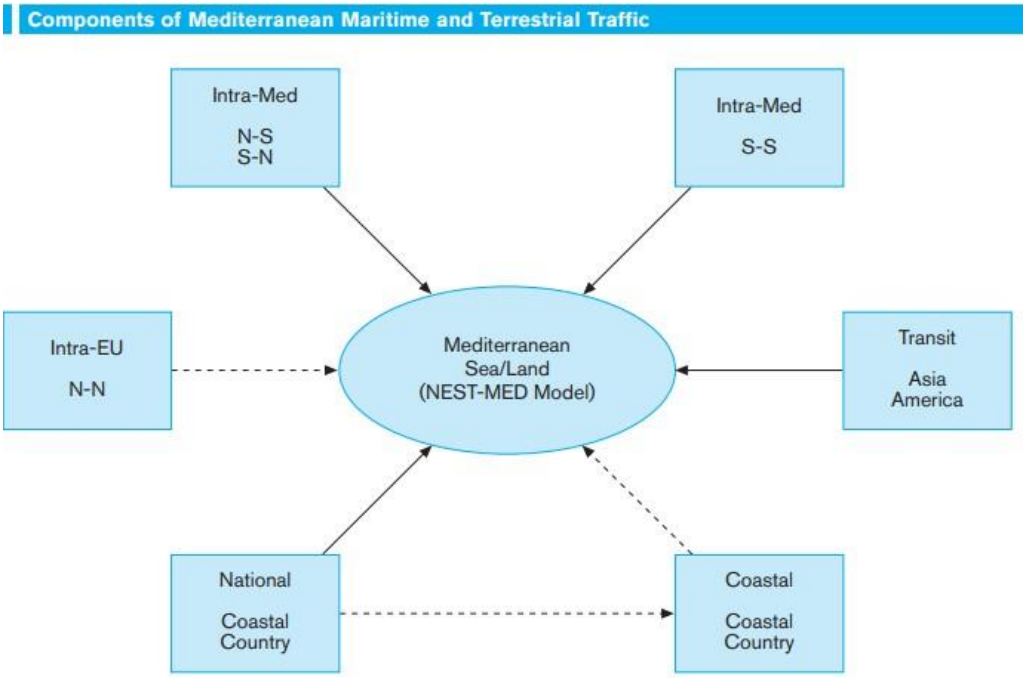

Figure 1 Components of Mediterranean Traffic

For the EU, this traffic can be divided between northern and southern European ports, with a much lower rate in northern port traffic, as shown on the map (Map 1) showing European port traffic. In any case, the Mediterranean has also seen the development of major hub ports that serve as redistribution points for the largest container ports, whose capacity now surpasses 16,000, and in some cases even 18,000 TEU. This organisation of world maritime transport has led to the creation

of an entire network of 'feeder traffics' among Mediterranean ports, used for trade among Mediterranean countries themselves. World container traffic has allowed an increase of the number of shipments among Mediterranean countries, with passage via maritime hubs essentially implemented for intercontinental world commerce.

The names of these major hubs are well known and their number is rising: in the eastern Mediterranean near the entrance/exit to the Suez Canal, in the central Mediterranean area with Maltese and southern Italian ports, and in the Straits of Gibraltar area with Algeciras and now Tangiers.

The Mediterranean: A Crossroads of Continents

The vocation of the Mediterranean serving as a crossroads of continents has grown stronger over the past few years in the Mediterranean, in particular in the eastern Mediterranean with the influence exercised by the countries along the Black Sea, those belonging to the CIS, Central Asian countries and Turkey, whose trade with the Mediterranean has grown considerably, and finally by the Persian Gulf States. The influence exercised by these continents on trade in the Mediterranean, and particularly in the eastern Mediterranean, has already been discussed in the preceding section on the Mediterranean as a world maritime trade route.

Indeed, it is difficult to estimate the maritime routes of globalisation in this trade, for which terrestrial routes can be used. Hence the interest of researching the effects on the terrestrial and maritime networks of the different continents in order to better comprehend the transport needs these in-depth structural changes will entail. In this perspective, the Mediterranean seems an ensemble of maritime routes connected to terrestrial continental routes. The European vision of the extension of trans-European networks via land corridors extending towards Central Asia through Turkey and priority corridors identified in the South Mediterranean and the Middle East confirms the interest of having a global view of land and sea transport in order to better understand the Mediterranean's role as a 'crossroads' and the role to be played by land routes in relation to maritime routes. In many cases, there is no single answer and a solution is the result

of a combination of maritime and terrestrial routes, with an emphasis on the future of the intermodal solution, whether this be road/rail transport, RO-RO transport, road/sea, or transport of cargo units with standard ISO containers allowing the three modes to be combined, as well as perhaps the maritime mode.

The Mediterranean: A Landlocked Sea

In this area, three types of flows can be identified: • Trade between the EU and SMCs. • Trade among the SMCs themselves. • Trade among EU Member States bordering on the Mediterranean. With regard to trade involving the EU Member States, moreover, it is important to distinguish between what we will call the southern EU countries, namely, Spain, France, Italy and Greece, and the northern EU countries. In trade between the EU and SMCs, the SMCs display a high degree of dependence, trade with the EU representing 30-70% of their foreign commerce. This dependence is

more marked for Maghreb countries than for eastern Mediterranean countries, even if all of these countries have experienced a diversification of foreign trade, as mentioned above, associated with globalisation. The situation is not reciprocal.

Mediterranean countries represent but 5-20% of the EU's foreign commerce: the highest percentages are attained by the southern EU Member States of Spain, France, Italy and Greece.
Trade among South Mediterranean Countries (SMCSMC trade) is highly limited due in particular to the difficulties of crossing borders still extant between neighbouring countries and a certain economic competition among these countries. In a hypothetical liberalisation of trade in the Mediterranean, trade should increase considerably among Maghreb countries, as well as among countries of the Middle East, Egypt and Turkey, whose populations, in particular urban ones, continue to rise rapidly, while this is not the case in Europe. The diversification of production structures associated with economic development should, moreover, limit the restraints associated with situations of competition in trade, multiplying opportunities for trade in different branches of the economy and businesses among neighbouring countries.

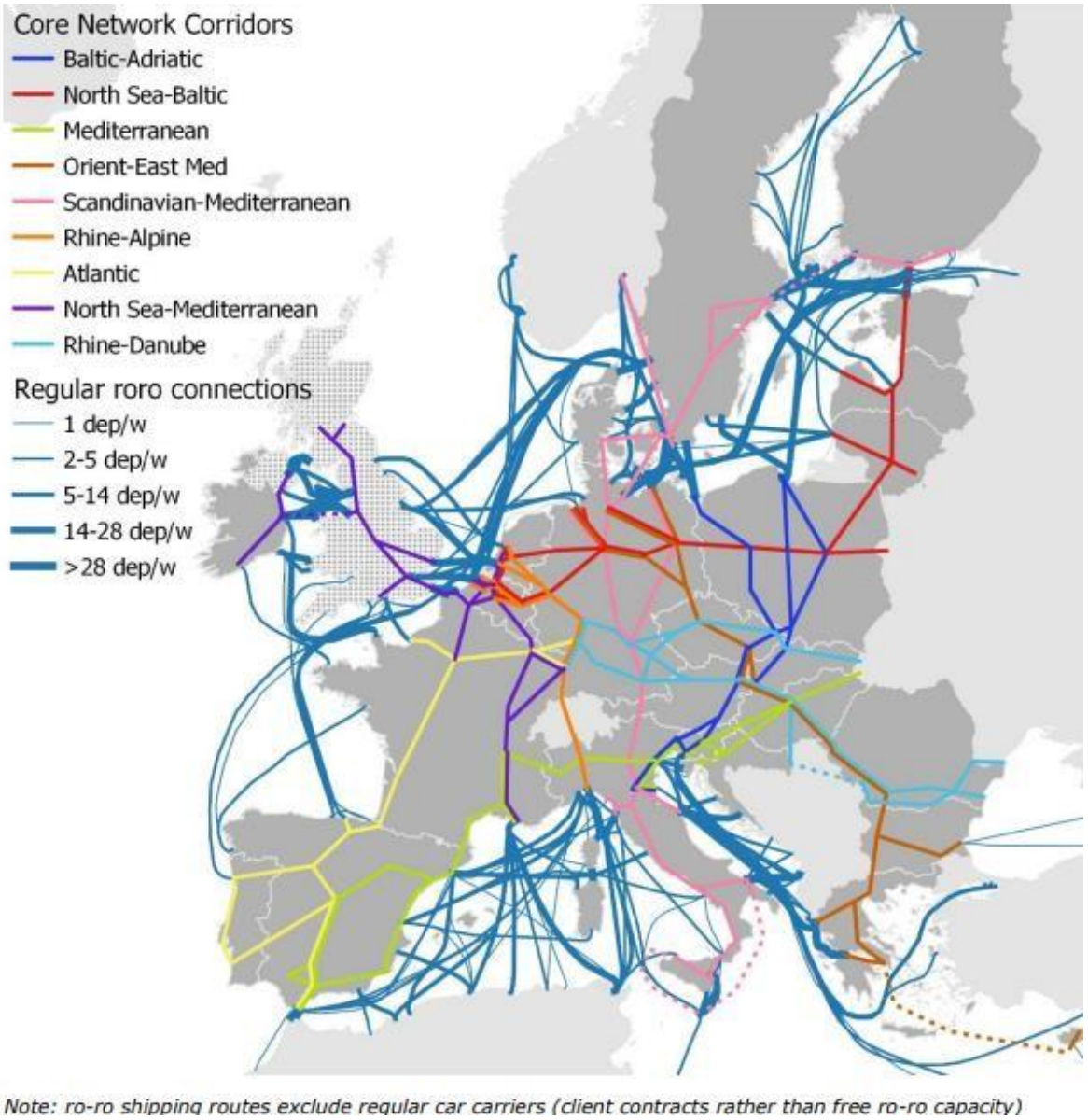

Figure 2 European Core Network Corridors and ro-ro shipping routes, Source: Motorways of the Sea Detailed Implementation Plan[5]

[5] https://www.onthemosway.eu/wp-content/themes/%23onthemosway/img/MoS-DIP-FINAL.pdf

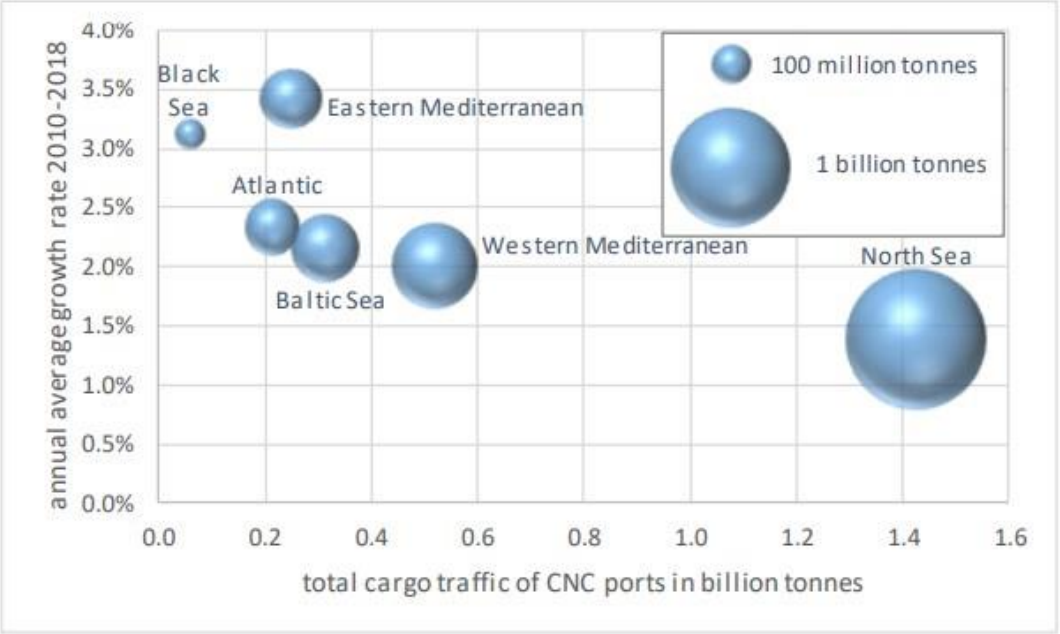

Figure 3 Average annual growth of Core Network Corridor (CNC) ports by sea basins, 2010-2018, Source: Motorways of the Sea Detailed Implementation Plan [6]

At this stage, a certain number of remarks need to be made concerning trade among Mediterranean countries, including trade with the EU:

• In intra-EU trade, northern ports handle a larger volume than southern ones: Antwerp is the main port of entry and exit for Mediterranean traffic, excluding oil.

• For the various merchandise, there are actually two coexisting transport organisation systems:

– The network of maritime container shipments mentioned above, which creates a sort of 'sub-system' for intra-Mediterranean trade; – A more direct provision of RO-RO services in the Mediterranean, as is the case in particular for North-South trade, with much less East-West movement.

In general, containerised product shipments entering and exiting ports of northern Europe, as shown on the chart, generally take a longer route but also prove less expensive. • There is a limited amount of competition between terrestrial and maritime transport in certain relations in the western and eastern Mediterranean, in particular between Morocco, Spain and the EU on the one hand, and between Turkey and the EU on the other.

It is quite clear that this type of model will be particularly used to ascertain the interest of new transport techniques such as the 'highways of the sea' advocated by the EU. This type of technique, one of the best examples of which is the transport between Turkey and Italy established some twenty

[6] https://www.onthemosway.eu/wp-content/themes/%23onthemosway/img/MoS-DIP-FINAL.pdf

years ago, could find privileged applications among southern EU countries wherever maritime transport routes prove much shorter than terrestrial ones. The third type of 'landlocked sea' trade is the trade taking place among EU Member States.

Due to European integration and economic development measures undertaken by EU countries, the potential volume of intra-European trade is considerable. For this type of trade, the past trend has been one of growth of road transport along often congested coastal roadways. Non-bulk maritime trade is highly limited except in the Adriatic between Greece and Italy, where there are also nice examples of maritime highways from Igoumenitsa and Patras in Greece, not to mention Piraeus. Hence, there are many opportunities yet to be developed, in particular among Spain, France and Italy, with much shorter maritime distances as compared to land routes, easily allowing transport agents to avoid crossing the natural barriers of the Alps and the Pyrenees.

2.Mediterranean Ports' Connectivity

2.1 A general view of European Ports Connectivity

The European Sea Ports Organisation looks forward to continuing to work in a constructive way with the Commission, the European Parliament and the Member States on making and supporting European policy that allows ports to further develop and respond to today's challenges.In 2017, ESPO commissioned a study 5 which identifies the drivers and investment needs of European ports. The study analyses the ports' abilities to make use of EU funding and financing instruments and recommends how the Connecting Europe Facility (CEF), the main financial EU funding instrument for transport, can be further improved.

The study concludes that European ports' investment needs amount to 48 billion EUR for the coming ten years. The needs are very diverse (see graph) and mirror the complex and diverse role of ports in Europe. Investments in basic infrastructure, including maritime access infrastructure and hinterland connections remain however very important: they take up 65% of all port projects submitted by port managing bodies. The study further reveals that the important role of ports does not seem to be well reflected in the share of the CEF budget allocated to ports during the current financial period 2014 – 2020, as port managing bodies have only been able to obtain 4% of the CEF transport budget over the past three years.

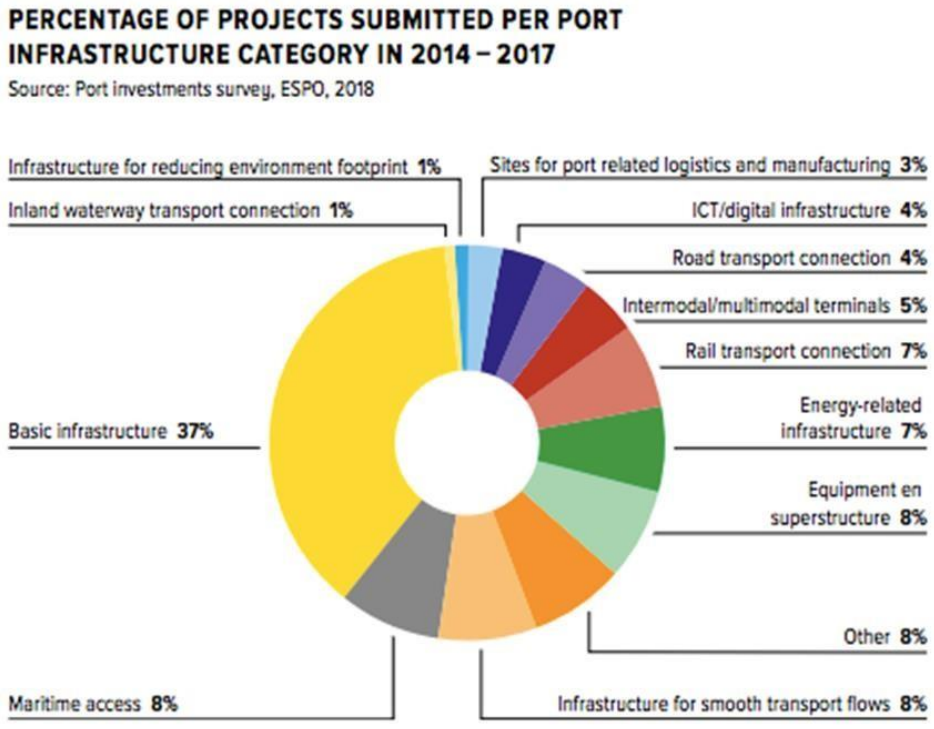

Figure 4Percentage of projects sub,itted infrastructure category

Source: ESPO, port investment survey, 2018[7]

[7] https://www.espo.be/media/Port%20Investment%20Study%202018_FINAL_1.pdf

The current TEN-T policy (2013) has two pillars, the TEN-T guidelines, defining the core and comprehensive network, the requirements and priorities for the different parts of the network (modes and nodes) and the Connecting Europe Facility (CEF), the financial pillar. The TEN-T network as defined in 2013 6 comprises 104 core maritime ports and 225 comprehensive maritime ports. The nine TEN-T corridors are also starting and ending in European core ports. The 2013 TEN-T regulation setting the guidelines will be reviewed in 2023.

The Connecting Europe Facility is the financial pillar of Europe's Transport Infrastructure policy and covers the period 2014–2020. It is the main source of EU financing for European ports. On 6 June 2018, the European Commission adopted its proposal for the Connecting Europe Facility 2021–2027 (CEF II). The European Parliament and Council found an agreement on the text of the proposal. The decision on the budget is to be taken in the framework of the negotiations on the Multi Annual financial Framework (second half of 2019).

ESPO (European Sea Port Organization) asks the new Commission, the new Parliament and the Member States to continue showing the same level of ambition in calling for an increased budget in view of completing Europe's Transport Infrastructure Network integrating fully the decarbonisation and digitalisation goals. ESPO urges the new Parliament to continue to use all its influence to call for an increased budget for the General Envelope of the CEF transport budget and to support the proposed earmarking for CEF within the Cohesion envelope.

THE CEF TRANSPORT BUDGET: OVERVIEW OF THE FIGURES UNDER DISCUSSION

CEF	TRANSPORT BUDGET	GENERAL ENVELOPE	COHESION FUND	MILITARY MOBILITY
CEF I 2014 – 2020	€ 24.05 bn	€ 12.8 bn	€ 11.3 bn	
CEF II 2021 – 2027 Commission proposal	€ 30.6 bn	€ 12.83 bn	€ 11.29 bn	€ 6.5 bn
European Parliament position	€ 37.79 bn* (*) € 37.51 bn in 2018 prices	€ 20 bn* (*) € 17.75 bn in 2018 prices	€ 11.29 bn* (*) € 10 bn in 2018 prices	€ 6.5 bn* (*) € 5.77 bn in 2018 prices

Figure 5 The CEF transport Budget

Source: ESPO, port investment survey, 2018[8]

The share of the CEF (Connecting Europe Facility) budget to be allocated to ports should better reflect the role European ports are playing today as main nodes of transport, energy, industry, digitalisation

[8] https://www.espo.be/media/Port%20Investment%20Study%202018_FINAL_1.pdf

and blue economy. They deserve more than the 4% share of the CEF budget received over the past years. ESPO asks European policymakers to strongly consider European ports as strategic assets. Even if ports are situated in one Member State, they should be considered cross-border actors and international in nature, as they are Europe's gateways for trade with other EU Member States and third countries and serve a hinterland and a catchment area which goes beyond their local and national borders. They should thus be prioritised on an equal basis with cross-border land transport infrastructure and projects. Motorways of the Sea (MoS) projects must be considered as cross-border maritime projects and must be seen as an important tool to enhance maritime transport between the Member States.

The synergy between the transport, energy and digital sectors as foreseen in the Connecting Europe Facility II can boost ports' investments in carbon free energy solutions. The forthcoming review of the TEN-T policy guidelines in 2023 must be used as an opportunity to update the TEN-T network taking into account new market developments and new needs without putting into question the basic aims of the TEN-T policy, which is to achieve an efficient, sustainable and multimodal Transport Infrastructure Network.

2.2 The Mediterranean ports connectivity in the middle of a vast network of trade lanes

The dynamics of Mediterranean activities during centuries became even more evident during the last twenty years due to their high acceleration process related to the concept of globalization. This evidence has forced to adapt the old Mediterranean lingua franca to new trends in international trade and to focus on the current dominant political, economic, social and anthropological aspects to reach a positive and efficient maritime transport development. New contexts, such as unbalanced growing areas of influence on different sides of the Mediterranean, e-commerce, new inland logistic areas versus old big transport routes – such as Gibraltar and Suez, size and scale of seaports, competencies and alliances, short sea shipping, new security rules or loss of a permanent gravity centre of any harbour, made such a redefinition mandatory to think of Mediterranean seaports without any ethnocentric bias.

The competition to keep up with rising volumes and bigger ships commands more port investments. The ports of the Mediterranean are varied in their utilization. Ports like the Spanish ports of Valencia and Algeciras, the Tangier-Med in Morocco, Malta's Marsaxlokk along with the Egyptian ports like Damietta, Port Said and Alexandria are transhipment hubs not only for freight moving throughout the greater Mediterranean region but act as a connector to ports as distant as the Americas or the Far East. Other ports like Genoa or Marseille serve their own industrial "catchment" regions and connect to Northern European markets.

The analysis of the relationships between the evolution of the volume of goods –income and outcome–, change in types of merchandise and growth or decline of the transport infrastructures, is

a necessarily reductive approach of maritime transport development around the Mediterranean, and prevents from understanding the huge complexity lying behind all these numbers.

The mutual needs of the different economies around the Mediterranean have changed the protecting view of the economy trading rules between European Union Countries and Maghreb Countries or Middle East economies, in a world highly interconnected where interdependence is necessary to maintain growth. The present world economic crisis is a perfect example of the way one region of the world can affect another, and of the different ways by which these regions are affected.

In the Mediterranean, the economy has permanently relocated activities, moved investments into developed or safe countries, while trade tried to promote open policies, and liberation of markets, with the constant intent of taking advantage from e-commerce. At the same time, the transport sector offered reduced traffic costs and more efficient services.

2.3 Mediterranean Sea Asymmetry

To understand the evolution of seaports in the Mediterranean Sea, and the trade generated along its shoreline, it is necessary to assess the difference between each area towards the whole system, and the present relevance of each for the future maritime transport development. Indeed, the importance of transport costs and infrastructure explains trade, access to markets, and increase in income per capita.

Regarding geographical asymmetries, we can easily appreciate the differences between three maritime entrances: the Gibraltar, Suez and Bosporus straits. Gibraltar is the natural and main gate to world from the Mediterranean sea, and so far new logistical technologies cannot avoid this evidence. Algeciras, on the Spanish side, and Tangier, on the Moroccan side, are competing to capture maritime transport and are investing to enlarge their transport facilities. As a consequence, small ports in the area compete for the rest of the trade, like Melilla and Beni-Anzar harbors, with very different strategies. Suez has become more relevant because of the energetic dependence of the European Community countries to the Middle East and Arab and Persian Gulf countries. Finally, Bosporus is the path to Black sea countries that unfortunately suffer from the weakness and instability of the Caucasian area, but the opportunity to communicate, through Turkey, to high potential growing areas.

The other main asymmetry is the economic basin behind each Mediterranean Sea shoreline. If we consider North African countries, except Egypt, they have a very short back economic basin. The Sahara Desert barrier, the very poor road and railway network connected with Central Africa, form an underdeveloped economic circle that do not attract the main maritime transport to stop in Algerian or Moroccan harbors. At the same time, the lack of development of harbor infrastructures prevents the economies of North and central African countries from growing. It is not only a North-South asymmetry, but also East-West. In the North-West area are located three or four countries: France, Italy, Spain and even Portugal, through the Spanish transport network. In this block, France has a

clearly privileged position regarding its commerce with the heart of the European Union, through the port of Marseille and the logistic area around Lyon. they are also politically working hard to cross the Pyrenees barrier thanks to a new effective railway transport. Italy, France and Spain are developing short sea shipping strategies, as promoted by the European Union. Their objective is to reduce transport by road, in order to limit the amount of fuel consumed by the EU, and the emission of greenhouse gases produced by the European road sector. Portuguese harbors, like Spanish economy, will benefit from the Spanish political inland-port logistic transport network connecting Mediterranean seaports, Atlantic seaports and EU.

In the Northeast sector, Italy, Slovenia, Croatia, Serbia, Montenegro, Albania, Greece and Turkey can form another block, where Italy, Greece and Turkey play the main role. In this sector, rules are different, since trade between Turkey and EU countries is likely to change soon, if Turkey becomes a EU country. The harbors located in this block have less weight and are also less developed, but are not less relevant than in the Northwest. Indeed, they have more potential growth and a more promising future, due to the economical changes in countries like Rumania, Bulgaria or Poland and to their connections with Ukraine, Byelorussia and Russia.

In the East, a group is formed by Syria, Lebanon, Palestinian Territories, Jordan and Egypt. Here, the main aspect is not geographical, and besides these countries, the political situation also affects the configuration of maritime transport development and trading networks of the whole Mediterranean sea.

Nevertheless, a common characteristic, if we compare the last two decades in the Mediterranean economies, is the rapid increase of the trading among all the regions. A representative example is the Autonomic Administration of Andalucía in the Southwest part of the Mediterranean. .

2.4 Network Inland Logistic Areas

The old features of main harbors consisted in intercontinental seaport networks, overseas traffic systems and shipping facilities and working efficient conditions with decreasing of handling cost, or less regulation.

A quick view of Mediterranean harbors showed that Algeciras (Spain), Giao Tauro (Italy), Pireo (Greece), Damietta (Egypt) and Haifa , where the biggest ones as hub harbors. Algeciras, handled less than 5 million TEUs, while North European harbors, like Rotterdam and Hamburg, handled around 10 million each one. Harbors like Barcelona, Valencia (Spain), Marseille (France), Genoa, La Spezia and Livorno (Italy) could be considered a gateway harbors.

Today, the network inland logistic areas changes the relation between Mediterranean seaports and their size, playing also a role in the transport trade. Being integrated in the logistic network has enabled harbors like Barcelona and Valencia to receive as many containers as the harbor of Algeciras. Or, for example, the small Spanish port of Motril wants to be the natural port of Madrid, located 600 km inland, instead of Granada, its administrative capital, only 40 km inland. Connecting a

Spanish Mediterranean harbor with the logistic area of Coslada dry port, in Madrid, means to be connected with the rest of the Iberian Coast and with an economic area that has been growing at the best rate in the EU during the last 20 years. The advantage comes from the fact of being related like a seaport and being in contact with the EU customs service agents.

Thanks to the use of new information and communication technologies, improvements in infrastructures, and with the advantage of the growing containerization rate, the same freight and insurance per ton of cargo provide today a quicker and more reliable service with less variation in delivery time than a decade ago.

In the meantime, Mediterranean harbors are growing towards the sea, due to the fact that the number of capacity container vessels bigger than 8,000 TEUS. The logistic network has grown inland and given some new opportunities to harbors located far from the main global transport lines. Mediterranean European harbors, especially Italian, French and Spanish, are henceforth connected with the main productivities areas of the EU, and Portuguese and North Spanish harbors with Mediterranean transport lines and thus with far East routes.

The development of short sea shipping is another related phenomenon. It is due to the congestion of land transport between Spain and France, through the Pyrenees, between Italy and the rest of Europe, and between Italy and Spain. The road transport from Spain to Europe is about 120 million tons per year, of which 94 millions tons cross through two points, Irun and La Junquera, versus 140 million tons by maritime transport. This unsustainable situation has developed an alternative, complementary and intermodal service. For example, the Ro-Ro service between Barcelona, Tarragona and Valencia on the Spanish side, is connected at least twice a week to Genoa, Livorno, Civitaveccia, Salermo and Palermo. It takes between 12 and 24 hours for a price of around 600 €.

The near future will connect railway and seaports, as it is necessary to define a “European land bridge network” between North Seaports, Logistic Inland areas and Mediterranean Seaports and to prevent isolated areas from limiting the development of the whole system. Distant areas like Portugal or Greece will clearly benefit from this policy, but also the other countries that will be able to bring their products there.

3. Mediterranean Ports' competences and competitions

The Mediterranean is an especially appropriate area for transport trade. The main global maritime route crosses the Mediterranean Sea from Suez to Gibraltar; one of the centers of the global economy is situated on the Northern shore of the Mediterranean; and the EU is opening its doors to new members. Moreover, emergent economies are located in the Northeast connected with the Black Sea and Africa. They have a potential of development and strong links with European economies through Mediterranean seaports. The optimal routing decision tends to be cargo shipping through hubs, as the hub charge has decreased and its efficiency improved . All of these aspects are catalysts for the growth of the well-defined seaports on the Northern shore, in order to establish a competence between them, to attract and generate new traffic and to develop new harbors on the Southern shore coast.

Harbors like Ceuta, Tangier, Djen-Djen, Bizerte, Damietta or Port Said are a new generation in the Mediterranean and will surely change the map of transport and economy in the South Mediterranean. A clever view will create a similar land bridge with Africa and the Mediterranean Sea, but unfortunately it will still take some decades.

In reality, competence between harbors is not only good for the users of their facilities; but it is also good for the whole logistic line, from inland dry ports to all seaports that have been connected by the logistic lines. We can now begin to talk about competence between logistic lines, which implies alliance between economies and territories, and between modes of transport and harbors. The sustainability of a seaport is nowadays not only in its efficiency but it also lies in the productivity of the whole logistical chain. The relation between Spanish seaports such as Barcelona, Tarragona and Valencia and Italian seaports like Genoa, Livorno, Civitaveccia, Salermo or Palermo, is a very good example of the way short sea shipping can change the aspect of transport whithin the continent. It enhances the necessity of a growth in size and in the same direction between harbors.

As these chains are becoming more complex, more intricate distribution structures are needed to tailor final products in all their facets to the customer's preferences, as Zhaojian Liu et al.5 pointed in their research. They propose options to introduce an integrated collaborative planning system where producers, retailers and logistic service providers work closely together through the sharing of information about production, sales and logistics.

To this increasing complexity, the transport logistic chain must also add environmental and security aspects that play a very important role in the definition of the whole transport system. It may leave out of the line the seaports that will not adapt their characteristics to international regulation on these matters.

In short words, it can be concluded, that the complexification and changes in international trade have taken place at a very fast velocity at a global scale. The time needed to carry a good from one part of

the world to another has declined, and at the same time, transport capacities have considerably grown. A ship can nowadays transport the same amount of cargo as carried by 40 ships 50 years ago, and stays only 3 days in the harbor, in contrast with the 12 days previously needed.The growth of seaports is not enough to adapt to the accelerated rate of economical growth, but new concepts, such as logistic chains, have to be applied to understand the new relationship between peoples, territories, economies and movement of goods. The relations between the different modes of transport have also changed in the design of a harbor. There is no sustainable harbor without space to connect with a main railway, or with a logistic area inside or close by a natural part of the seaport.Dry ports are becoming new pieces in the logistic chain, giving new opportunities to inland areas, and connecting harbors that will never be connected by sea, creating new corridors or land bridges between harbors.

The movement of all these amounts of goods, efficiently, in time, safe, and controlled, is impossible without the support of the new communication technologies, in a world where the international trade rules are not always easy.

The Mediterranean Sea transport trade is not an exception but has its own particularities, where many asymmetries are still making differences between territories, and where many considerable changes in the near future will draw new maps of relations between growing economies. Long-term strategies cannot avoid these realities, and have to play with the political uncertainties that remain in the region.

3.1 Western Mediterranean – Competition Pushes Expansion

Located on the Moroccan side of the Straits of Gibraltar, the Port of Tanger Med is two ports in one, located on the crossroads of north–south and east–west maritime routes, which together carry about 20 percent of global trade. Is the largest port in North Africa and soon may be the premier port for the entire Mediterranean Sea. With the June opening of APMT's $800 million Tangier Med 2 Extension, the port arguably now has the largest container capacity (TEUs) in the Mediterranean and is positioning itself to become a key transhipment hub for Maersk Line and its alliance partners. The Tangier Med 2 has two new container terminals – TC3 and TC4 – with an additional 6 million TEU capacity.

Port Said, Egypt and Tangier Med, Morocco are the leading African ports in the Mediterranean region; Tangier Med recorded the world's highest absolute increase in its index during the first decade of its operations since 2007. Both Port Said and Tangier Med provide extensive trans- shipment services, benefiting from their geographical position and private sector investments from major global port operators

The Spanish Port of Valencia is the largest in the Mediterranean (although Piraeus is positioned to overtake them this year), tallying over 5 million TEUs in 2018. Valencia's strategy is to be one of the 'last' three ports for ocean carriers to and from Europe – one of the essential transhipment hubs for

transiting ocean carriers – but the port's operating at near full capacity. So, to keep up with port competition from Tangier Med and now Piraeus, Valencia is embarking on building a fourth container terminal.

In 2018 the Port of Algeciras, located on the Spanish side of the Strait of Gibraltar, handled 4.77 million TEUs in 2018. The Port consists of two main facilities: the APM Terminals Algeciras and Total Terminal International Algeciras. The Algeciras can handle 18,000 TEU boxships but is looking to upgrade the port's facility. Recently the Port Authority of Algeciras (APBA) announced it would invest 233 million euros ($259 million) over the next four years with 62 million euros ($69 million) coming in 2020. Perhaps the most important items in the plan is increasing the draft of the Juan Carlos I dock from 17 meters to 18.5 meters and the construction of new roads and esplanades to meet the demand for ro/ro traffic in the port, as well as the acquisition of a new container scanner, within the Container Security Initiative (CSI).

3.2 Northern Mediterranean Ports

The northern Mediterranean ports like Spain's Barcelona, France's Marseille or the Italian ports of Genoa and La Spezia are integrated into the European hinterland through rail and road networks. For the most part, container volumes have continued to rise. For example, the Spanish Port of Barcelona tallied just over 3.4 million TEUs in 2018 compared to just about 3 million in 2017. And the French Port of Marseille-FOS was over 1.4 million TEUs comparted to 1.36 million in 2017. The Italian Port of La Spezia also posted an increase, improving to 1.54 million TEUs in 2018 from 1.47 million TEUs a year earlier. The only port to post a decline was the Italian Port of Genoa (Savano- Vado) which notched 2.6 million TEUs down from 2.62 million in 2017. In the case of Genoa some of the reduced tally was the result of the August 14, 2018 collapse of the Morandi Bridge in Genoa– a main connector for the port.The bridge was successfully completed in the spring of 2020 and is to be set to open to traffic in July of 2020

Many ports in the world, including the port of Limassol in Cyprus, seek to become accredited transhipment hubs. This means that large shipments from other Mediterranean and Black Sea countries could be consolidated and sent to Cyprus, from where they could be efficiently distributed to various nearby ports, e.g. in Egypt, and other countries in the Middle East, using smaller vessels and SSS operations. To be a successful transshipment hub, a port should be able to plan its operations precisely and ensure relevant information are available to visiting ships.

The role of Cyprus as an international shipping centre was established about 55 years ago. Cyprus has managed to attract shipping companies due to its excellent maritime infrastructure, and a high level of expertise, particularly in the fields of surveying, ship brokering and maritime insurance. Today, the Cyprus Registry is classified as the 22nd largest merchant fleet globally and the 3rd largest fleet in the European Union, with approximately 900 ocean going vessels of a gross tonnage exceeding 49 million tons3. It is estimated that approximately 4% of the world's fleet and around 20% of global

third party ship management activities are controlled from Cyprus. For the companies established in Cyprus, around 87% are controlled by Cypriot and EU interests4. The island's ports have developed purpose-built container terminals and Cyprus is one of the first countries of the Eastern Mediterranean to use specialized gantry cranes. Moreover, the island is now considered one of the most important cruise centers and transportation hubs in the region.

The Cypriot Government's vision is to develop initiatives that will further expand Cyprus's role as a communication bridge between the European Union and the countries of Middle East, such as Egypt, Jordan, Lebanon. In addition, the interest of major shipping organizations in using hub ports in the region has increased the need for upgrading the infrastructure and for providing more cost- efficient service.

3.3 Transhipment Hubs

The Mediterranean has nine major transhipment hubs but two stand out because of their central location, the island of Malta's Marsaxlokk port and Gioa Tauro in Southern Italy. Both are located in the central Mediterranean – a crossroads of major trade lanes. Marsaxlokk posted 3.3 million TEUs in 2018 up over the 3.1 million a year earlier. Conversely, Gioa Tauro lost ground, tallying 2.3 million TEUs in 2018 from 2.45 million TEUs in 2017.

Despite their enviable locations, both transhipment hubs are facing challenges. Back in May, Malta Freeport announced that Maersk and MSC plan to reduce their operations at Freeport, relocating to Tanger Med and to Egypt's Port Said. The terminal operator said the move might cut their business by up to 35%. While Maersk is expected to retain a presence and other carriers are poised to increase, the move illustrates the tenuous existence of hub ports without a major cargo catchment area attached.

In April, Gio Tauro became 100% controlled by the MSC Group as Contship Italia sold its stake to TIL – MSC's terminal arm. MSC said it would invest 120 million euros ($133 million) for new equipment and capital works to help boost the annual throughput to 4 m TEUs within two years.While the ports of Marsaxlokk and Gioa Tauro are fighting to retain market share, the Greek Port of Piraeus has emerged as one of the Med's key hubs. (7)

In 2018 Piraeus hit 4.9 million TEUs up nearly 900,000 from 2017. The key to the port's turnaround was the investment by COSCO. In 2016 COSCO Shipping acquired a 51% stake in Piraeus Port Authority PPA. Under the COSCO aegis the port authority fortunes have flourished. Profits for the first half of 2019 were up by about 20% compared to the same period in 2018. And under the terms of the agreement should COSCO invest at least $330 million in the port by 2022, it will be eligible to up its stake by another 16%.

Recently, Greece's Port Planning and Development Committee granted approval of an investment master plan submitted by PPA which would open the way for $670 million in infrastructure upgrades at the port. Although a proposed new 4th container terminal was not approved by the committee, the issue is not dead. The goal of the PPA is to bring the TEU capacity from the existing 7 million TEUs to 10 million TEUs – potentially making it the largest box port in the Mediterranean.

3.4 Suez Canal, and the Belt & Road Initiative: the Role of the Mediterranean countries

The BRI and the Chinese development strategy for the future The Chinese Belt & Road Initiative (BRI) is probably the most important investment project worldwide since the Marshall Plan that

followed World War 2 in terms of number of countries involved in the project and amount of financial resources devoted to the initiative.[9]

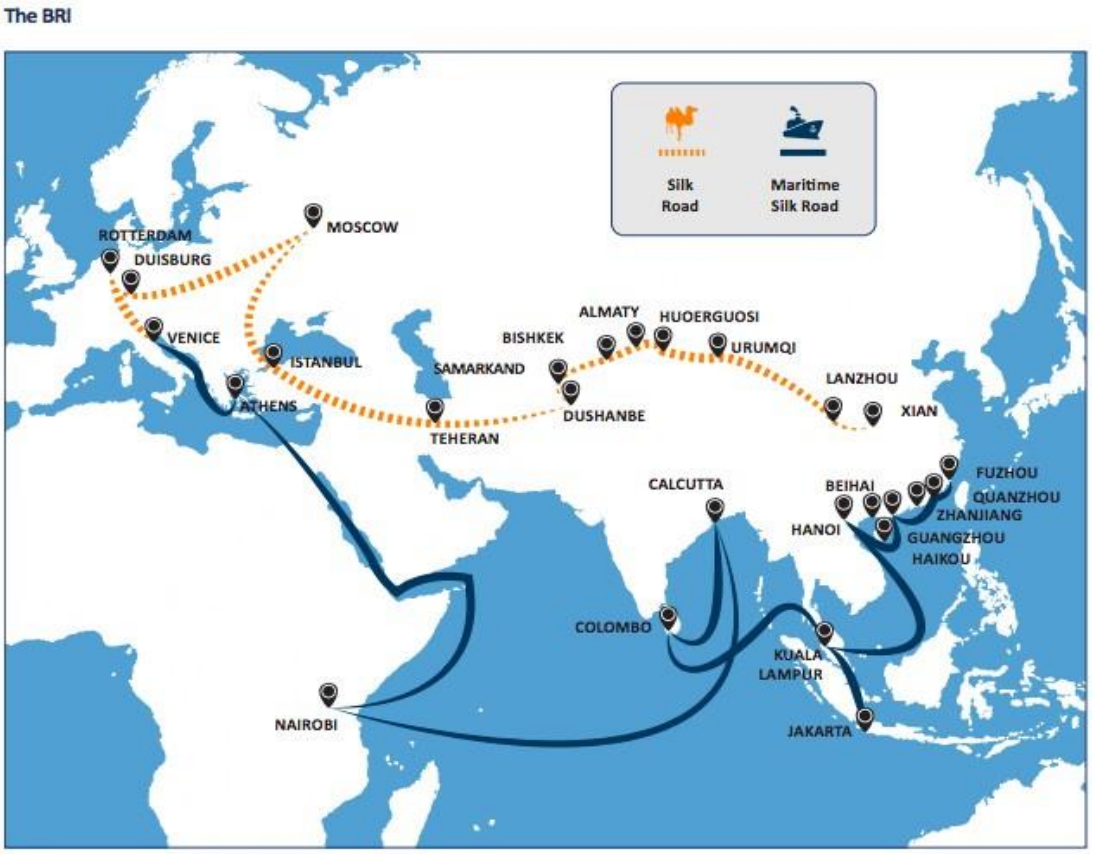

Figure 6 the Belt & Road Initiative

Source: DocksTheFuture[10]

Based on official statements and documents by Chinese officials and agencies, the project aims to implement the following:

1. An inland Silk Road economic belt connecting West China with Europe via Central Asia, Russia and Northeast Europe, as well as with the Indian Ocean through Pakistan. A network of railway lines, highways and pipelines will form the inland economic belt.

2. A maritime Silk Road to connect the South-eastern coastline of China to the Mediterranean Sea through the South China Sea, the Indian Ocean and the Suez Canal.

The project involves investments in port areas and inland logistic and industrial facilities along these maritime routes. The BRI was officially launched by President Xi Jinping in a speech at Nazarbayev

[9] https://www.srm-maritimeconomy.com/wp-content/uploads/2018/12/srm_alexbank_suez_2018.pdf

[10] https://www.docksthefuture.eu/suez-canal-and-the-belt-road-initiative-the-role-of-the-mediterranean-countries/

University in Astana (Kazakhstan) in September 2013. It originally involved 65 countries11 in Asia, Europe and Africa and will be wholly completed by 2049. According to some estimates, China will spend around $1,000 billion in the next ten years to implement the initiative. The financial resources required would total around $8,000 billion over the entire investment period12. The GDP in these 65 countries considered as a whole represents around 1/3 of the entire world's GDP and over 60% of the world's population. Furthermore, since its launch many other countries have expressed interest in the project, by joining the Asian Infrastructure Investment Bank (AIIB)13 or planning and developing transport infrastructures in cooperation with China. In fact, 48 other countries – besides the 65 countries officially involved in the BRI since its launch – have been identified so far. They are likely to become active participants in the project. As of September 2017 China had already signed cooperation agreements with 74 countries.[11]

The project will probably extend to other areas of the world, involving countries in Oceania and South America as well. Table 1 is a list of European and MENA countries involved in the BRI (in bold type, the countries with shores on the Mediterranean Basin). 43 European countries and 19 countries of the MENA region are involved in the BRI or have shown interest in the project. Among these, there are 22 countries with shores on the Mediterranean Basin, 13 of them are European countries and 9 of them fall within the MENA region.[12]

[11] https://www.docksthefuture.eu/suez-canal-and-the-belt-road-initiative-the-role-of-the-mediterranean-countries/

[12] https://www.docksthefuture.eu/suez-canal-and-the-belt-road-initiative-the-role-of-the-mediterranean-countries/

Co-funded by the Horizon 2020 programme of the European Union

European and MENA countries involved in the BRI

Europe			MENA	
Albania	Georgia	Poland	**Algeria**	**Syria**
Austria	Germany	Portugal	Bahrain	**Tunisia**
Armenia	**Greece**	Romania	Djibouti	UAE
Azerbaijan	Hungary	Russia	**Egypt**	Yemen
Belarus	Iceland	Serbia	Iran	
Belgium	**Italy**	Slovak Republic	Iraq	
Bosnia and H.	Latvia	**Slovenia**	**Israel**	
Bulgaria	Lithuania	**Spain**	**Jordan**	
Croatia	Luxembourg	Sweden	Kuwait	
Cyprus	**FYR Macedonia**	Switzerland	**Lebanon**	
Czech Republic	**Malta**	**Turkey**	**Morocco**	
Denmark	Moldova	Ukraine	Oman	
Estonia	**Montenegro**	United Kingdom	Qatar	
Finland	Netherlands		Saudi Arabia	
France	Norway		**Palestine**	

Table 1 European and MENA countries involved in BRI initiative

Source: SRM [13]

The growing presence of China in the Mediterranean: economic cooperation and investments The attractiveness of Chinese investments has grown among European countries since the outbreak of the Euro crisis in 2011; over the last decade increasing Chinese investments have taken place in several Mediterranean countries. Take the example of Greece, a country heavily hit by the financial crisis, where the acquisition of the Port of Piraeus by the Chinese shipping company Cosco in 2011 was a major relief for the public budget.

Intense competition between Mediterranean countries for attracting Chinese investments has emerged in recent years. In response to the Chinese maritime strategy of investing in several port infrastructures in the Mediterranean Basin, the Med countries on both the northern and the southern shore of the Basin are promoting themselves as a priority gate for inland countries and territories. The increase of ship size of the main container carriers has had a significant impact on global maritime routes. In fact, not all Mediterranean ports are equipped to accommodate 19k to

21k TEUs ships and few of them can offer the required level of logistic efficiency and connection. Moreover, in the view of Chinese authorities the presence of industrial zones, logistic facilities and tax-free areas serving port infrastructures can play a very important role in boosting the efficiency of the

[13] https://www.srm-maritimeconomy.com/wp-content/uploads/2018/12/srm_alexbank_suez_2018.pdf

maritime industry and thus they are considered as positive factors by investors. On the south- eastern shore of the Mediterranean, Turkey has received significant funds to improve its infrastructures.[14]

The city of Kars, close to the border with Armenia, is the terminal of the BTK 32 www.srm-maritimeconomy.com (Baku-Tbilisi-Kars), a railway line linking Azerbaijan to Turkey through Georgia. This 838 km long line will shorten the usual route between China and Europe by 7,000 km. Near the Bosporus Strait there are other big infrastructure projects linked to the BRI: the rail tunnel of Mammary and the third bridge over the strait – the Tavuz Sultan Selim Bridge . The Turkish coastline is also a staging post to the Maritime Silk Road. North Africa, thanks to its strategic position between the Middle East and Europe, plays an important role within the BRI project.

The five countries of the area have different strategies concerning economic partnership and alliances within the African continent. While Egypt, Libya and – from last April – Tunisia are part of the COMESA (Common Market for Eastern and Southern Africa), Morocco joined the CEDEAO (Economic Community of West African States) in 2018 and Tunisia gained the status of observer member of this organization in November 2017. Algeria, on the other hand, joined the CEMAC (Central African Economic and Monetary Community) a choice consistent with the new Trans- Sahara Highway connecting Lagos in Central Africa to Algiers. The highway may serve as a strategic infrastructure to connect the southern shore of the Mediterranean to Central Africa.

All North African countries are directly involved in the Belt & Road Initiative, even if only Egypt has been part of the project since its launch back in 2013. Their geographic position on the southern shore of the Mediterranean in an asset for investors in ports and logistic facilities in the framework of the maritime silk road. Following the "string of pearl" strategy for the maritime silk road, Chinese investors have planned to take control of a series of port infrastructures along the maritime route from southeast China to the Mediterranean through the Indian Ocean and Suez.

Complementarities between the Chinese strategy underlying the BRI project and North African countries are rather evident:

- Following the strengthening of commercial ties between China and Europe – which is among the main purposes of the BRI – the economies of the southern Mediterranean can play an active role within the supply and value chains that will be created.

- One of the priorities for Chinese authorities is to secure the energy needs of the country in the coming years, considering the expected sharp increase of China's energy consumption. As it will be pointed out further on in this chapter, China focuses its energy strategy on the Middle East, and specifically on Persian Gulf countries, while investments in North Africa are mainly directed to the RES project.

[14] https://www.srm-maritimeconomy.com/wp-content/uploads/2018/12/srm_alexbank_suez_2018.pdf

- North African countries greatly need improved infrastructures to fuel their economic development and solve the strong imbalances between coastal areas and inland regions: this is a strategic issue for countries like Tunisia and Egypt where the lack of financial resources can open the way for Chinese investors; China, for its part, can use its overcapacity in the domestic building sector for infrastructure projects in Northern Africa.

Its geographic position Marocco– between Europe and West Africa, the Mediterranean Basin and the Atlantic Ocean – is strategic. The port of Tangier Med can serve as a regional hub for both Western Europe and Western Africa. The trade agreements Morocco has signed with 55 countries, in particular with European countries and the US, represent another strong point of the Kingdom of which China can take advantage. Morocco is also the greatest investor in West Africa and the city of Casablanca has become the most important financial hub of the whole continent. As regards transport infrastructures, the port system of Tangier Med – which includes a free zone and a series of industrial parks and logistic facilities – can boast maritime connections with more than 170 ports and 70 countries worldwide.

Economic cooperation between China and Morocco has recently improved: in May 2016 a strategic partnership was signed with 15 agreements between the two countries; on 17th November 2017Morocco officially joined the BRI project. Following the II China-Africa Investment Forum that took place in Marrakesh in November 2017, Morocco and China signed a cooperation agreement for two economic projects: “Tangier Tech City” – aimed at building an environmentally friendly industrial city in the area of Tangier Med – and an electric transport system to be realized in Morocco by Chinese company “BYD Auto industry”.
Egypt is the biggest country in North Africa with a population of almost 100 million inhabitants, a figure higher than the rest of North African countries combined. The country lies in an enviable geographic position between the Mediterranean Basin, the Red Sea and the Middle East and, above all, it controls the Suez Canal, a strategic chokepoint between the Indian Ocean and the Mediterranean Sea. In the framework of the Egyptian strategic view “Vision 2030”, the Government proceeded in the direction of improving the business climate of the Country through a series of legislative interventions: in November 2016 Egypt decided to allow its currency (the Egyptian Pound) to float freely on the currency market; in June 2017 the new law of investment came into force; last April the Government announced plans to cut fuel and electricity subsides respectively by 19% and 48%.[15]

[15] https://www.srm-maritimeconomy.com/wp-content/uploads/2018/12/srm_alexbank_suez_2018.pdf

All these measures aim to attract foreign investors for infrastructural projects in the country. Chinese company China Harbor Engineering Company Ltd will cooperate with Egyptian companies in the construction of new logistic and industrial areas along the Suez Canal. On the occasion of the visit of President Xi Jingping to Egypt in January 2016 the two countries signed 21 partnership agreements with a total value of $15 billion. The Chinese company "China State Construction Engineering Corporation" will cooperate to the construction of the new administrative capital 45 km east of Cairo, a project valued at $45 billion.

In summary, following the Suez Canal enlargement, Egypt plans to take on the role of industrial and logistic platform for Chinese investments in the framework of the Belt & Road. A short list of Chinese investment in some MENA countries (excluding Morocco and Egypt) can be seen in the figure below.

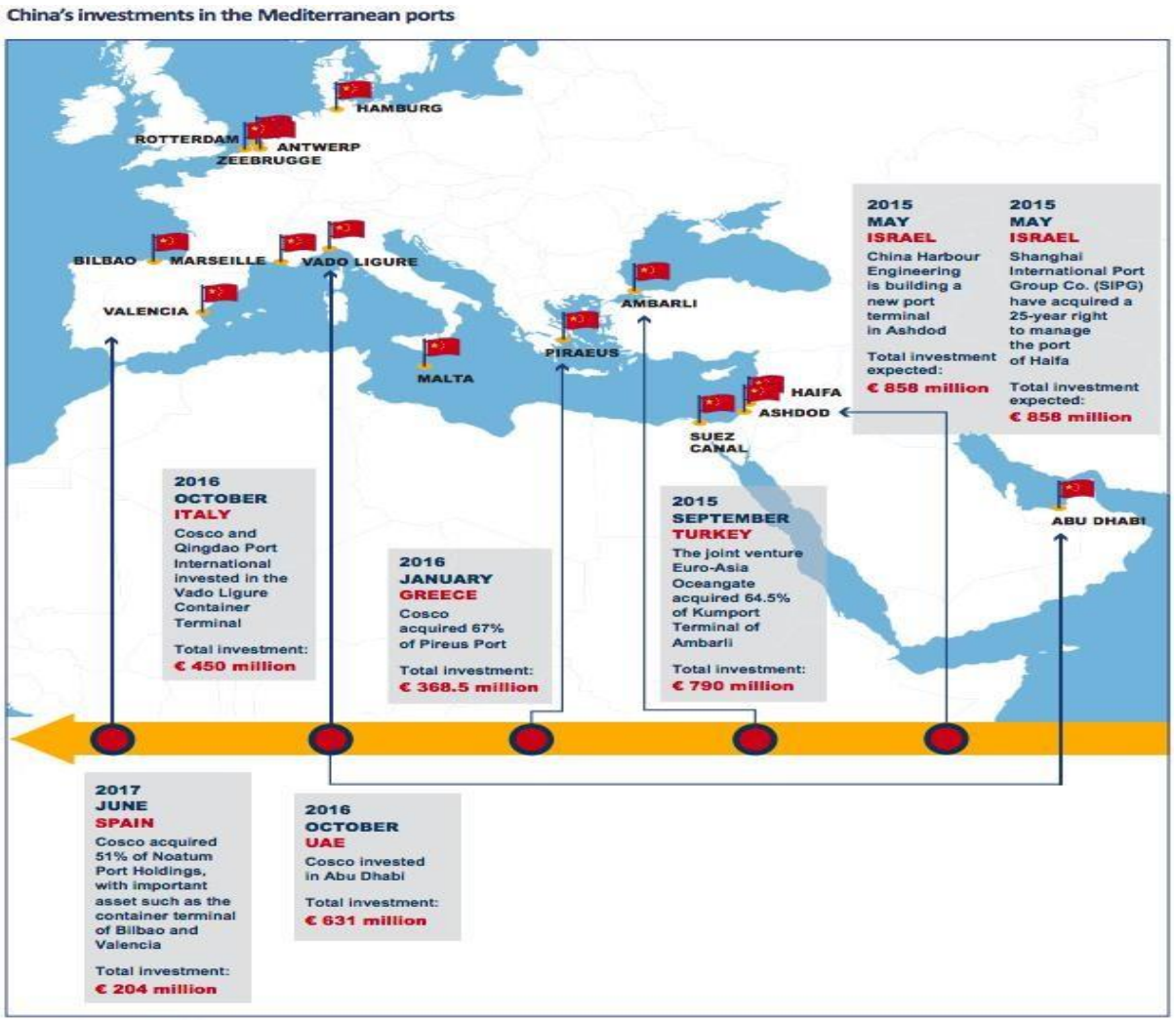

Figure 7 China's investment in Mediterranean Ports

Source: SRM[16]

[16] https://www.srm-maritimeconomy.com/wp-content/uploads/2018/12/srm_alexbank_suez_2018.pdf

4. Short Sea Shipping in Mediterranean Sea

Short Sea Shipping (SSS) has been defined by the European Commission (1999): 'the movement of cargo and passengers by sea between ports situated in geographical Europe or between those ports and ports situated in non-European countries having a coastline on the enclosed seas bordering Europe. Short Sea Shipping includes domestic and international maritime transport, including feeder services, along the coast and to and from the islands, rivers and lakes. The concept of Short Sea Shipping also extends to maritime transport between the Member States of the Union and Norway and Iceland and other States on the Baltic Sea, the Black Sea and the Mediterranean'.

The European Commission has also identified two main SSS regions in Europe: a first region which includes ports located in the North Sea and Baltic Sea; a second region includes the Mediterranean and Black Sea ports. To the first region belong all the main northern European ports, in particular those of the so called 'northern range': ports from Le Havre to Hamburg. The second region instead includes Mediterranean and black Sea ports.

In Europe, according to the goals set by the European Commission, SSS should constitute an alternative to road transport, either as part of an intermodal transport chain or as a fully substitutable mode, depending on the type of corridor. Problems such as congestion, pollution, and other environmental aspects have encouraged the development of emission reduction transport policies.

Motorways of the Sea – the maritime dimension of the Trans-European Transport Network[17]

The Motorways of the Sea represent the waterborne dimension of the TEN-T network. Its programme is funded by the Connecting Europe Facility (CEF). In other words, funding allocated to projects under the Motorways of the Sea funding programme support maritime industry stakeholders (ports, ship and logistics operators, maritime suppliers and service providers, and public administrations) in implementing projects that seek to develop maritime transport and maintain a viable EU maritime sector. This includes projects looking at improving connectivity between core and comprehensive ports of the TEN-T network and land-based core network corridors, optimising cargo flows, and improving the environmental performance of the sector. Through these projects, MoS also seeks to support projects bridging access to the various European sea basins.

The legal basis for the MoS funding programme is contained in Article 21 of the TEN-T Regulation (EU) 1315/2013, where it is established that MoS, inter alia:[18]

[17] https://www.onthemosway.eu/wp-content/themes/%23onthemosway/img/MoS-DIP-FINAL.pdf

[18] https://www.onthemosway.eu/wp-content/themes/%23onthemosway/img/MoS-DIP-FINAL.pdf

(1) shall contribute towards the achievement of a European maritime transport space without barriers. They shall consist of short-sea shipping routes, ports, associated maritime infrastructure and equipment, and facilities as well as simplified administrative formalities enabling short-sea shipping or sea-river services to operate between at least two ports, including hinterland connections (...),(3) Projects of common interest (...) may also include activities that have wider benefits and are not linked to specific ports, such as services and actions to support the mobility of persons and goods, activities for improving environmental performance (...). Under the current TEN-T Regulation, two main types of projects can receive funding under Motorways of the Sea:

- projects to support new or upgraded maritime links, i.e. a serviced route between two core ports or between one core and one comprehensive ports;
- projects with wider benefits, i.e. projects and studies not linked to a specific maritime link that benefit the wider maritime community.

The TEN-T Regulation is coming up for revision in 2020/2021 which may lead to a change in certain definitions and concepts, however, for now, the above articles are still valid. In order to assess the characteristics of MoS activities, this DIP looks at the structure of each region according to a sea basin approach, allowing for a more detailed prioritisation of issues according to common challenges and opportunities. Furthermore, it should be noted that this DIP has a clear focus on the movement of freight given the importance of freight for the TEN-T network in terms of traffic flows, and the associated investments needed to improve such flows (intermodal terminals, rail/IWW infrastructure, etc.).[19]

In 2018, the 335 ports of the TEN-T core and comprehensive networks handled 3.8 billion tonnes of cargo .Almost three quarters of this volume were handled in the 84 core network corridor (CNC) ports.[20]

[19] https://www.onthemosway.eu/wp-content/themes/%23onthemosway/img/MoS-DIP-FINAL.pdf

[20] https://www.onthemosway.eu/wp-content/themes/%23onthemosway/img/MoS-DIP-FINAL.pdf

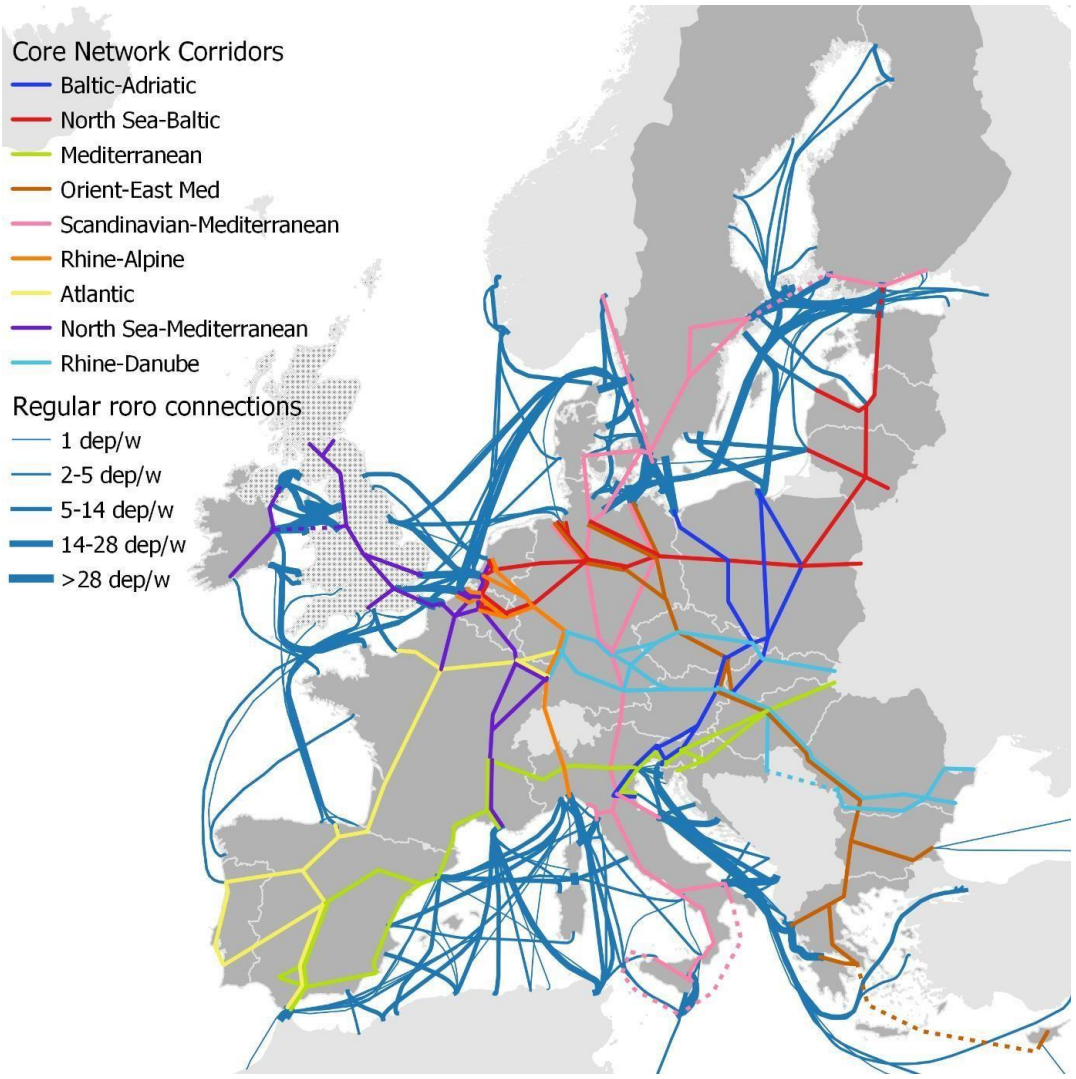

Figure 8 European Core Network Corridors and ro-ro shipping routes, Source: MoS study consortium,

source: On the motorways of the sea[21]

Six major sea basins can be distinguished in Europe: the Baltic Sea, the North Sea, the Atlantic, the Western and the Eastern Mediterranean, and the Black Sea. These sea basins are all characterised by a more intensive exchange within than between basins, though they are, of course, interconnected among each other. In addition, there are maritime ports in the EU's outermost regions (e.g. Azores, Madeira, the Canary Islands, Guadeloupe, Martinique, Reunion Island and French Guiana). Out of the total 3.8 billion tonnes handled in 2018, almost two thirds were related to short sea traffic. Short sea shipping (including feeder traffic) had a particularly high share in the Baltic Sea, the Eastern Mediterranean and the Black Sea.The largest volume of cargo is handled in the North Sea basin. Its 20 CNC ports handle 1.4 billion tonnes per year, equal to more than one third of the total EU maritime traffic. It is followed by the Western Mediterranean (around 500 million

[21] https://www.onthemosway.eu/wp-content/themes/%23onthemosway/img/MoS-DIP-FINAL.pdf

tonnes) and the Baltic Sea (around 350 million tonnes). The Atlantic basin has the largest volume handled in core ports which are not part of the core network corridors. Taken together, all Atlantic core ports actually handled around 360 million tonnes.

	Total cargo volume handled (mln tonnes)				*of which short sea*	
sea basin	CNC ports	other core ports	comprehensive ports	Total	*million tonnes*	*share of total*
Baltic Sea	355	16	183	554	*470*	*(85%)*
North Sea	1.386	89	118	1.593	*912*	*(57%)*
of which UK	*167*	*89*	*58*	*314*	*232*	*(74%)*
Atlantic	213	154	109	477	*287*	*(60%)*
of which UK	*61*	*44*	*41*	*146*	*106*	*(72%)*
Western Mediterranean	522	45	144	712	*477*	*(67%)*
Eastern Mediterranean	249	0	55	305	*225*	*(74%)*
Black Sea	58	0	12	69	*51*	*(74%)*
Outermost regions	0	29	14	43	*26*	*(61%)*
Total EU maritime ports	3.011	466	735	4.213	*2.786*	*(58%)*
of which short sea	*1.734*	*216*	*500*	*2.449*		
	(58%)	*(46%)*	*(68%)*	*(58%)*		

Note: UK ports are no longer part of the TEN-T network after the UK left the EU. The presented figures are for 2018, hence still including the UK.

Table 2 Maritime cargo traffic by major sea basins, 2018,

Source: ISL based on Eurostat, 2019[22]

The Eastern Mediterranean (around 250 million tonnes) and the Black Sea (around 60 million tonnes) are the regions with the smallest absolute volumes, but they have also been the fastest-growing basins with 3.4% and 3.1% average annual growth between 2010 and 2018, respectively. During the same period, the EU average was 1.9%.

4.1 Structure of maritime traffic in Western Mediterranean Sea

Five core network corridors start/end in the Western Mediterranean basin. Four corridors (from East to West: Atlantic, North Sea-Mediterranean, Rhine-Alpine, and ScandinavianMediterranean) are North-South corridors linking the different ports of the Western Mediterranean with the European hinterland. The Mediterranean CNC is an exemption: it stretches from the Strait of Gibraltar along the Mediterranean coast to North Italy and on through Slovenia, Croatia and Hungary to the Ukraine.

[22] https://www.onthemosway.eu/wp-content/themes/%23onthemosway/img/MoS-DIP-FINAL.pdf

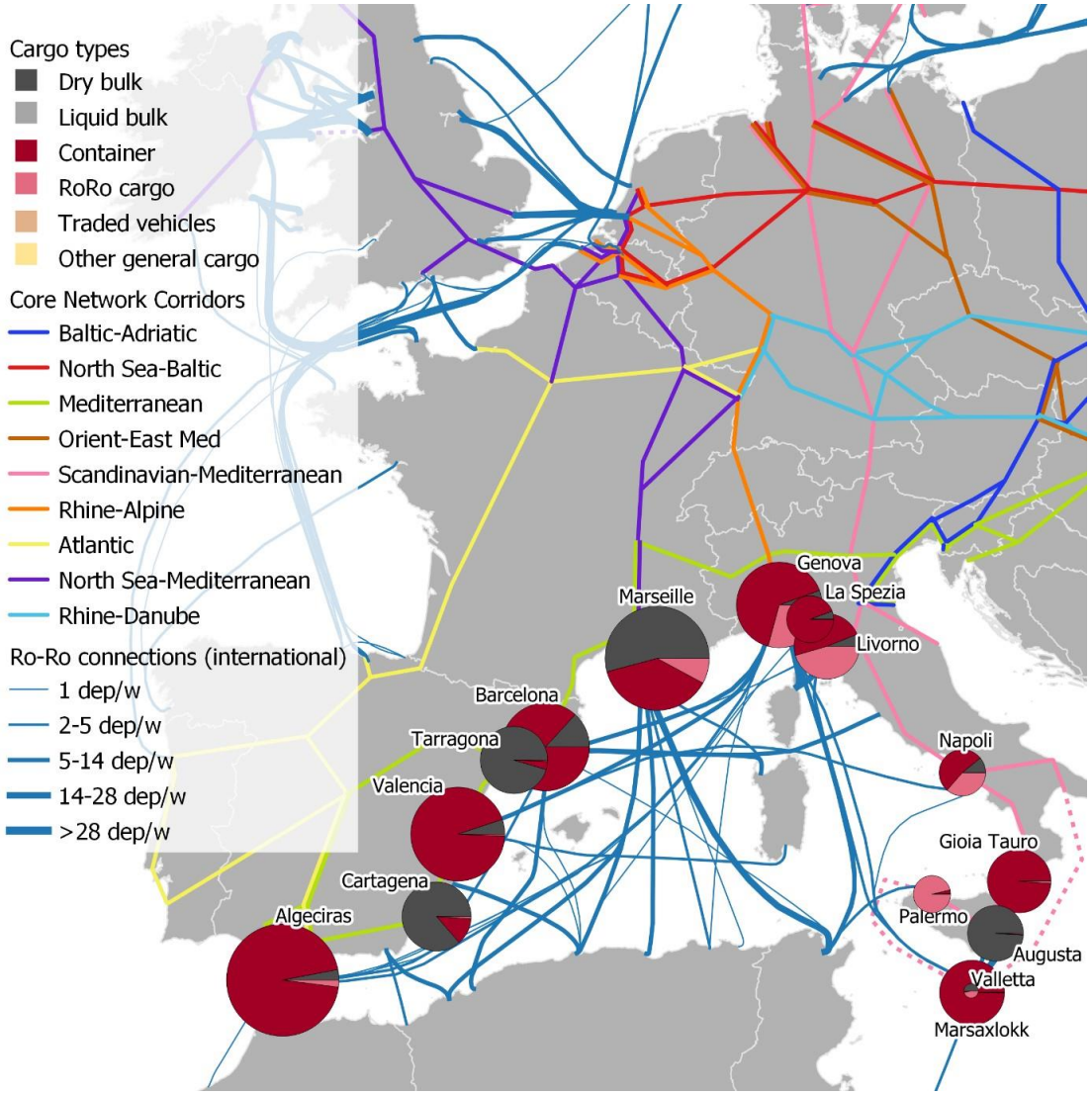

Figure 9 Core Network Corridor ports and regular ro-ro services in the Western Mediterranean,

2018, Source: ISL, 2019[23]

The various Ro-Ro connections in the Western Mediterranean CNC ports prolong the NorthSouth corridors to North Africa. There is hence an extensive exchange between the corridors and Motorways of the Sea. The port of Algeciras provides the shortest sea distance and high-frequency services to/from Morocco. Valencia, Barcelona, Marseille and Genoa provide numerous long-distance services to Morocco, Algeria and Tunisia. Malta – the southernmost tip of the Scandinavian-Mediterranean Corridor – is connected to the continent via Italian ports. In addition, there are East-West connections between Italy and Spain, a direct alternative to land-based transport.

[23] https://www.onthemosway.eu/wp-content/themes/%23onthemosway/img/MoS-DIP-FINAL.pdf

There are fifteen CNC ports in the Western Mediterranean handling more than 500 million tonnes per year – the second-largest volume after the North Sea. There are five ports handling more than 50 million tonnes: Algeciras, Marseille, Valencia, Barcelona, and Genoa.

	Share of cargo segment in %						
country/port	dry bulk	liquid bulk	container	ro-ro	other general cargo	million tonnes	av. annual growth 2008-2018
Spain							
Algeciras	2%	36%	57%	1%	4%	88,6	4,0%
Cartagena	20%	77%	3%	0%	1%	33,5	2,8%
Valencia	4%	3%	76%	0%	16%	62,0	2,1%
Tarragona	31%	59%	1%	0%	8%	31,8	-0,3%
Barcelona	8%	28%	51%	0%	13%	54,5	2,8%
France							
Marseille	20%	60%	14%	3%	4%	75,7	-2,0%
Italy							
Genoa	4%	34%	42%	20%	0%	51,6	1,0%
La Spezia	5%	7%	88%	0%	0%	16,0	-0,6%
Livorno	4%	24%	35%	32%	4%	30,4	0,6%
Napoli	7%	35%	33%	24%	0%	15,5	5,5%
Gioia Tauro	0%	3%	93%	1%	2%	28,5	-1,0%
Palermo/Termini Imerese	1%	18%	2%	77%	3%	9,7	5,0%
Augusta	4%	93%	0%	0%	2%	21,4	-2,2%
Malta							
Valletta	39%	9%	2%	36%	14%	1,4	-4,2%
Marsaxlokk	0%	3%	97%	0%	0%	29,7	3,6%
Total West Med. CNC ports	9%	37%	42%	7%	6%	550,4	1,1%

Table 3 Maritime cargo traffic of CNC ports in the Western Mediterranean by cargo type, 2018,

Source: ISL based on Eurostat, 2019[24]

The share of container traffic is higher than in any other port range, reaching 42% on average in the basin. This is partly due to the large transhipment hubs (Algeciras, Gioia Tauro and Valencia), but also due to a high share of containers in regional hinterland traffic. The share of dry bulk, by contrast, is the lowest of all European basins.

4.2 Structure of maritime traffic in Eastern Mediterranean and Black Sea

The Eastern Mediterranean ports hosts five different core network corridors, three of which concern ports in the Adriatic Sea: Scandinavian-Mediterranean, Baltic-Adriatic and Mediterranean. The Adriatic has a dense network of ro-ro services, connecting the East coast of Italy with Croatia and with neighbouring Montenegro and Albania. In addition, there are various services connecting the Adriatic

[24] https://www.onthemosway.eu/wp-content/themes/%23onthemosway/img/MoS-DIP-FINAL.pdf

CNC ports with Greece and onwards to Turkey. For cargo coming from Western Europe, they provide an alternative to the landbased Orient-East Med Corridor for cargo to Greece.

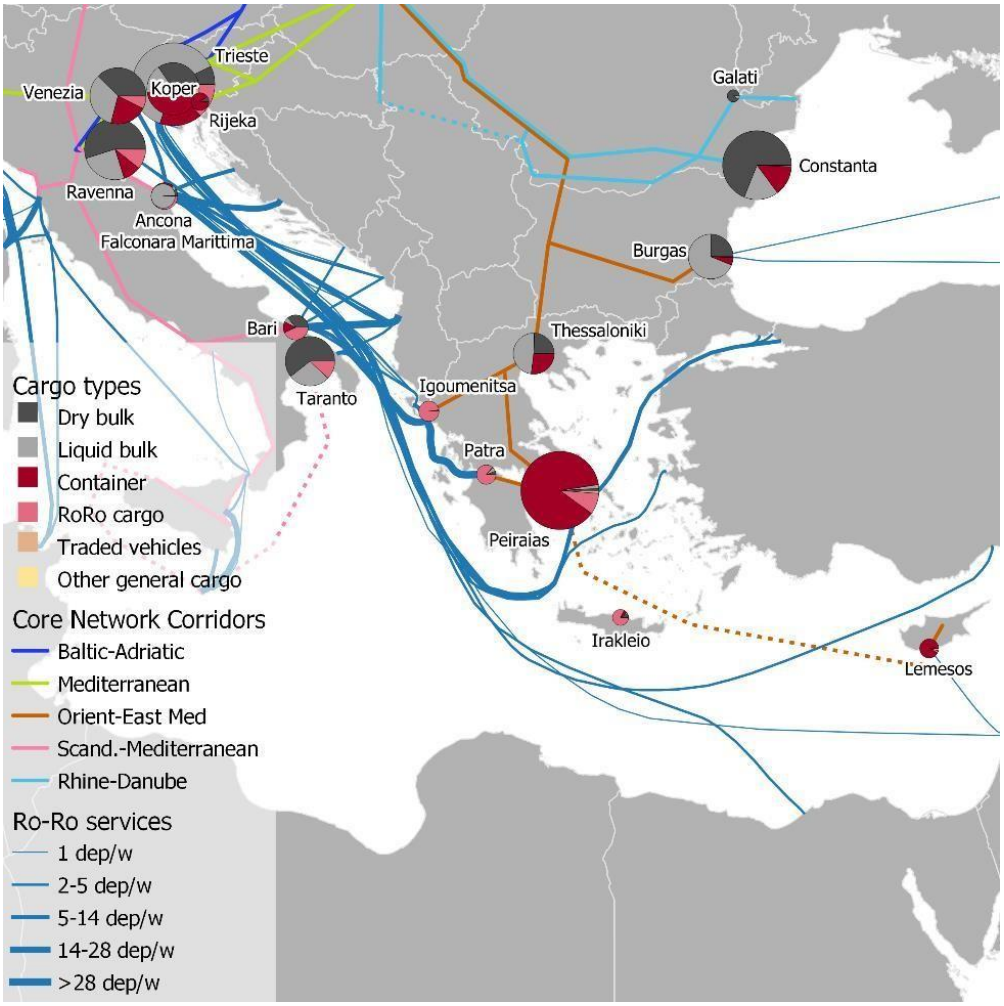

Figure 10 Core Network Corridor ports and regular ro-ro services in the Eastern Mediterranean and Black Sea, 2018, Source: ISL, 2019[25]

[25] https://www.onthemosway.eu/wp-content/themes/%23onthemosway/img/MoS-DIP-FINAL.pdf

The Orient-East Med Corridor itself connects Central Europe with Greece and on to Cyprus(connected to the EU with container services, among others to/from Piraeus andThessaloniki). Finally, the Rhine-Danube Corridor links the Romanian ports of Constanta and Galati with Central and Western Europe. The Danube is already intensively used forbulk transport while container transport only plays a minor role. The seventeen ports of the basin handled roughly 300 million tonnes in 2018 – less thanthe port of Rotterdam alone. There are nine ports with an annual maritime traffic of morethan ten million tonnes, the largest ones being Trieste, Piraeus and Constanta (see Table4). Almost half of the basin's traffic is handled in the Northern Adriatic ports.[26]

With regard to cargo types, the region stands out with a comparatively high share of dry bulk. The port of Constanta is the largest player in this segment with around 25 milliontonnes handled in 2018. Ro-Ro traffic is also slightly above average, Trieste and Piraeusbeing the major players and another eleven ports handling ro-ro traffic in the basin.

	Share of cargo segment in %						
country/port	dry bulk	liquid bulk	container	ro-ro	other general cargo	million tonnes	av. annual growth 2008-2018
Croatia							
Rijeka	9%	0%	76%	0%	15%	2,7	-0,3%
Slovenia							
Koper	32%	16%	40%	0%	11%	23,1	3,4%
Italy							
Trieste	6%	56%	15%	12%	9%	57,5	4,5%
Venezia	35%	31%	20%	7%	7%	26,3	-1,3%
Ravenna	51%	23%	9%	10%	8%	31,1	0,3%
Ancona/Falconara Marittima	8%	5%	28%	52%	7%	5,9	1,1%
Bari	31%	6%	12%	37%	15%	5,3	7,8%
Taranto	58%	26%	0%	12%	4%	20,3	-8,5%
Greece							
Igoumenitsa	2%	0%	0%	98%	0%	3,6	0,0%
Patras	6%	7%	1%	85%	1%	3,3	-2,0%
Piraeus	1%	2%	88%	9%	1%	50,9	19,2%
Heraklion	8%	2%	7%	81%	1%	2,2	-5,1%
Thessaloniki	24%	47%	26%	0%	4%	14,0	-1,0%
Cyprus							
Limassol	0%	0%	79%	4%	17%	3,0	-1,8%
Bulgaria							
Burgas	22%	61%	5%	0%	12%	16,7	0,4%
Romania							
Constanța	64%	15%	13%	0%	7%	39,5	-1,5%
Galați	66%	7%	0%	0%	28%	1,3	-2,5%
Total East Med/Black Sea CNC ports	28%	26%	28%	11%	7%	306,8	1,0%

Table 4 Maritime cargo traffic of CNC ports in the Eastern Mediterranean and Black Sea by cargo type, 2018, Source: ISL based on Eurostat, 2019[27]

[26] https://www.onthemosway.eu/wp-content/themes/%23onthemosway/img/MoS-DIP-FINAL.pdf

[27] https://www.onthemosway.eu/wp-content/themes/%23onthemosway/img/MoS-DIP-FINAL.pdf

The competition in ShortSea Shipping issues (SSS) have arisen with respect to the unbalanced modal split in the freight transport market, where road transport absorbs around half of the total market. The main goal is that by 2030 at least 30% of what is currently carried as road freight traffic over a distance of 300+ km will be shifted to other modes, such as rail or SSS and that this figure will be 50% by 2050. The total gross weight of goods transported as part of EU short sea shipping is estimated at almost[28]

1.8 billion tonnes of goods in 2018, an increase of 4.4 % from the previous year. The overall increase in short sea shipping recorded by the main EU ports consolidated the gradual recovery seen in EU short sea shipping following the economic downturn in Europe in **2009** and reached a new high in **2018.** Short sea shipping made up close to 59 % of the total sea transport of goods to and from the main EU ports in 2018, about the same as compared to 2017. However, the share of short sea shipping in total sea transport varies considerably between the reporting countries. The predominance of short sea shipping of goods over deep sea shipping was particularly pronounced in Finland, Malta, Cyprus, Denmark, Sweden, Ireland, Bulgaria, Italy, Latvia, Estonia, Greece, Poland, Romania, Lithuania , as well as in the United Kingdom, the EFTA country Norway and the in the candidate countries Montenegro and Turkey, all with short sea shipping shares of 70 % or more in their main ports.[29]

4.3 Short sea shipping by sea region and country

Italy was the major short sea shipping country in the EU in 2018, overtaking the Netherlands, with a share of almost 15 % of the total tonnages of EU short sea shipping in 2017 (313 million tones). The Netherlands followed with 294 million tonnes and then Spain with 213 million tonnes of short shipped goods recorded in their main ports (Figure 11).

[28] https://www.onthemosway.eu/wp-content/themes/%23onthemosway/img/MoS-DIP-FINAL.pdf

[29] https://www.onthemosway.eu/wp-content/themes/%23onthemosway/img/MoS-DIP-FINAL.pdf

Co-funded by the Horizon 2020 programme
of the European Union

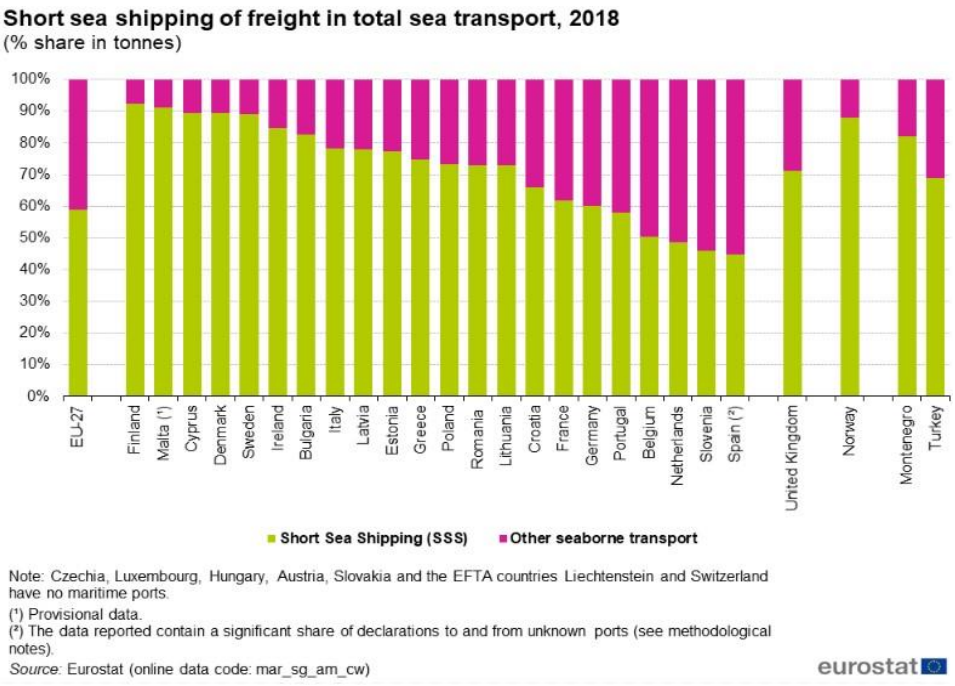

Figure 11 Sort sea shipping for 2018

Poland recorded the largest relative increase in short sea shipping between 2017 and 2018 (+19.5 %), followed by Lithuania (+15.9 %), Greece and Romania (both +11.1 %), Italy (+10.4 %) and Finland (+10.1 %). By contrast, Cyprus recorded the largest relative fall in short sea shipping of goods (-25.3 %), followed by Malta (-18.0 %) and Slovenia (-9.1 %).

The short sea shipping of goods between main EU ports and ports located in the Mediterranean Sea came to more than 601 million tonnes in 2018. This amounted to 31 % of the total EU short sea shipping tonnages for all sea regions in 2018. The Mediterranean Sea was followed by the North Sea and the Baltic Sea, with shares of 23 % and 21 % of the total EU short shipping tonnages, respectively (see below Figure).

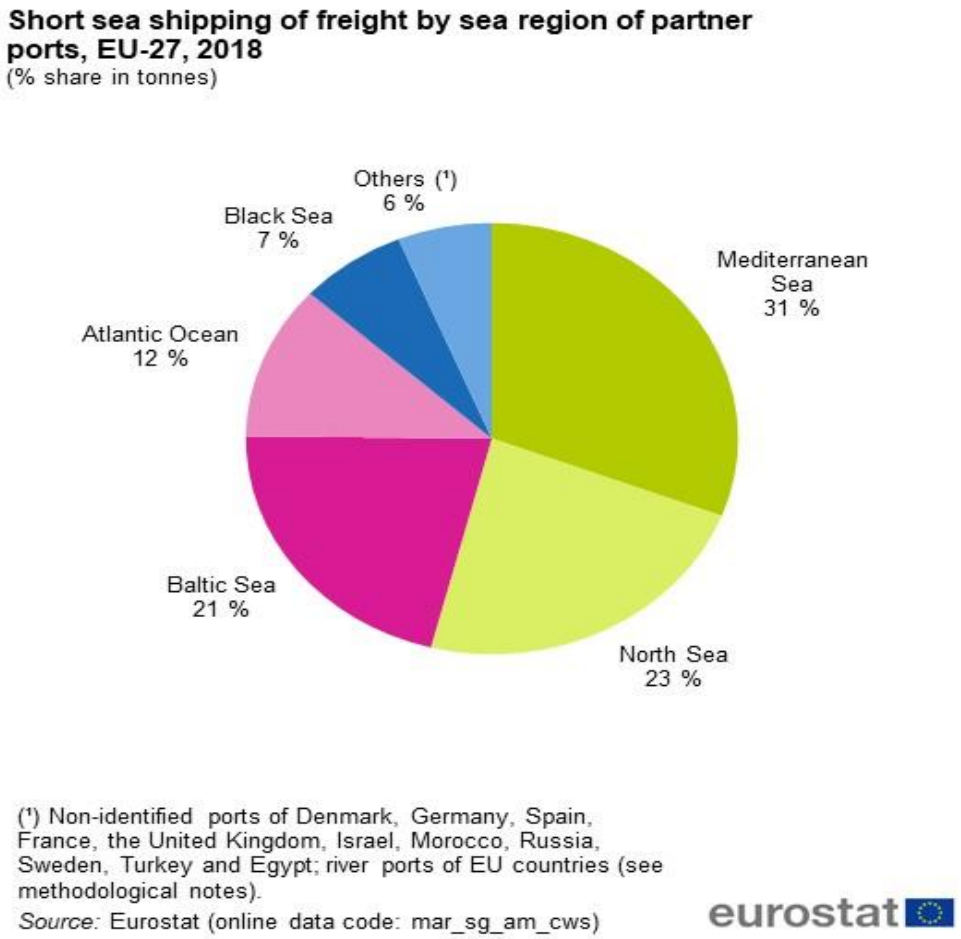

Figure 12 Shrotsea shipping for Europe in 2018

Source: Maritime transport statistics - short sea shipping of goods[30]

[30] https://ec.europa.eu/eurostat/statistics-explained/pdfscache/9639.pdf

4.4 Short Sea Shipping by Type of Cargo

As in previous years, liquid bulk remained the dominant type of cargo in EU short sea shipping. At 734 million tonnes, liquid bulk accounted for 41 % of the total short sea shipping of goods to and from main EU ports in 2018. Liquid bulk was followed by dry bulk at 374 million tonnes (21 %), containers at 288 million tonnes (16 %) and roll on - roll off (Ro-Ro) units at 249 million tonnes (14 %).

For liquid bulk, the Netherlands had the largest volume of short sea shipping in 2018 (153 million tonnes), followed by Italy (130 million tonnes). Netherlands also led the EU rankings for short sea shipping of dry bulk goods (53 million tonnes). Italy was the main country in terms of short sea shipping of goods in containers (60 million tonnes) and on Ro-Ro units (62 million tonnes) (Figure13).

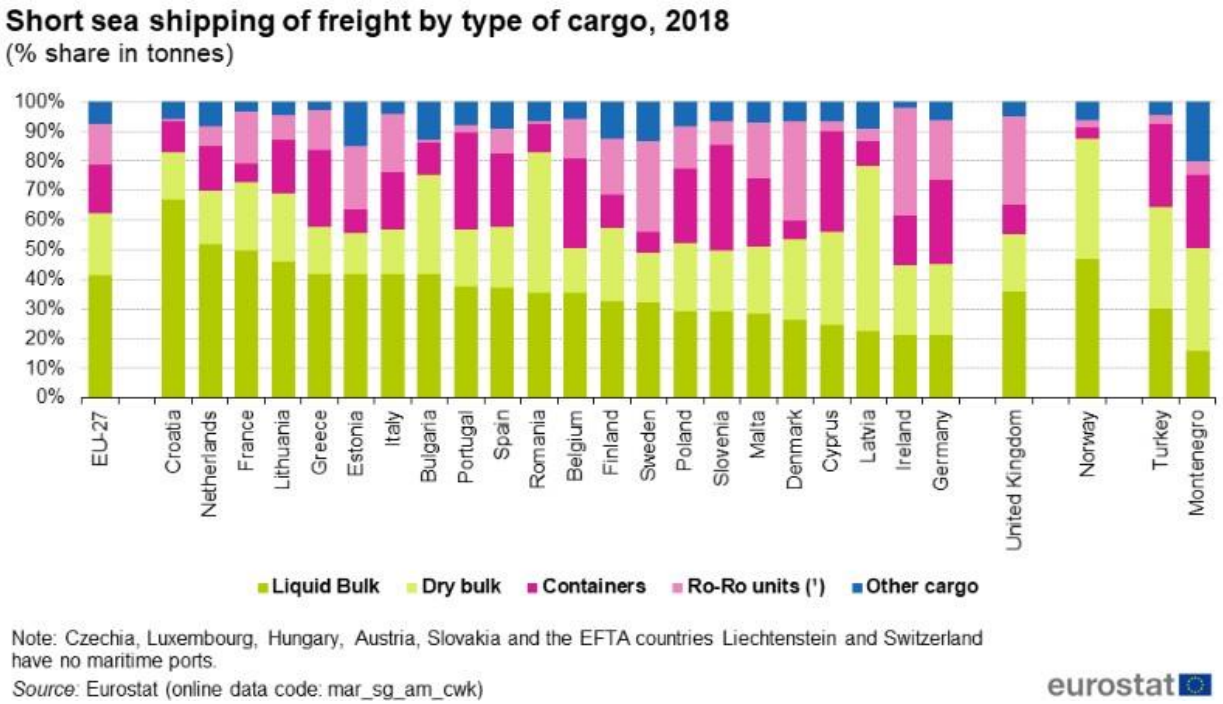

Figure 13 Shortsea shipping for freight type in 2018

Source: Maritime transport statistics - short sea shipping of goods [31]

Short sea shipping of liquid bulk goods was dominant in all sea regions in 2018, even though the composition of the short sea shipping cargo varies among the sea regions. While liquid bulk goods accounted for more than 55 % of total short sea shipping of goods in the Black Sea, the comparable figure for the Atlantic Ocean was almost one third of the total. By contrast, the share of dry bulk goods in the short sea shipping of each sea region is more evenly distributed, with a range from 17 % in the Mediterranean Sea to 34 % in the Black Sea (Figure 14).

[31] https://ec.europa.eu/eurostat/statistics-explained/pdfscache/9639.pdf

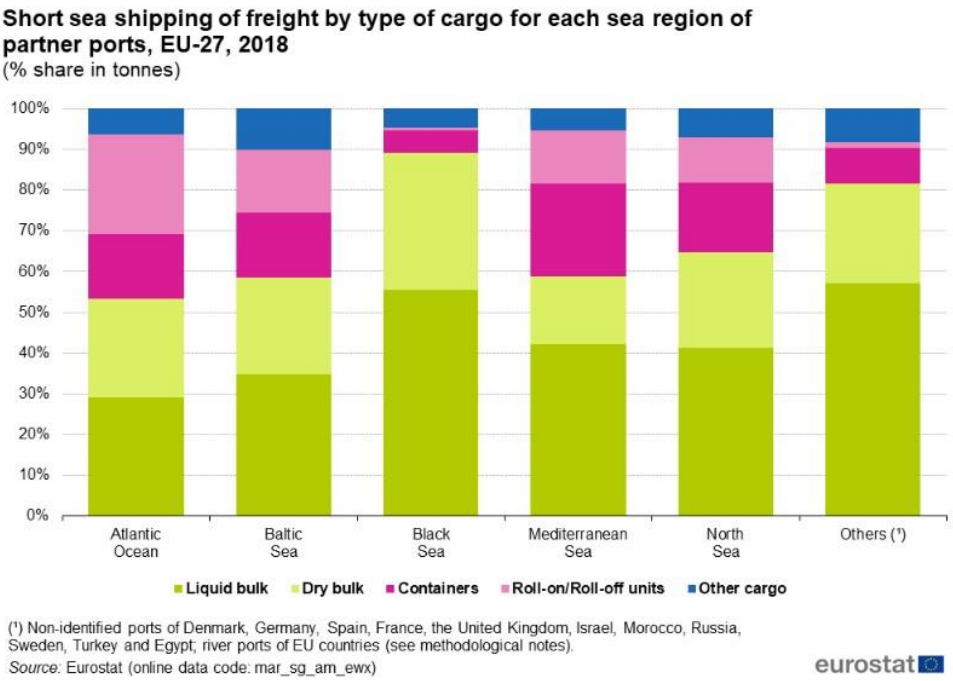

Figure 14 Shortsea shipping of freight by type of cargo for each sea region in EU

Source: Maritime transport statistics - short sea shipping of goods [32]

4.5 Top EU Ports in Short Sea Shipping

The top 20 ports accounted for more than 40 % of the total short sea shipped goods handled in the main EU ports in 2018. Rotterdam remained the largest EU port for short sea shipping, handling a total of 207 million tonnes of short sea shipped goods in 2018. Among the other top three ports, Antwerpen handled 97 million tonnes of short shipped goods in 2018 and Hamburg handled 50 million tonnes (Table below)

[32] https://ec.europa.eu/eurostat/statistics-explained/pdfscache/9639.pdf

Co-funded by the Horizon 2020 programme of the European Union

Top 20 short sea shipping EU-27 ports, 2018

Rank 2018	Ports	*	Total SSS (million tonnes)	Change 2018/2017 (%)	Share of EU-27 SSS (%)	Other seaborne transport (million tonnes)
1	Rotterdam (NL)	=	206.8	+2.6	9.1	234.7
2	Antwerpen (BE)	=	96.8	+6.4	4.2	115.2
3	Hamburg (DE)	=	50.0	+1.3	2.2	67.6
4	Marseille (FR)	+1	47.9	+2.5	2.1	27.7
5	Amsterdam (NL)	-1	46.0	-2.8	2.0	53.5
6	Trieste (IT)	=	44.6	-2.8	2.0	12.8
7	Genova (IT)	=	43.9	+7.0	1.9	7.6
8	Algeciras (ES)	=	43.1	+5.9	1.9	45.6
9	Goteborg (SE)	=	35.0	-2.3	1.5	5.6
10	Piraeus (EL)	+1	33.0	+12.4	1.4	17.9
11	Gdansk (PL)	+7	30.8	+30.1	1.4	11.6
12	Valencia (ES)	+2	30.3	+10.5	1.3	31.7
13	Le Havre (FR)	-3	29.8	-9.4	1.3	35.1
14	Klaipeda (LT)	+2	28.5	+12.7	1.2	14.3
15	Riga (LV)	-2	28.3	+2.9	1.2	6.1
16	Constanta (RO)	-1	26.7	+5.3	1.2	12.8
17	Livorno (IT)	-5	25.8	-6.3	1.1	4.4
18	Dublin (IE)	-1	25.8	+6.0	1.1	0.6
19	Ravenna (IT)	+1	25.3	+8.3	1.1	5.9
20	Gioia Tauro (IT)	+14	25.2	+34.1	1.1	3.1
Total top 20			**923.9**	**+3.8**	**40.4**	**713.7**
Total handled in main EU-27 ports (')			**2 284.9**	**+3.8**	**100.0**	**1 235.6**

Note: (*) column indicates number of positions lost or gained compared to 2017.
(') The sum of inward and outward movements of short sea shipping in main EU-27 ports (no elimination of double counting between ports), except for transport movements within the same statistical port (only inward movements used, see methodological notes).
Source: Eurostat (online data code: mar_sg_am_pw)

Table 5 Top 20 Shortsea Shipping Ports In EU

Source: Maritime transport statistics - short sea shipping of goods [33]

[33] https://ec.europa.eu/eurostat/statistics-explained/pdfscache/9639.pdf

4.6 Horizon of Short Sea Shipping in Mediterranean

Egyptian-Greek relations

The two states cooperate in the fields of trade, maritime, energy, culture and tourism, with Greece being the 4th largest European investor in Egypt, with over 208 Greek companies being active in the Egyptian market, while Egypt is Greece's 6th biggest trading partner .Being a land bridge over the vital transport corridors of Europe, Asia and Africa, Egypt and Greece get more involved in short sea shipping strategically. • Consequently it is a must to determine the short sea shipping area for both countries because of the liner services and logistics chain. This might define the market conditions that will have more importance in the following years.[34]

Egypt with its strategic position has a natural area for successful short "sea shipping services" within or between Mediterranean sea ports, located in both European and African countries, and between these ports and the other ports located in third countries. Gateway to Asia/Africa through the Mediterranean and Red Sea. According to the Global Competitiveness Report Middle East and North Africa improves its average performance this year. Across the region, the most-improved country this year is Egypt (101st, up 14). Coupled with The World Bank's projections 2018 growth in Egypt is projected to rise to 5.2 percent in 2018 and 5.5 percent in 2019 reflecting stronger momentum in domestic demand and the effect of structural reforms.[35]

Figure 15 Egypt with its strategic for successful shortsea shipping services

Source: Maritime transport statistics - short sea shipping of goods [36]

[34] https://ec.europa.eu/eurostat/statistics-explained/pdfscache/9639.pdf

[35] https://ec.europa.eu/eurostat/statistics-explained/pdfscache/9639.pdf
[36] https://ec.europa.eu/eurostat/statistics-explained/pdfscache/9639.pdf

Greece has the largest controlled fleet within Europe (36% of GT and/or 43% of DWT). Piraeus port is within the top 20 ports Share of Short Sea Shipping (SSS) in total maritime transport for EU. Gateway to Asia/Russia through the Black Sea; Central hub for access to Eastern Europe and strategic proximity to Northern Africa and Middle Eastern routes.

Figure 16 Sortsea Routes In Med Region

Source: Maritime transport statistics - short sea shipping of goods [37]

Short Sea Shipping in the Cyprus Context

Cyprus is an EU member and an island in the Eastern Mediterranean Sea, with an important role to play in improving the efficiency and sustainability of SSS in its vicinity. In particular, more than 90% of its seaborne transport is currently SSS. As an accredited transshipment hub, Limassol could be a focal point for large shipments from other countries. Cargoes could be consolidated and sent to Cyprus, from where they could be efficiently distributed to various nearby ports, such as those in Egypt, and other countries in the Middle East, using smaller vessels and SSS operations.

Cyprus in the International Maritime Sector Cyprus, established as an international shipping center about 55 years ago, has managed to attract shipping companies due to its excellent maritime infrastructure, and a high level of expertise, particularly in the fields of surveying, ship-brokering, and

[37] https://ec.europa.eu/eurostat/statistics-explained/pdfscache/9639.pdf

maritime insurance. Today, the Cyprus Registry is classified as the 22nd largest merchant fleet globally and the 3rd largest fleet in the EU, with approximately 900 ocean going vessels of a gross tonnage exceeding 49 million tons. It is estimated that approximately 4% of the world's fleet and around 20% of global third-party ship management activities are controlled from Cyprus. For companies established in Cyprus, around 87% are controlled by Cypriot and EU interests. The island's ports have developed purpose-built container terminals and Cyprus is one of the first countries of the Eastern Mediterranean to use specialized gantry cranes.

Moreover, the island is now considered one of the most important cruise centers and transportation hubs in the region. The Cypriot Government's vision is to develop initiatives that will further expand Cyprus's role as a communication bridge between the EU and the countries of Middle East, such as Egypt, Jordan, Lebanon. In addition, the interest of major shipping organizations in using hub ports in the region has increased the need for upgrading the physical and digital infrastructure for providing more cost-efficient services.

The geographical location of Cyprus encourages the use of its ports as transshipment hubs for SSS (see Figure 17). Another favouring factor is also the political stability of Cyprus relative to several countries in the region. Cyprus is expected to become a shipping knowledge center, both exchanging information with steaming ships in the Eastern Mediterranean region for optimizing their routes and avoiding possible hazards, and with other ports in the region to enhance the planning horizon among the stakeholders within the port.

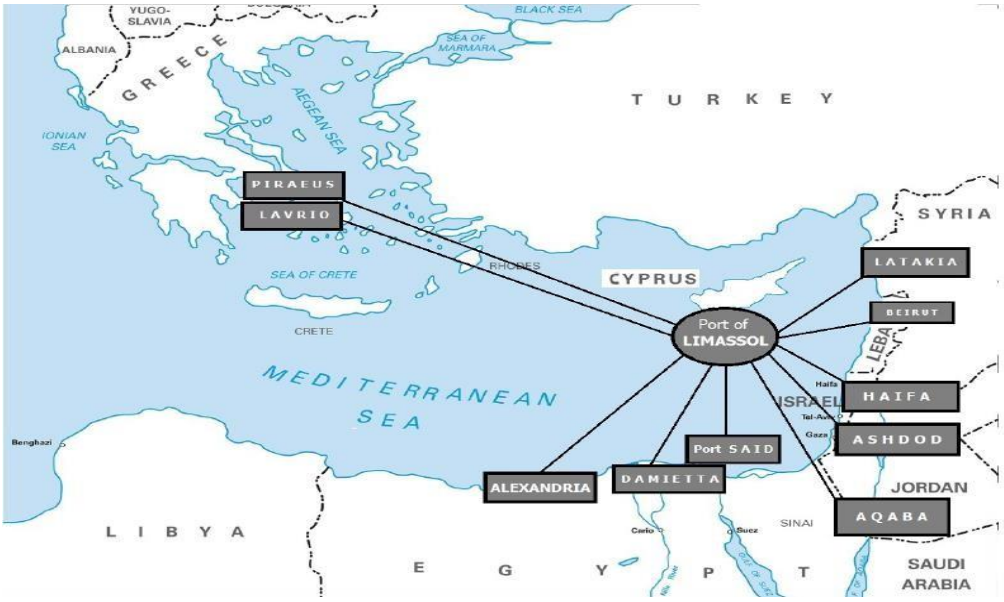

Figure 17 Limassol EU Port in the Eastern Mediterranean,

Source: Maritime transport statistics - short sea shipping of goods [38]

[38] https://ec.europa.eu/eurostat/statistics-explained/pdfscache/9639.pdf

To be a successful transhipment hub, a port should be able to plan its operations precisely and ensure that relevant data are available to visiting ships as well as to neighbouring ports. This is particularly important for Cyprus as the distances between Limassol and its neighbouring ports are quite small. Figure 18 shows the traffic patterns between Cyprus and the countries in the Eastern Mediterranean for the years 2017–2018.

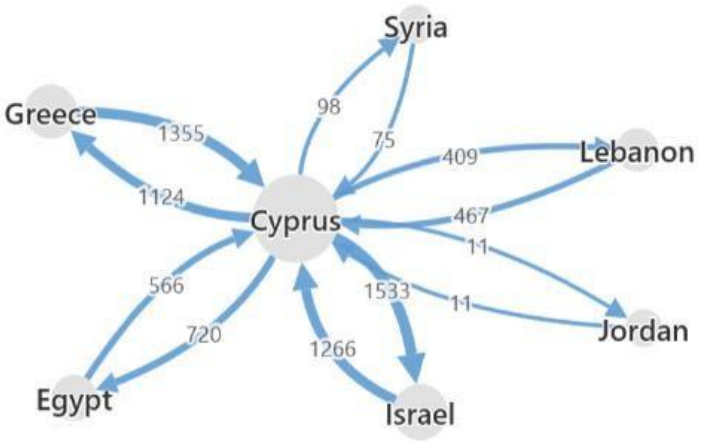

Figure 18 Traffic to the Port of Limassol from various countries in the Eastern Mediterranean and vice versa,

Source: Maritime transport statistics - short sea shipping of goods [39]

Port of Limassol has over the last three and a half years, based on its participation in the PortCDM testbeds within the Sea Traffic Management (STM) Validation project, developed a maturity in data sharing. This journey will continue by enhancing port call operations with PortCDM capabilities, as an important milestone in enabling SSS. The PortCDM platform enables real-time situational awareness to all participants involved in the port's maritime activities for the purpose of increasing operational efficiency within and around the port.

The scope of this work extends from coordinating port call operations within the port to collaborative decision making across ports. New services for port-to-port collaboration will also be explored and developed. Port-2-Port (P2P) communication is a lubricant of Short Sea Shipping . Such functionality is of particular importance to the various operators at Limassol. Importantly, since January 2017, following privatization, operations at the Port of Limassol are handled by three private operators: DP World (general cargo and cruise terminal), Eurogate (container terminal) and P&O Maritime (pilotage, towage, and mooring services). The main problem currently identified by all operators is the inability of ships and shipping agents to provide accurate estimates of a ship's intended arrival (ETA).

According to Constantinos Aristidou, the berth planner of P&O Maritime: "Normally the shipping agents announce the incoming vessels on the PCS about a week before; however, it sometimes happens that this announcement is made only 8 h before arrival!" This, combined with the short

[39] https://ec.europa.eu/eurostat/statistics-explained/pdfscache/9639.pdf

Co-funded by the Horizon 2020 programme
of the European Union

routes between Limassol and the surrounding ports, creates a serious coordination problem for planning the various operations on the port side to promptly receive a ship (just-in-time) without unnecessary delays. As Constantinos adds: “The distance between the Port of Limassol and some of the closest surrounding ports in the area is about 150 miles (240 km), which means it would only take about 10 h to reach Limassol from those destinations.”[40]

[40] https://ec.europa.eu/eurostat/statistics-explained/pdfscache/9639.pdf

The Port of Limassol receives vessel traffic from 448 ports in 66 countries. To support interpretation of our analysis, we group all referenced countries into ten (10) regions, listed in Table below. The East Mediterranean region accounts for 57.9% of the total traffic to the Port of Limassol, while 17.3% comes from other ports in Cyprus. The West Mediterranean and Black Sea regions contribute 11.3% and 9.6%, respectively, while the remaining regions account for 3.9%.

Region	Countries	Port Calls	
		Count	Percent
Africa	Congo, Côte d'Ivoire, Kenya, Morocco, Mauritania, Nigeria, Senegal, Tanzania	5	0.1
Arabian	Arab Emirates, Djibouti, Iraq, Oman, Qatar, Saudi Arabia, Sudan, Yemen	33	0.5
Asia	Bangladesh, China, India, Sri Lanka, Malaysia, Singapore, Turkmenistan	36	0.6
Black Sea	Bulgaria, Georgia, Moldova, Romania, Russia, Turkey, Ukraine	620	9.6
East Med	Egypt, Greece, Israel, Jordan, Lebanon, Syria	3740	57.9
Local	Cyprus	1117	17.3
N. America	Bahamas, Mexico, United States	12	0.2
N. Europe	Belgium, Germany, Denmark, Great Britain, Ireland, Netherlands, Norway, Poland, Sweden	144	2.2
S. America	Argentina, Brazil, Curacao, Trinidad	18	0.3
West Med	Albania, Algeria, Spain, France, Gibraltar, Croatia, Italy, Libya, Montenegro, Malta, Portugal, Slovenia, Tunisia	729	11.3
Total		8070	100

Table 6 Countries And Number Of Port Calls

Source: Maritime transport statistics - short sea shipping of goods [41]

5. Mediterranean Environmental Sustainability - 'Horizon 2020 Initiative'

Despite measures taken to improve the marine environment and ecosystems in the Mediterranean region over the last five decades, there is little evidence of progress. The need for cooperation and coordination amongst all the countries bordering the Mediterranean has long been recognized. This has resulted in close to 40 years of international efforts to protect this fragile and vulnerable ecosystem including the Mediterranean Action Plan (MAP); the Barcelona Convention for the Protection of the Marine Environment and the Coastal Region of the Mediterranean and its Protocols, the Euro-Mediterranean Partnership (EUROMED) referred as the Barcelona Process and re-launched in 2008 as the Union for the Mediterranean (UfM).

[41] https://ec.europa.eu/eurostat/statistics-explained/pdfscache/9639.pdf

It operates within the framework of existing and developing environmental policy instruments and supports the implementation of the pollution reduction commitments undertaken in the framework of MAP and its Barcelona Convention. A number of concrete actions, as well as a feasible timetable on how to depollute the Mediterranean by 2020, were suggested during the 2006 ministerial conference. Following this a road map for the first phase of implementation (2007–2013) was adopted by ministers. This marked an important milestone for regional environmental cooperation and commitment. The road map focused on the:

- identification of projects to reduce the most significant sources of pollution;
- identification of capacity building measures to help neighboring countries to create national environmental administrations that are able to develop and police environmental laws;
- use of the European Union (EU) research budget to develop and share knowledge of environmental issues relevant to the Mediterranean;
- development of indicators to monitor the success of 2020.

In the first phase of implementation (2007–2013), H2020 focused on three policy priority areas, namely municipal waste, urban waste water and industrial emissions. Collectively, these are recognized to be responsible for up to 80 % of pollution in the Mediterranean Sea. Other topics, including desertification, climate change, biodiversity and air quality are considered on a longer-term perspective. These issues are addressed either in full or in part through other processes such including the UNEP/MAP ecosystem approach, the Mediterranean Strategy on Sustainable Development, the Strategic Partnership for the Mediterranean Sea Large Marine Ecosystem (MedPartnership).

The implementation of the H2020 initiative is overseen by a Steering Group, the members of which participate on an equal footing and include focal points of European Neighborhood Policy (ENP) Mediterranean partner countries, focal points of EU member states, EU Institutions (the European Commission, the European Investment Bank (EIB), the European Environment Agency (EEA)) and other stakeholders, such as Inter-Governmental Organizations (IGOs), International Financial Institutions (IFIs), Non-Governmental Organizations (NGOs), local authorities, the private sector etc.

The H2020 Steering Group is supported by three thematic subgroups, established to oversee its implementation:

1. Pollution reduction (PR), with the objective to support the identification, prioritization and implementation of the most significant pollution reduction projects tackling major priority sources of pollution (chaired by the EIB);
2. Capacity building (CB), to support to the implementation of H2020 by identifying key gaps and promoting capacity building actions at the regional, national and local level (chaired by the Mediterranean Information Office for Environment, Culture and Sustainable Development (MIO-ECSDE)), that represents a forum of more than 100 Mediterranean NGOs);

3. Review, Monitoring and Research (RMR), to monitor the progress of the implementation of H2020, through the development of common indicators and shared information systems that support a mechanism for regular reporting on environmental issues (chaired by the EEA).Each subgroup is supported by EU-funded projects which leads and support the process (Figure below). The project for the PR subgroup is entitled the 'Mediterranean Hot Spots Investment Programme-Project Preparation and Implementation Facility' (MeHSIP-PPIF); For the CB subgroup the project is the 'H2020 Capacity Building/Mediterranean Environment Programme' (H2020 CB/MEP); and Under the RMR subgroup the project is entitled European Neighborhood Policy Instrument (ENPI) Shared Environmental Information System (SEIS), known as the ENPI-SEIS project (2). The H2020 Mediterranean report is one of the key outcomes of the ENPI-SEIS project.

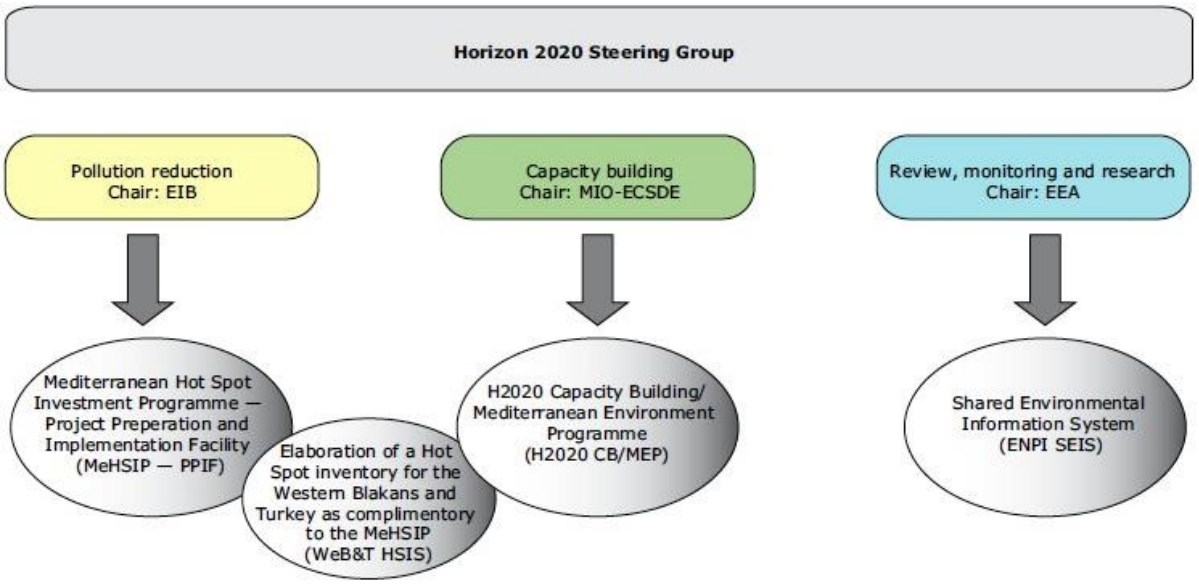

Figure 19 H2020 Components

Based on the data and indicators reported by Mediterranean partner countries and country analyses, the objective of the H2020 Mediterranean report is twofold: first to inform on the pollution levels in the region; and, second to take stock of progress made at regional and national levels in monitoring and reporting on this progress.

5.1 Geographical context of H2020 — regions and groups of countries

The 22 Mediterranean bordering countries and Jordan provide the geographical context to H2020. The assessment presented in Part 2 of this report ocusses primarily on the eight ENP-South partner countries (Algeria, Egypt, Palestine, Jordan Lebanon, Morocco, Palestine and Tunisia). However, in order to provide an overall Mediterranean perspective, reference to the nine European

countries bordering the Mediterranean Sea (Cyprus, Spain, France, Greece, Croatia, Italia, Monaco, Malta and Slovenia) grouped as EU Med countries, is made whenever possible. A third group of countries with Albania, Bosnia-Herzegovina, Montenegro and Turkey referred to as West Balkans and Turkey is also considered.

The cooperation with Syria is currently suspended. Syria did not take part in the reporting exercise.

5.2 Geographical levels

Three major geographical levels are considered in the indicator-based assessment: national, coastal regions and coastal hydrological basins (Figure 20). For each priority area, reference to different geographical levels is made as follows:

- national and coastal regions for municipal waste;
- national and coastal hydrological basins for water (sanitation and wastewater) and specific hotspots for nutrients;
- industrial Emissions — the geographical scope covers all emissions reaching directly and indirectly the Mediterranean Sea as specified in the MED POL Strategic Action Programme (SAP).

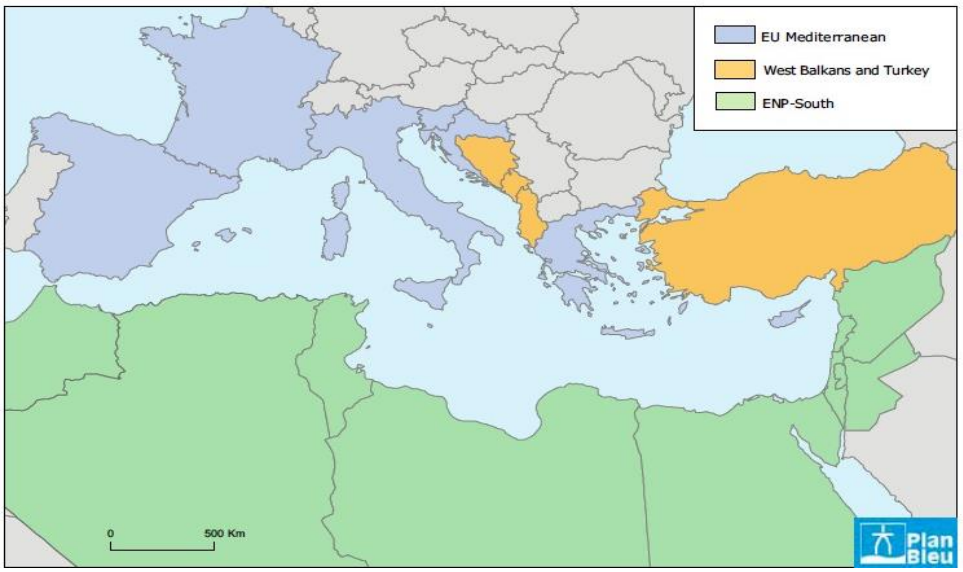

Figure 20 Mediterranean Countries Covered By H2020

Note: EU Mediterranean: Croatia, Cyprus, France, Greece, Italy, Malta, Monaco, Slovenia andSpain. ENP-South: Algeria, Egypt, Palestine, Jordan, Lebanon, Morocco, Palestine and Tunisia.West Balkans and Turkey: Albania, Bosnia-Herzegovina, Montenegro, Turkey , Source: Plan Bleu, 2014.

Figure I.5 Map of the Mediterranean regions delineating the coastal regions and coastal hydrological basins

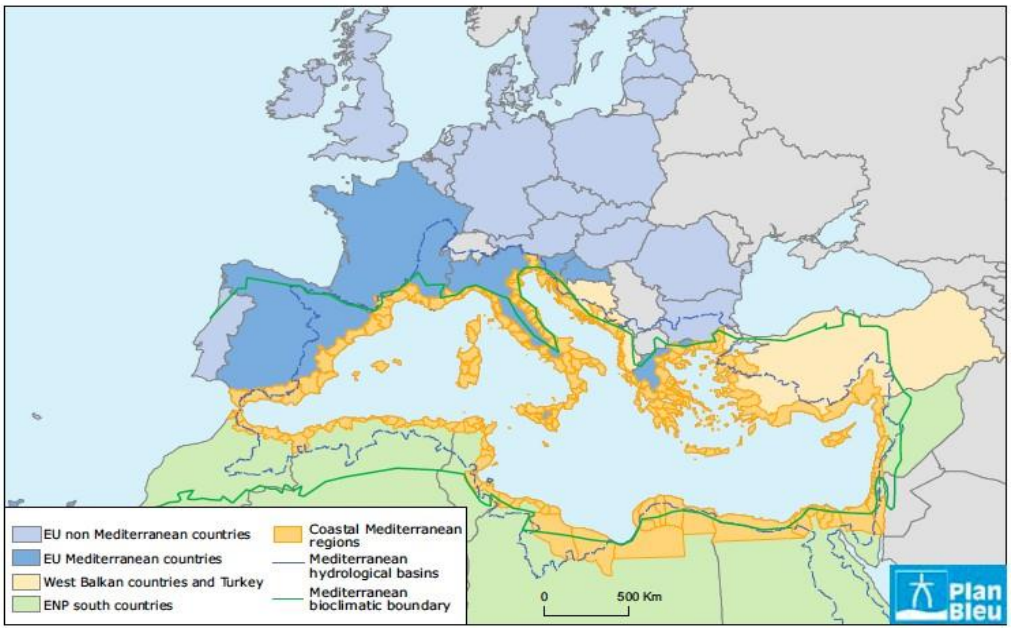

Figure 21 Map Of Med Regins Delineating The Coastal Regions

Source: Plan Bleu, 2014.

6. The Mediterranean Region in evolving relations with surrounding non-EU countries

According to the Guardian Report , EU foreign policy chief Josep Borrell says end of US-led global system and Europe needs robust strategy for Asia. The Asian century may have arrived marking the end of a US-led global system, the EU's foreign affairs chief has said amid a growing discussion in Europe on how to weave a path between China and the US.[42]

"Analysts have long talked about the end of an American-led system and the arrival of an Asian century. This is now happening in front of our eyes," Josep Borrell told a group of German diplomats on Monday, adding that the coronavirus pandemic could be seen as a turning point and that the "pressure to choose sides is growing".

In remarks that appear to confirm that the European Union will speed up a shift to a more independent and aggressive posture towards Beijing, he said the 27-nation bloc "should follow our own interests and values and avoid being instrumentalised by one or the other".

"We need a more robust strategy for China, which also requires better relations with the rest of democratic Asia," he added.

[42] https://www.theguardian.com/world/2020/may/25/asian-century-marks-end-of-us-led-global-system-warns-eu-chief

The EU has been reluctant to side with Donald Trump's confrontational stance towards China, but Beijing's assault on the independence of Hong Kong, its growing willingness to side with Europe's populists and its refusal to open its markets has led to a change of heart, according to analysts. Margrethe Vestager, the EU competition commissioner and a key figure in how Europe will handle China in the future, has recently noted what she describes as a lack of reciprocity. "In the part of west Denmark in which I grew up, we were taught that if you invite a guest to dinner and they do not invite you back, you stop inviting them," she explained. She said Europe needed "to be more assertive and confident about who we are".[43]

Borrell has previously admitted the EU has been naive about aspects of China, but said this was now coming to an end. In an article published this month in many European newspapers, he urged more collective discipline towards China. Already a raft of senior politicians in France and Germany are becoming more vocal in their criticism of China, seeing echoes of Russian efforts to divide the bloc through a mixture of disinformation or pandering to rightwing populists who ideologically should be anathema to Chinese communists.

No one knows yet how far this "new realism" will take the EU in altering its economic relationship to China. Daily EU imports from China amount to €1bn (£895m), but economists say there are already signs that some trade is not returning.[44]

On issues ranging from supply chains to telecoms security, diversification has become the watchword. Borrell has spoken of his surprise at discovering that all of Europe's supplies of paracetamol derive from China. The German cabinet has already approved new laws to prevent foreign takeovers of medical companies. The French finance minister, Bruno Le Maire, has said "some companies are vulnerable, some technologies are fragile and could be bought by foreign competitors at a low cost. I won't let it happen." Sweden's relations with China are close to breakdown.

Andrew Small, an associate senior policy fellow at the European Council on Foreign Relations thinktank, said Beijing had been able until recently to hide behind EU suspicions of Russia.

He wrote: "It benefited from the contrast that many Europeans drew between China and Russia. In this view, whereas Russia was actively hostile to the EU, China only sought to stymie European unity on a set of narrowly Sinocentric issues; whereas Russia thrived on chaos, China could be relied on as a status quo actor during crises; and whereas Russia pumped out disinformation, targeted European citizens, and sought to bring populists to power, China focused on positive image management and behind-the-scenes elite capture."

[43] https://www.theguardian.com/world/2020/may/25/asian-century-marks-end-of-us-led-global-system-warns-eu-chief

[44] https://www.theguardian.com/world/2020/may/25/asian-century-marks-end-of-us-led-global-system-warns-eu-chief

The EU's natural desire to be tougher on China has been held back by revulsion at Trump's methods and a fear that if Europe jettisoned China altogether, its chief partner would have to be Trump. key change came in spring 2019 when, frustrated by difficulties accessing the Chinese market and alarmed by the nationalist direction of Xi Jinping's leadership, the EU labelled China "a systemic rival promoting alternative models of governance" in a landmark strategy paper. Even now it is used in evidence by the US state department for similarities to its own stance.

Many factors prompted a change of heart. The expected bonanza from China's "belt and road" initiative had by and large failed to materialise as China's own economy slowed down. "The period of romantic optimism had come to an end," said Latvia's foreign minister, Edgars Rinkēvičs. "Four years ago it was only about the economy, about trade, about the 'belt and road', about more investment. Now, it is more balanced." Emmanuel Macron, the French president, in particular lobbied for the change, urging Europe to look to Russia for an alliance.[45]

But it was not immediately clear how much the 2019 strategy paper would translate at a nation-state level. In the same month it was published, Italy became the first European country to sign a "belt and road" investment memorandum with China. Many European countries individually gave Huawei the go-ahead to run their 5G networks.

Beijing itself wanted to halt the slide in relations, declaring 2020 would be the year of Europe with two large summits and many ceremonial signings. China also continued courting eastern Europe in what has been known as the 17+1 group.

Philippe Le Corre, a nonresident fellow at the Carnegie Endowment for International Peace, says Covid has been "the game-changer" in finally altering European perceptions of China. "Chinese diplomacy backfired. It did not acknowledge the initial help Europe gave to China, perhaps due to the regime being discomforted by foreigners providing help. There were fake videos in Rome of Italians singing the Chinese national anthem. It was very strange."

Small suggested Beijing appeared to have decided to use Europe at a moment of deep internal strain in a broad information battle about the supposed inadequacies of western democracy. "It was not enough to argue that the Chinese Communist party had succeeded; others had to be seen to fail," he said. Borrell called China's "politics of generosity" a stunt and the European External Action Service, the EU's diplomatic arm, swung into action accusing China of running a "global disinformation campaign to deflect blame for the outbreak of the pandemic and improve its international image".

China's behaviour has also backfired with European public opinion. A poll published by the Körber-Stiftung thinktank showed that 71% of Germans believe "greater transparency by China would have mitigated the corona epidemic". A net 68% of Germans said their opinion of the US had deteriorated over the past year, but China's reputation had also suffered, dropping by a net 11%.

[45] https://www.theguardian.com/world/2020/may/25/asian-century-marks-end-of-us-led-global-system-warns-eu-chief

In France, an Ifop/Reputation Squad poll conducted at the end of April found only 12% saw China as best placed to meet the challenges of the next decade.[46]

The key exception is Italy, but it has long been more sympathetic to China, and opinion appears fluid. The question for European politicians now is how to harness this new awareness to resist China, without tumbling into Trump's cold war. The first step is to compile what is being described as inventory of dependence on China, and investment screening reviews are now under way in France, Germany, Italy and Spain. Le Maire has promised "to strengthen our sovereignty in strategic value chains", such as those of the automotive, aerospace and pharmaceutical industries.

The next test is China's own direction. Veteran officials and advisers are not enamoured by what has been described as China's "Sopranos school of diplomacy". The Chinese scholar Lanxin Xiang admits he has kicked up quite a bit of dust by arguing it undermines China's strategic objective of turning the EU into a buffer zone against the US.

6.1 The Mediterranean region and high population neighboring countries

Euro-Mediterranean partnership

The key objective of the trade partnership is the creation of a deep Euro-Mediterranean Free Trade Area, which aims at removing barriers to trade and investment between both the EU and Southern Mediterranean countries and between the Southern Mediterranean countries themselves. Euro-Mediterranean Association Agreements are in force with most of the partners (with the exception of Syria and Libya).

Figure 22 Together the region represents 9.4% of total EU external trade in 2016.[47]

[46] https://www.theguardian.com/world/2020/may/25/asian-century-marks-end-of-us-led-global-system-warns-eu-chief

[47] https://ec.europa.eu/trade/policy/countries-and-regions/regions/euro-mediterranean-partnership/

The scope of these agreements is essentially limited to trade in goods and a number of bilateral negotiations are on-going or being prepared in order to deepen the Association Agreements. These ongoing or future negotiations are related to further liberalisation of trade in agriculture, liberalisation of trade in services, accreditation and acceptance of industrial products and regulatory convergence.

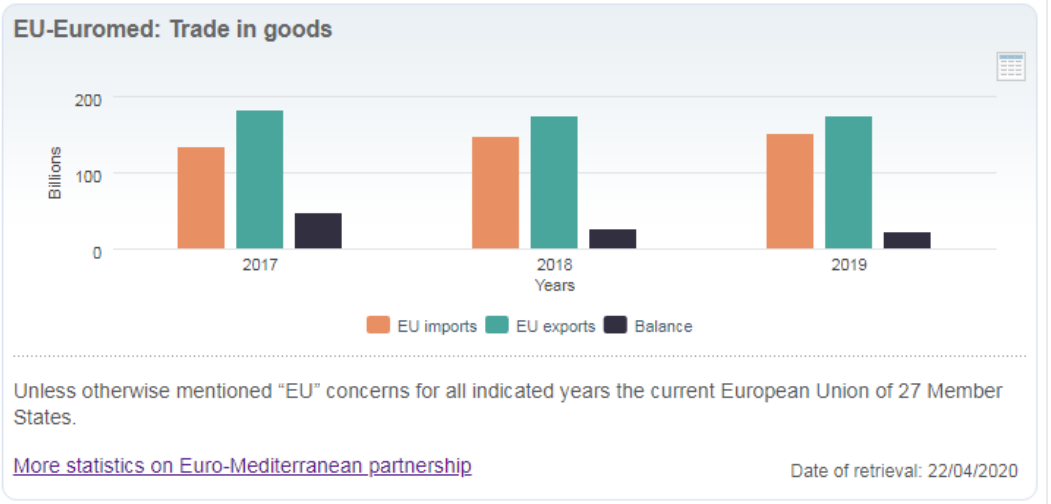

Figure 23 Eu-Euromed Trade In Goods

Source: https://ec.europa.eu/trade/policy/countries-and-regions/regions/euro-mediterranean-partnership/

EU and the Mediterranean region

The Union for the Mediterranean aims to establish a common area of peace, stability, and shared prosperity in the Euro-Mediterranean region. EU-Southern Mediterranean relations at bilateral level are managed mainly through the Euro-Mediterranean Association Agreements. Nearly all countries have concluded Association Agreements with the EU. Preparations are going to deepen these agreements through the establishment of deep and comprehensive free trade areas.

Negotiations for a Framework Agreement between the European Union and Libya are currently suspended. Steps towards the signature of the initialed Association Agreement with Syria are currently suspended

Country	Status	Date signed	Entry into Force
Algeria	Signed	April 2002	September 2005
Egypt	Signed	June 2001	June 2004
Israel	Signed	Nov 1995	June 2000
Jordan	Signed	Nov 1997	May 2002
Lebanon	Signed	June 2002	April 2006
Morocco	Signed	Feb 1996	March 2000
Palestine	Signed	Feb 1997	Interim Agreement J 1997
Syria	Initialled (December 2008)		
Tunisia	Signed	July 1995	March 1998
Turkey	Customs Union January 1996	Customs Union	December 1995

Table 7 EU and the Mediterranean region

Source: https://ec.europa.eu/trade/policy/countries-and-regions/regions/euro-mediterranean-partnership/

These agreements cover trade in goods and are complemented with a number of additional ongoing negotiations and preparations for future negotiations:

- to open up additional agricultural trade,
- liberalise trade in services and investment,
- to negotiate agreements on accreditation and acceptance of industrial products,
- to establish deep and comprehensive free trade areas.

Deepening South-South economic integration is a key goal of the Euro-Mediterranean trade partnership. It is an essential element towards the establishment of a fully-fledged Free Trade Area. However, regional economic integration between Southern Mediterranean countries is still limited: intra-regional trade is a small fraction (5.9% in exports, 5.1% in imports) of the countries' total trade , one of the lowest levels of regional economic integration in the World.

The EU supports the strengthening of trade relations amongst Southern Mediterranean countries:

- the Agadir Agreement between Tunisia, Morocco, Jordan, and Egypt, in force since 2007, remains open to other Arab Mediterranean countries;
- Israel and Jordan have signed a Free Trade Agreement;

- Egypt, Israel, Jordan, Lebanon, Morocco, the Palestinian Territories, Syria and Tunisia have signed bilateral agreements with Turkey.
- Negotiations are underway between other Mediterranean countries to establish similar agreements.

The EU works closely with each of its Southern Mediterranean partners to support economic and social transition and reform, taking into account each country's specific needs and characteristics. These programmes are funded under the European Neighbourhood Policy

Algeria

EU and Algeria[48]

Algeria has a Free Trade Agreement with the EU which already grants preferential treatment to its exports to the EU; therefore, according to the Regulation on Generalized Scheme of Preferences (GSP), Algeria has stopped benefiting from GSP treatment from January 2014. Bilateral trade between the two partners is primarily based on Algerian exports of oil and gas products. Algeria is the EU's third largest supplier of natural gas, after Russia and Norway.

Acute awareness of global warming

The forthcoming Comprehensive Strategy with Africa, and the 2020 summit between the African Union and the EU, should make climate and issues key strands in relations between the two continents. In particular, the Africa-Europe Alliance for sustainable investment and jobs will seek to unlock Africa's potential to make rapid progress towards a green and circular economy including sustainable energy and food systems and smart cities. The EU will strengthen its engagement with Africa for the wider deployment and trade of sustainable and clean energy. Renewable energy and energy efficiency, for example for clean cooking, are key to closing the energy access gap in Africa while delivering the required reduction in CO2. The EU will launch a "NaturAfrica" initiative to tackle biodiversity loss by creating a network of protected areas to protect wildlife and offer opportunities in green sectors for local populations.

Furthermore, the new European Green Deal will make consistent use of all policy levers: regulation and standardisation, investment and innovation, national reforms, dialogue with social partners and international cooperation, which will have a positive impact on all forthcoming negotiations with EU's trade partners.

Algeria in Euromed

Algeria is one of the partners of the Euro-Mediterranean Partnership (Euromed).

Euromed is one of the initiatives of the European Neighbourhood Policy, through which the EU offers its neighbours a privileged relationship, building upon a mutual commitment to common

[48] https://ec.europa.eu/trade/policy/countries-and-regions/countries/algeria/

values (including democracy and human rights, rule of law, good governance, market economy principles and sustainable development). These objectives are in the EU cooperation programme for Algeria 2014-2017.

A major African economy

The top exports of Algeria are Petroleum Gas, Crude Petroleum, Refined Petroleum, Coal Tar Oil and Ammonia, using the 1992 revision of the HS (Harmonized System) classification. Its top imports are Cars, Wheat, Refined Petroleum, Concentrated Milk and Packaged Medicaments. The top export destinations of Algeria are Italy, Spain, France, the United States and Turkey. The top import origins are China, France, Italy, Spain and Germany. Algeria is classified as an upper-middle income country by the World Bank. With an overall GDP of around USD 170 billion, the country ranked 53rd among world economies in 2016 and 2017, dropping four places compared to 2015 (49th). It is the fourth largest economy on the African continent after Nigeria, which is in 30th place, South Africa in 32nd place and Egypt in 44th place. The recovery in oil prices in 2017 and early 2018 saw per capita GDP rise again. Because of its abundance of oil reserves, and of gas in particular, the country's economic model is largely based on its hydrocarbon exports, which bring in sizeable revenues and allow it to rely on public spending and support certain sectors (basic goods, education, housing and health).

The pan-Euro-Mediterranean cumulation and the PEM Convention on rules of origin

The pan-Euro-Mediterranean cumulation system of origin brings together the EU, Algeria, and other Mediterranean countries to create a common system of rules of origin.

The system was originally based on a network of free trade agreements having individual origin protocols. These individual origin protocols are being replaced by a reference to the Regional Convention on pan-Euro-Mediterranean preferential rules of origin (PEM Convention), which was established in 2011 to provide a more unified framework for origin protocols. Algeria joined the Regional Convention in March 2017.

Egypt

EU and Egypt[49]

In June 2013 the EU and Egypt began discussing how to deepen their trade and investment relations through a Deep and Comprehensive Free Trade Agreement (DCFTA).A future DCFTA would aim to improve market access and the investment climate. It would also support Egyptian economic reforms.It would extend beyond the Association Agreement to include trade in services, government procurement, competition, intellectual property rights, and investment protection.

The EU commissioned a Sustainability Impact Assessment (SIA) for a possible DCFTA with Egypt in 2014.

[49] https://ec.europa.eu/trade/policy/countries-and-regions/countries/egypt/

From January 2014, due to its Association Agreement with the EU, Egypt stopped benefitting from preferential access to the EU market under the Generalised Scheme of Preferences (GSP).

Financial support

The European Neighbourhood Policy provides political and financial assistance to Egypt.In November 2010, the EU and Egypt signed a protocol creating a dispute settlement mechanism that applies to the trade parts of the association agreement. Egypt has not yet ratified the protocol.As a response to the events across the Arab world in 2011, the EU has identified ways to develop and deepen our trade and investment relations with Southern Mediterranean partners:the Joint Communications on the Partnership for Democracy and Shared Prosperity with the Southern Mediterranean of 8 March 2011a policy review: A New Response to a Changing Neighbourhood of 25 May 2011.

Egypt in Euromed

Egypt is one of the partners of the Euro-Mediterranean Partnership (Euromed).Euromed is an initiative of the European Neighbourhood Policy whereby the EU offers its neighbours a privileged relationship by building upon a commitment to common values (including democracy and human rights, rule of law, good governance, market economy principles and sustainable development).In 2004, Egypt signed the Agadir Agreement with Jordan, Morocco, and Tunisia. This agreement removes all trade tariffs between them and harmonises their rules on product standards and customs.

The pan-Euro-Mediterranean cumulation and the PEM Convention on rules of origin

The pan-Euro-Mediterranean cumulation system of origin brings together the EU, Egypt, and other Mediterranean countries to support integration to create a common system of rules of origin.The system was originally based on a network of free trade agreements having individual origin protocols. Individual origin protocols are being replaced by a reference to the regional convention on pan-Euro-Mediterranean preferential rules of origin (PEM Convention), which was established in 2011 to provide a more unified framework for origin protocols.Egypt joined the regional convention in October 2013.

Turkey

The EU and Turkey are linked by a Customs Union agreement, which came into force on 31 December 1995.Turkey has been a candidate country to join the European Union since 1999, and is a member of the Euro-Mediterranean partnership.

- In 2019, Turkey was the EU's 5th largest trading partner, export market and provider of imports. The EU is by far Turkey's number one import and export partner, as well as source of investments.
- After several years of rapid growth in the EU-Turkey bilateral trade in goods were curbed by Turkey's economic difficulties in 2018, in 2019 trade continued to show a mixed picture. While imports

retrenched further, exports expanded, bringing Turkey's overall trade deficit to a ten-year low of €26.3 billion. Towards the end of the year, however, there were signs of continuing to the previous trend of strengthened imports.

- EU goods exports to Turkey in 2019 fell by 1.3% to €68.2bn, while imports from Turkey rose by 4.4% to €69.8bn. Overall trade in goods thus amounted to €138 billion in 2018.
- Turkey's main export markets are the EU (42.4%), UK, Iraq, USA and Israel.
- Imports into Turkey come from the following key markets: the EU (32.3%), Russia, China, USA and India.
- EU exports to Turkey are dominated by machinery, transport equipment and chemical products. In turn, Turkey's exports to the EU are mostly transport equipment and textile articles, followed by machinery.

EU and Turkey

The Customs Union entered into force on 31 December 1995. It covers all industrial goods but does not address agriculture (except processed agricultural products), services or public procurement. Bilateral trade concessions apply to agricultural as well as coal and steel products.In addition to providing for a common external tariff for the products covered, the Customs Union foresees that Turkey is to align to the acquis communautaire in several essential internal market areas, notably with regard to industrial standards.

In December 2016, the Commission proposed to modernise the Customs Union and to further extend the bilateral trade relations to areas such as services, public procurement and sustainable development. The Commission proposal was based on comprehensive preparatory work throughout 2016 which included a public consultation with stakeholders, a detailed Impact Assessment and also a study by an external consultant. However, the Council has not yet adopted the mandate.

Turkey and Euromed

Turkey is member of the Euro-Mediterranean partnership (Euromed) and as such should conclude free trade agreements with all other Mediterranean partners, with a view to the creation of a Euro-Mediterranean free trade area.The Euro-Mediterranean Partnership promotes economic integration and democratic reform across 16 neighbours to the EU's south in North Africa and the Middle East. One important part of this work is to achieve mutually satisfactory trading terms for the Euromed region's partners.

The Euro-Mediterranean Partnership is an essential component in the pursuit of greater economic integration in the Mediterranean region.

6.2 Mediterraniean region and emerging economic powers

Russia

Since 1997 the EU's political and economic relations with Russia have been based on a bilateral Partnership and Cooperation Agreement (PCA). The trade-relevant sections of the Agreement aim to promote trade and investment and develop mutually beneficially economic relations between the EU and Russia. Since 2014 the illegal annexation of Crimea and the conflict in Eastern Ukraine have seriously affected the bilateral political dialogue. As a result, some of the policy dialogues and mechanisms of cooperation, including in the area of trade, have been suspended.

Since 2012, when Russia joined the WTO, EU-Russia trade relations have also been framed by WTO multilateral rules. Russia is the EU's fifth largest trading partner and the EU is Russia's largest trading partner, with a two-way trade in goods value of €232 billion in 2019. In 2019 Russia was the origin of ca. 40% of EU imports of gas and 27% of EU imports of oil. Due to the large value these imports, EU's trade deficit with Russia (€ 57 billion in 2019) is only second to EU's trade deficit with China.

EU-Russia bilateral trade in goods peaked in 2012, dropping by 43% between 2012 and 2016 from two-way €322 billion in 2012 to €183 billion in 2016. Since 2016, bilateral trade has partially recovered. However, Overall EU exports to Russia were in 2019 25% lower than in 2012, agri-food exports were 38% lower. In 2019 Russia was the destination of 4,1% of EU global exports, down from 6,7% in 2012. As for the origins of imports into Russia, the EU accounted in 2019 for 35%, down from 39% in 2012.[50]

Russia's current interests in the Mediterranean region have been formed by a long history of bilateral and multilateral relations. African and Arab countries played an important role in the foreign policy of the Russian Empire and the Soviet Union. The USSR's relations with some Mediterranean countries were to a large extent based on the Soviet Union's support for decolonization,1 but also characterized by a high level of Soviet participation in large infrastructure projects. The USSR helped erect and operate such structures as the Aswan Dam in Egypt, the El-Hadjar Metallurgical Plant, Beni-Zid and Tilezdit Dams in Algeria, and many others in Morocco, Libya, and Tunisia. Furthermore, the USSR exported armaments to the Arab countries, with Libya being the largest importer. Despite this successful and long-standing economic collaboration, the disintegration of the USSR resulted in an interruption of links with the Arab world and it was not until the end of the 1990s that Russia started to return to the region.

Evidently, Russia's Mediterranean policy has now lost the ideological content Soviet policies used to have. This has been a pre-condition for establishing fruitful economic cooperation based on mutual interests. At the same time, the new Russian policies tend to build on the real economic achievements of the Soviet era. In particular, Russia has been regaining importance in suchareas as energy, irrigation, infrastructure, and armaments. Furthermore, Russia enjoys social links to the

[50] https://ec.europa.eu/trade/policy/countries-and-regions/countries/russia/

region. The confessional makeup of the Russian population and the large number of Russian descendants living in the region provide a strong impetus for Russia to develop cultural and religious relations with the regional states as the main Christian, Muslim, and Jewish holy shrines are situated there.

One of the key priorities of Russia's foreign policy in the region is to manage its multidimensional security issues, including regional conflicts, proliferation, terrorism, and energy, as well as environmental issues and contagious diseases, by working together with the countries of the region through the United Nations (UN) and other specialized organizations for regional crisis and conflict prevention and resolution.4 Indeed, the Mediterranean region has again become a strategic priority for the Russian Ministry of Foreign Affairs due to its immediate proximity, its international importance, its enormous mineral resources (primarily oil and gas), concerns conditioned by extreme population growth, and current as well as potential religious and tribal conflicts. An analysis of today's geopolitical and geoeconomic situation both in the Mediterranean and in Russia reveals that the following factors determine Russia's interests in the Mediterranean region:

- a strategic presence in the region;
- relative proximity of the East Mediterranean countries to the borders of the Commonwealth of Independent States (CIS);
- possible inflow of terrorists and religious fundamentalists from the region to the North Caucasus; and
- economic and trade cooperation achievements and prospects.

Russia's Economic Cooperation and Trade with Mediterranean Countries

Three factors determine Russia's economic cooperation and trade with Mediterranean countries. First, some of them still have outstanding debts, the payment of which Russia has been waiting for since the fall of the Soviet Union. This problem requires an efficient and well thought out approach to debt re-engineering. Second, the Mediterranean region is blessed with relatively cheap labor resources that considerably boost returns on investments. The region is potentially a relatively large market for Russian exports. At the same time, the region's proximity to the EU as well as the preferential trade agreements that bind some of the Mediterranean states to the EU and the United States create a foothold for third parties, including Russia, wishing to access the largest consumer markets in the world. Third, Russian statesmen and businessmen take a special interest in some regional industries and activities, such as oil and gas extraction and transportation, agriculture and irrigation, atomic energy, infrastructure projects, education, high tech, banking, and tourism.

It should be noted that the oil and gas industry is undoubtedly the most significant and strategic sector in the Mediterranean economy. Many Russian researchers find that the Russian Federation has all the necessary technologies and resources to develop and improve interaction with Mediterranean partners (especially Algeria and Libya prior to the Arab Spring) in this area. This

interaction could be in the fields of prospecting extraction, transportation, or trade. The latter is considered the most promising. For instance, Shumilin indicates that an increase in oil and gas consumption in India and China will inevitably lead to an overload of the existent transportation infrastructure. Thus the development of new pipelines and new delivery routes will be required. Here Russia could play a vital role in collaboration with Mediterranean "hydrocarbon powers."

Furthermore, the oil and gas industry is the one in which the interests and ambitions of Russia (as the largest exporter) and the European Union and the United States (as the largest importers) intersect. There are also other areas of economic cooperation. For example, Egypt's imports of grain are mainly from Russia. In 2010, a Russian mobile provider Vimplecom announced the acquisition of the Algerian Orascom assets for $6.5 billion. A method worth noting with regard to stimulating economic and trade relations between Russia and the Mediterranean countries Internet forums and trade expositions.13 In November 2010 and October 2011, two expos of Russian goods and services were organized in Algeria. A third similar expo is scheduled for October 2013.

Furthermore, in order to improve economic cooperation, Russia seeks to set up its companies' presence in the region's special economic zones (which have low taxes and other benefits for foreign investors). Such zones have already been established in Syria, Jordan, Lebanon, Egypt, Tunisia, and Morocco. However, it is expected that the Arab Spring may somewhat change this "pre-revolutionary" situation.15 In terms of Russia's general interaction with the Arab countries of the Mediterranean region, a prominent role is assigned to the bilateral intergovernmental committees for economic and trade and scientific cooperation, and to the Russian-Arab Business Council, charged with facilitating and stimulating economic and trade relations between the Russian Federation and Arab countries. The latter has proved to be an efficient tool for establishing links at the company level and collecting, analyzing, and disseminating commercial information.

By 2011, the picture had changed slightly. While total turnover of value of Russian–Mediterranean goods stood at $10.83 billion .Tunisia had also come closer to the leaders with a share of 11 percent. Other countries did not play any significant role in Russia's trade relations with the region. However, it should be noted that the total share of the Mediterranean region in Russia's overall foreign trade (in goods) is insignificant (0.06 percent in 2011). The share of Russia in the Mediterranean countries' foreign trade is not significant either (not exceeding 3 percent). Despite its relative insignificance, the volume of total trade in goods with Mediterranean countries increased over four times in the 2000–2011 period. In sum, by 2010 Russia had restored or established adequate economic or political links with all the major stakeholders in the region: Iran, Syria, Saudi Arabia, Egypt, Qatar, Iraq, and Afghanistan.

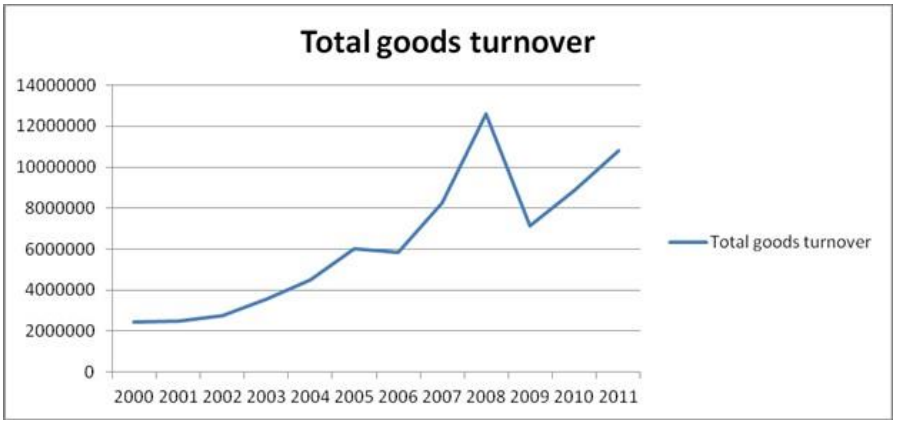

Figure 24 Graph showing the Total Trade of Russia with the Mediterranean Region

China

For decades, China has attached great importance to developing friendly relations with Mediterranean states. Despite huge differences between China and the Arab world in terms of historic background, culture, lifestyle, religious beliefs, political systems, and development paths, both sides had no historical entanglement and no conflict of fundamental interests. Similar historical experiences in the past and common aspirations for development in the future have laid a solid foundation for both to forge friendly and cooperative relations.

This study observes China's evolving energy, economic, and security ties with the countries of the region and then analyzes the impact of the Arab Spring on these. Beforehand, however, it should be noted that political terms such as Southern and Eastern Mediterranean are rarely used in China. Geographically, China regards the region as West Asia and North Africa (WANA) and, even more often, the Chinese adopt the European geopolitical term, calling it the Middle East. The term Middle East refers to the 22 member states of the Arab League (including Palestine) and non- Arab countries, namely Iran, and Turkey. Since most of the countries are Arab states, Chinese scholars sometimes call the area the "Arab world." In contrast to this, the term WANA does not necessarily include the (Persian) Gulf region, that is the six member states of the Persian Gulf Cooperation Council (GCC), Iran, and Iraq, so it comes closer to the geographical term Southern and Eastern Mediterranean used in this study.

China's Evolving Economic, Security, and Political Interests in the Region

China's most important concern in the WANA region is the maintenance of peace and stability as preconditions for regional development, world peace, and Chinese interests in the region. China has a number of very important interests in the Middle East, the highest ranking of which is energy security. Since 1993, China has become a net oil importer and the oil imported from the Middle East has increased annually ever since. At present, oil from the Middle East accounts for more than

half of China's total oil imports from abroad. Thus, alongside its rapid economic growth, China has become more and more dependent on Middle Eastern oil.

Secondly, China has developing economic interests in the region. The Middle East has become China's seventh largest trade partner, with bilateral trade volumes reaching $268.9 billion in 2011, a record high and a year-on-year growth of 36.5 percent.35 Mutual investment enabled this growth momentum.

The third area of concern is security interests: friendly relations with the region could help China fight what it calls the "three ugly forces," that is terrorism, separatism, and extremism, which is very important for China to ensure security in the Western region of China, mainly in Xinjiang. For a long time, organizations such as the East Turkistan Organization repeatedly penetrated this region with killings, bombings, and other terrorist acts, thus seriously affecting stability and development in Xinjiang. These organizations, as foreign media have recently reported, are also connected to al- Qaeda, allegedly fighting together with them in Syria now. By maintaining and developing friendly relations with the countries in the WANA region, China hopes that they will support China's position on this issue and cooperate with them in takingnecessary measures against any link of the "three ugly forces" with certain groups or organizations in their countries.

Fourthly, China has taken up a major strategic initiative, called the Westward Policy. After the economic reform program — Reform and Opening up — was launched in 1978, China's economic and social development took place mainly along the eastern coastal areas, while the western regions remained relatively poor and backward. In the last decade, China developed the Westward Development Strategy with the aim of narrowing the gap between east and west, and fostering a more balanced and coordinated development. As part of these measures, the Ningxia Hui Autonomous Region established the China (Ningxia) International Fair for Investment and Trade and Sino–Arab Economic and Trade Forum (CAETF) in 2010. The majority of residents in Ningxia are Muslims and the region has had various links with the Arab world since ancient times. CAETF has become an important platform for Ningxia to develop economic and trade relations with foreign countries, especially with the Arab countries.

Furthermore, Xinjiang set up the China and Euro–Asia Expo in 2011. Given its geographical advantage, Xinjiang will make efforts to turn this into a platform for international exchange and cooperation with foreign countries. Enhancing good and friendly relations with Middle Eastern countries would therefore be very important for China in materializing that strategy.

China has also attached special importance to developing multilateral relations with the Arab countries. In January 2004, at the initiative of the Arab League, China and the Arab countries established the China–Arab States Cooperation Forum (CASCF), through which China and the Arab countries can exchange views on how to strengthen cooperation in political, economic, security, and other fields, and also on regional and international issues of common concern.

Eight years after its set-up and as a result of joint efforts, CASCF has contributed a great deal to the development of Chinese–Arab relations as a whole. In the political field, both sides have established a strategic partnership of comprehensive cooperation and common development as a result of which the relations of both sides have been strengthened. In the economic sphere, the amount of bilateral trade between China and the states of the Arab League has grown rapidly, rising from $36.7 billion in 2004 to nearly $200 billion last year, with mutual investment rising year by year.

China's Policy toward Egypt

China and Egypt officially established diplomatic relations in May 1956. The Chinese people will not forget that Egypt was both the first Arab and the first African country to establish diplomatic relations with the new China, helping it to open the door to diplomatic ties with other Arab and African countries. Therefore, China has always attached great importance to relations with Cairo. China considers Egypt a strategic partner and the most important regional country. With joint efforts, China and Egypt have developed healthy and stable relations. In April 1999, China and Egypt agreed to up-grade their bilateral relations into strategic– cooperative ones. Once again, Egypt was the first country in the Arab world and Africa with which China has forged such strategic relations. In recent years, due to the efforts of both countries, bilateral cooperation has expanded and trade has grown. Egypt is now China's fifth largest trade partner in Africa. In 2011,the bilateral trade volume stood at $8.8 billion, a 26.5 percent increase with respect to the previous year.

The Arab world, because of its important strategic location, its rich resources of oil and gas, and the long history and enormous impact of the Islamic civilization in many parts of the world is already an important player in current international politics. Therefore, during this period of changing regional and international patterns and the reconstruction of the international political and economic order, all world powers attach great importance to the Arab world and actively regard it as a strategic partner.

As the political upheaval unfolded in Arab countries, China clearly underlined that the will and choice of the people should be respected, appealed to the parties concerned to solve theconflicts and disputes through dialogue and consultation, and firmly opposed the use of force and interference in the internal affairs of other countries. China is actively committed, working together with the international community and the countries concerned, to achieving a political solution to the crises, especially the Syrian crisis, as soon as possible. Only in this way can the countries concerned undertake national reconstruction, recovery, and economic development. China will pay close attention to the development of the situation to safeguard China's legitimate economic interests in these countries, in the hope of resuming and promoting cooperative relations in various areas.

The violent conflicts or civil wars in some countries triggered by the Arab Spring have seriously affected not only the peace, stability, and development of those countries, but also the mutually beneficial cooperation between them and China. In Libya, for example, Chinese companies suffered huge financial losses. Chinese companies have also been affected by the violent conflicts in Syria and Yemen. However, the Arab Spring has provided China not only with challenges, but also opportunities. China believes that the world is changing and moving forward, and so is the WANA region where people are demanding change, more freedom, social justice, and a better life, fully in line with the world trend. The positive perception and principle of peaceful foreign policies will serve as the new foundation for China and the Arab world to maintain and develop friendly and cooperative relations in the future. China has noticed that there is a strong momentum in some Arab countries to find a development road suited to their national conditions, learning from and valuing the strategic partnership with China. This trend itself will help China and the Arab world to strengthen bilateral relations.

India

India shares historical–civilizational links with the countries of the wider Middle East, including the Mediterranean sub-region. It had close ties with and was influenced by all the prominent monotheistic religions that emerged in the Middle East, and the Arabian Peninsula was, even before the birth of Islam, a major trading and commercial center for Indian merchants. In modern times, the arrival of the British on the subcontinent in the early 17th century added geostrategic dynamics to these historic ties. The British interests in the Persian Gulf region were decided, pursued, and administered from the Bombay Presidency on the Western coast of India. Following its independence in 1947, India sided with the counties of the Middle East under the banner of decolonization and anti-imperialism and befriended countries that espoused and followed a non-aligned foreign policy and vehemently opposed continued foreign presence and domination.

The end of the Cold War significantly transformed India's foreign policy. While its leaders continue to pledge their support for non-alignment, its view of the outside world has become pragmatic and less ideological. The economic reforms initiated in 1991 started bearing fruits and, far from being an aid-recipient, India started to post steady economic growth. This in turn compelled a foreign policy based on political realism and interests.

While the wider Middle East, including the Persian Gulf, has been vital for India, the importance of the Mediterranean region has been somewhat mixed for New Delhi. During the past two decades, an Indian policy driven primarily by economic considerations is visible toward Mediterranean countries such as Egypt and Syria that possess energy resources. At the same time, India has been adopting a restrained, if notindifferent, position toward popular protests in the Arab world. If it

were to capitalize on the ongoing political transition and economic reconstruction in the Arab world, India would have to move away from the past hesitancy and look for convergence of interests with other regional players who have vital stakes in the region.

As a result, India's ability to cooperate with the West, especially with the United States, over the Mediterranean region is limited. Its traditional opposition to external intervention is now accompanied by diminishing U.S. influence and even relevance. At least in the Mediterranean context, India's foreign policy stands would be influenced by the positions taken by China and Russia, especially in the UNSC. Furthermore, regional consensus on issues would be more relevant to India than any transatlantic demands or agreement. Intimations of this have already appeared in its stand on Libya and Syria. At the same time, India would not seek a coordinated BRIC stand vis-à-vis the region; while there could be issue-based agreements, there is no wider convergence of interest between India and the other three players. On issues such as energy security and external non-intervention, India faces competition and rivalry from other countries, especially China. Its preference for regional consensus, thus, would be an interim strategy until India acquires greater regional influence.

Following a regional consensus would be critical if India were to increase its profile and influence in the Mediterranean. At the same time, India would be reluctant to present any model or ideas for the region, especially to countries that are in the middle of domestic unrest. Despite their shortcomings and imperfections, secularism, democracy, and multiculturalism are India's strong points.

It is committed to the co-existence of diverse religious communities through accommodation and compromise. While prepared to part with its knowledge and experience, especially in the conduct of elections and institution building, India and its leaders would be reluctant to present themselves as the model for the heterogeneous Mediterranean region lest they be seen as aggressive and hegemonic. Its limited political capital in the Middle East would also inhibit India from seeking any leadership role for itself. India's interest in the Southern Mediterranean is considerable, while its interest in the eastern region is evolving. Its traditional positions — non- intervention, political stability, and preference for peaceful political transition — continue to

shape and dominate its interests and involvement. Driven by its appetite for energy, its foreign policy has increasingly assumed an economic dimension and within this context, countries such as Egypt, Syria, and Libya could become more important than before. At the same time, it should be noted that while offering alternate supply options, the ability of these countries to compete with the more lucrative Persian Gulf region is limited.

Iran at the crossroad of two important international corridors to Europe

6.4.1 The International East-West (China-Europe) Transport Corridor

Belt and Road Initiative (BRI) is a Chinese multi-layered economic, and geopolitical agenda that by which the two ends of Eurasia, as well as Africa and Oceania, are being more closely connected along two routes–one overland and one maritime. The Chinese President Xi Jinping initially proposed it in 2013. Later in 2015, the People Republic of China issued an action plan for realizing the initiative.

Formally, One Belt One Road focuses on five main areas of cooperation between involved countries:

1. coordinating development policies,
2. forging infrastructure and facilities networks,
3. strengthening investment and trade relations,
4. enhancing financial cooperation, and
5. deepening social and cultural exchanges.

However, infrastructure such as highways and roads, railways, seaports, energy systems and pipelines has been at the centre of attention within this initiative. The BRI brings a view of a US$1.3 trillion investment program, mostly by China, to create a network of infrastructure. It aimed to boost economic inter-connectivity and assists development across Eurasia, East Africa among more than 60 partner countries.

The new Silk Way imagines the establishment of six key economic cooperation corridors and some crucial maritime pivot points across Eurasia. In short, on land, the Initiative planned to build a new Eurasian land bridge and develop five economic corridors of China-Central Asia-West Asia; China-Mongolia-Russia; the China-Indochina peninsula; China-Pakistan; and Bangladesh- China-India-Myanmar. On the seas, the BRI will enhance jointly built, secure, smooth, and energy efficient transport routes connecting major seaports along the belt and road. Very recently, Polar Silk Road also introduced as a route, in addition to the Maritime Silk Road. Altogether, they form the “belt” and “road”.

Figure 25 BRI Chinese initiative

The Silk Road Economic Belt's overland infrastructure covers the Eurasia Land via the above-mentioned five corridors, empowered with high-speed railways and hydrocarbon pipeline networks. The 'Belt' corridor extends from the west of China through Central Asia to Europe. It targeted the integration of the Eurasian landmass into an interrelated economic area.

The Maritime Silk Road is concentrated on developing some ports. For the maritime 'Road', the seaports and hubs across the Indo-Pacific are crucial as they act to connect to land-based transportation routes. Development of port facilities across the Indian ocean in Indonesia, Bangladesh, Sri Lanka, Pakistan, Kenya, Tanzania, Oman and Djibouti are all according to the plan to provide maritime access for China. In the EU end, the route connects to Greek port of Piraeus which owned by COSCO the Chinese Shipping Group. It facilitates China's access to the European markets. China claims that the initiative can further integrate China into the rest of the world while allowing poorer economic parts of the country to gain the benefits of its opening-up policy. In

2016, the China Daily reported that in line with the new BRI Initiative, China has established 75 overseas economic and trade cooperation zones in 35 countries as part. However, the new silk ways are still immature and strive for external endorsement and support.

6.4.2 The International South-North (India-Europe) Transport Corridor

At a meeting of the International North-South Transport Corridor (INSTC) coordination council in Tehran, it was announced that capacity on the corridor would be increased. Iran's Minister of Roads and Urban Development said that the increase would be achieved by expanding railway and port infrastructures.

He added that member states had agreed to create a joint company, including government representation, for the corridor to increase capacity, subject to the necessary political will to proceed with the plan.

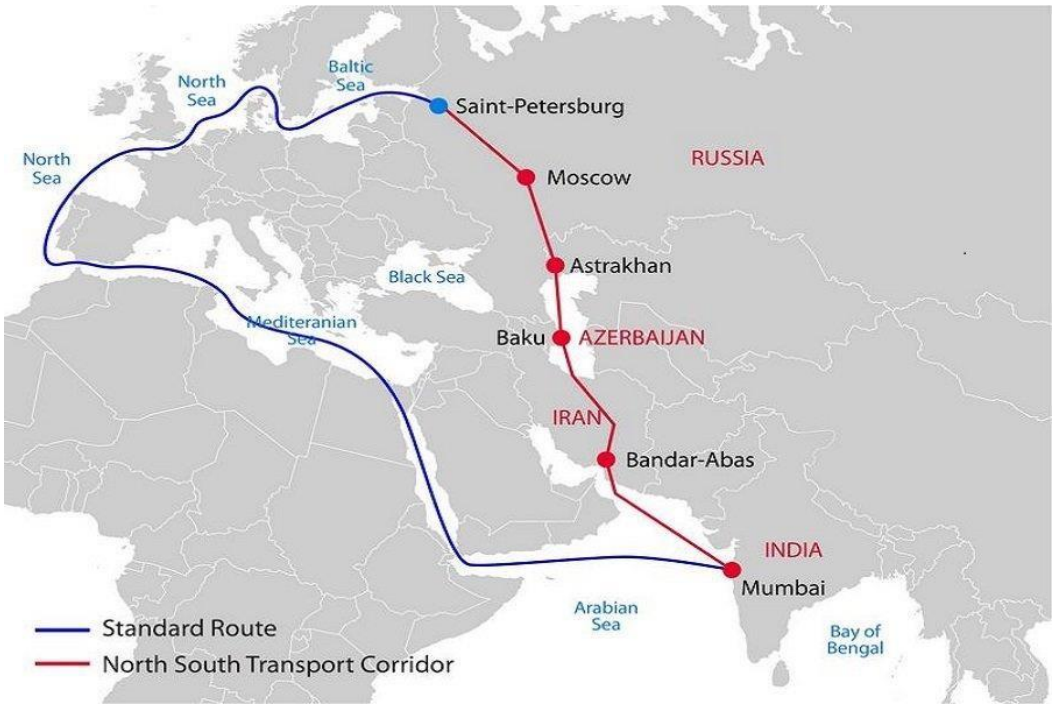

Figure 26 South-North International Corridor

The International North-South Transport Corridor (INSTC) is a 7,200 km long multi-modal network of ship, rail, and road routes for the transport of freight between India, Iran, Afghanistan, Armenia, Azerbaijan, Russia, Central Asia, and Europe. The objective of the corridor is to increase trade connectivity between major cities such as Mumbai, Moscow, Baku, Astrakhan, Tehran, Bandar Abbas, and Bandar Anzali.

The aim of the corridor is not just to increase trade between member countries, but also to standardize tariffs and customs duties. Baku port also serves as a link to transport corridors which target European markets.

The foreign ministers of Romania, Azerbaijan, Georgia, and Turkmenistan have this week signed a declaration for the promotion of a multimodal corridor for the transport of goods between the Black Sea and the Caspian Sea (Caspian Sea – Black Sea International Transport Corridor project – ITC-CSBS). It will link the ports of Constanța (Romania), Poti (Georgia), Baku (Azerbaijan) and Turkmenbashi (Turkmenistan).

7. DocksTheFuture 's International Consultative Committee meeting on "Relationship with Med and Neighbouring countries"

The second International Consultative Committee meeting of DocksTheFuture project took place on 28 April 2020 between 10-11. The Objective of the conf.call was: How to develop the " *Relation with Med & Neighbouring Countries*", and to add a specific chapter on this topic to the Deliverable D.5 of the project.

For this purpose, four below areas suggested to be at the centre of discussion:

- Current ports' Policies in Mediterranean basin, cooperation or competition?
- How Med ports will face the environmental challenge, moving towards sustainability?
- How to proceed capacity building for the less developed ports in the Med region?
- The best practices of the successful maritime and port projects in the Med region.

The partticipants of this meeting were from four groups of:

- ICC members: Michele Acciaro, Paul Brewster,
- MEDport Association: Luca Lupi, Gabrielle Charpentier
- WestMED Initiative: Javier Fernandez
- Docks The Future (DTF) project's partners: Circle s.p.a: Reza Karimpour, Alexio Picco, Beatrice Dauria, PortExpertise group: Joris Claeys, Peter Bresseleers , Magellan Association: Manuela Flachi

Circle s.p.a that leads the project welcomed the participants of the meeting and explained about the project and its progress. He also pointed out how to proceed organising the 3rd expert workshop in this pandemic days.

Mr.Reza Karimpour from Circle s.p.a presented the Docks The Future, and the Structure of the meeting. He gave a brief introduction to the project that DTF is a project funded by the European Commission under Horizon 2020. As a Coordination and Support Action (CSA) it will support the EC (DG MOVE and INEA) in covering coordination and networking of Research and Innovation projects, Programs and policies. The project is coordinated by Circle S.p.A (Italy) as the leader of the Working Group including: ISL - Institut für Seeverkehrswirtschaft und Logistik (Germany) ,Magellan (Portugal), PortExpertise (Belgium) ,University of Genoa (Italy)

Then, the Current conditions of the Docks The Future for the below workpackages explained in short.

WorkPackage.1: Definition Of The Concept

WorkPackage.2: Clustering Of Projects

WorkPackage.3: Evaluation Analysis

WorkPackage.4: Dissemination

WorkPackage.5: Plan For The Exploitation Of The Results

In continuation, it was mentioned that DocksTheFuture has already addressed in early stages of the Project: a preliminary research on the "Port of Future" concept; and the definition of several "Port of the Future topics" to be addressed and their related targets in 2030;

- Port infrastructure
- Accessibility and Standards
- Integration in the supply chain and synchromodality
- Environment
- Sustainability
- Relation with Med & Neighbouring Countries
- Digitalization
- Port-city relations
- Governance
- Human element
- Safety & security
- Bridging R&D and implementation

In WP.1 Docks The Future performed the work on *essential concepts of a port of the future.* Deliverable 1.5 of the project: Port of the Future concepts, topics and projects ,desktop analysis lead by PortExpertise, has already touched the topic of "Relation with Med & Neighbouring Countries" , some of them listed below.

Some of the references of PortExpertise for this Deliverable have been "Port Cooperation Policies in the Mediterranean Basin: An Experimental Approach Using Cluster Analysis"', "Challenges for the future of ports. What can be learned from the Spanish Mediterranean ports? ", "Port-2-Port Communication Enabling Short Sea Shipping: Cyprus and the Eastern Mediterranean", and " Port Collaborative Decision Making (PortCDM) project."

Later on, the Objective of the conf.call highlighted: How to develop the " Relation with Med & Neighbouring Countries", and the four below areas suggested to be at the centre of discussion after the MEDport presentation.

- Current ports' Policies in Mediterranean basin, cooperation or competition?
- How Med ports will face the environmental challenge, moving towards sustainability?
- How to proceed capacity building for the less developed ports in the Med region?

The best practices of the successful maritime and port projects in the Med region.

Secretary General of the MEDport Association, presented the Association as per below. The MEDports Association is the result of the desire and necessity to ensure port and maritime cooperation between the southern and northern banks of the Mediterranean.

- 23 Port Authorities, 3 Associated Members, 6 Objectives , 6 Technical Committees

23 Port Authorities and National Port's Agencies from Northern (15) and Southern banks (8) in SPAIN, ALGERIA ,FRANCE ,ITALY ,MOROCCO ,TUNISIA ,LEBANON,SLOVENIA ,MALTA ,GREECE. Furthermore, MEDport has 3 Associated Members from Northern (1) and Southern banks (2), and 5 Training Institutes from Northern (3) and Southern banks (2) associated to the works of the MEDports Association. Luca stated the MEDport objectives as per below:

Later it was emphasized that the North-South Med cooperation is at the centre of focus for the associations' activities. There are committees in the association for the internal works: RII Committee: Relations with International Institutions, Smartport Committee, SMA Committee:Statistics and Market Analysis, Security & Safety Committee, Sustainability Committee, and ETME Committee Employment, Training and Maritime Expertise.

He added that there are Actions within MEDports such as Signing MoU with the Union of the Mediterranean (UfM) and MED CRUISE, Organizing Training Seminars for trainees from both banks. MEDport is also active in International events and projects. MEDports Association Forum (MPF) conducts activities like Annual event bringing together experts, ports and actors from the maritime sector of the two Mediterranean banks based on a topic which welcomes the needs and interests of all Members. Furthermore, it is highlighted the MEDport contribution to some regional projects such as:

The Young Employment in Ports of the Mediterranean (YEP-MED)

- Better match labour supply with labour demand in the Med area
- 10 countries are involved: Egypt, France, Italy, Jordan, Lebanon, Spain, Tunisia
- Project supported by the Escola Europea – Intermodal Transport
- Selected by the ENI
- MEDports Association as an associated entity, is expected to work within the ETME Committee

RMF2M project

Réseau Méditerranéen de Formation aux Métiers Maritimes (RMF2M), Mediterranean Network Occupations Of Training Programs

- Idea presented during the Summit of the Two Shores in Marseille (2019)
- Supported by the MEDports Association
- An international and Mediterranean solution to challenges of the Blue Economy o Intelligent platform that will summarize the training formations and job offers corresponding to a profile

At the end it is explained that DocksTheFuture & MEDports Association can have cooperation and collaboration in many common fields of activities, a Win-Win cooperation. It could be listed but not limited to the following points :

- Access to the largest current Ports Network in the Med area
- Exchange best practices from our Members
- Take advantage from the work of the internal Committees, especially from the
  - Smartport and Training Committees
- The MEDPorts Association highlights the problems of the ports of the South to the
  - EU, especially through the RII Committee

At this stage, the ICC members entered the discussion on the topic with the MEDport invitees. The first question was if MEDport have some kind of information on the current funded projects in terms of collaboration among the European Ports, or Mediterranean ports?
It was replied that MEDport is working on that it is very important to work together to solve the problems and it is one of the reasons to set up the association. At this stage, Mr.Javier Fernandez from the West MED initiative said that the maritime cooperation and initiatives has been at the focus of attention by the EU. Basically this maritime initiative has been working for a couple of years with strong leadership from member countries that sit together every 2-3 months in the framework of the steering committee and in December 2018 in Algeria meeting, they set up a road map for sustainable development of Blue Economy in the West MED area.
One of the cores of this roadmap is the “Cooperation” between the states in the region. For West Med, it is important to develop the North-South cooperation too, and is really relevant. West Med have

managed to support 12 projects in the region, and working in this context of the DocksTheFuture is really welcomed and valuable. He proposed two points:

1. The cooperation and participation from the DocksTheFuture for the next forthcoming steering committee in the Malta, and the other one

2. Each of the partners of the technical groups of the sustainable transport

framework have two representatives: one from institutes and the one from the industry. The national hubs are working with these two representatives. So for the DocksTheFuture and MEDport will be an opportunity to be in contact with this technical groups and the representatives.

It was also asked if the sustainable transport scope of the West Med includes the maritime transport, and the reply was yes. It was also mentioned that it is just initiated, it also may anticipate the topics of the LNG and the On the motor ways of the Seas.

It was said that if any of the participants can mention one point to focus at this step for the cooperation in the scope of the ports in North and South. From MEDport also agreed with the MEDport prospective. Magellan highlighted the communication aspects. Circle stated that finding the right contact and getting in touch with the correct contacts at the ports of the Med region is very difficult. It could be one of the challenges for further cooperation in the future, also added that this topic is also relates to the “Network of the Excellence”. And to be bolded, one of the important points is sharing the best practices among the states and ports in the MED area and also EU, a sort of a network; the “Network of Excellence”, to be a collaborative network. The point is a “Balance “between cooperation and competition”.

Also mentioned that the maritime initiatives is a collaborative type between the countries, sometimes partnership in preparing the proposals, competition have not been seen yet in the West Med. Mr.Acciaro, shared a few points that it is very valuable to have this WestMED initiatives and MEDport association, because the collaboration between the Mediterranean countries have not yet produced the desired results, as the EU usually works in isolation . This has been a mistake when it was about the not only China but also in Mediterranean area. Unfortunately for many Med countries these initiatives have been looked at as the way to grab some money without real outcomes and results. Therefore, there is an urgent need for real collaboration in Med area. He suggested to include other countries in the initiatives such as the Turkey, or even the UK. In continuation, he added that When we talk about the European ports there are right concerns of some posed EU regulations on the ports that constrains the developments of the ports, are subjected to the countries in the area that are not European regulation, for example in transhipment and in cruise sector. So When we talk about the sustainability we should think that the flow of the cargo is also to other countries like Russia, Egypt, Turkey, so there should be a strong cooperation from them with the European ports.

Also harmonising funding and policy regulating was discussed. Maybe it would be valuable to consider also the Belt and Road Chinese initiatives for coordinating and elaborating to have a successful maritime transport network with EU. He added that compared to the Med ports in south of EU, in Northern Europe there are more measures in terms of technology and innovations taken such as Onshore Power Supply, Hydrogen, electrification, and etc. He thinks that collaboration in Mediterranean level and applying the best practices across the European ports can help a lot to the med ports. Mr. Picco put a comment that there will be a good big project of onshore-power supply that is in evaluation within the motor ways of the sea, in the Med area and other forthcoming initiatives and projects as a good opportunity for the collaboration between the MED ports and the West Med initiative. Mr. Bresseleers in continuation joined the discussion and left his comment. He said that they captured a lot of info from the Med ports and he is wondering why there is so much internal communication in Med ports, which not reaching out to other ports. They port of Antwerp had a webinar on Covid19, one of the issues about the ships coming from Med region to Antwerp and the required Sanitation Certificates. So it shows that cooperation is more needed between ports even more than before.

At the end, it summarised that we are going to plan how to go more in analysis of this topic, It also emphasized that DocksTheFuture is going to use the capacity of these two initiatives to develop a specific chapter on "Relation with Med and neighbouring countries". For this purpose, DocksTheFuture is going to keep contacts with these two initiatives and regularly attend the forthcoming physical or online events of the MEDport Association & WestMED Initiatives in order to gather the info and feedbacks. In addition, DocksTheFuture will connect to all social media (Twitter, FB, LinkedIn) of MED port & WestMed Initiatives to disseminate each other's activity in the same topic.

As the next step, for developing the specific chapter on the "Relation with MED and neghbouring countries" within the project, DocksTheFuture is going to send Questionnaire to the Med Ports & West Med members on some relevant group of topics such as: Current port Policies in Mediterranean basin, best mechanisms of cooperation among Med ports, top challenges in the Med ports in moving towards Sustainability, capacity building in the Med region's ports, identifying the best practices from other EU ports to be implemented for the MED ports, potential of the Port-2-Port communications for enabling Short Sea Shipping between the Med ports, and etc.

Furthermore, inviting the experts from these two initiatives for the DTF expert call and the final conference is one of the measures to help DocksTheFuture in developing the specific chapter on "Relation with Med & Neighbouring countries". This specific chapter may include other measures like interviews with some port managers of non EU-Countries (for example in Turkey, Egypt, Algeria, Morocco, Russia, etc.), and also approaching the successful European regional maritime & port organizations like HELCOM in Baltic region in terms of their cooperation with non-European states (such as Russia) in order to simulate for the Mediterranean ports in relationship with Non-EU ports in

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of the European Union

Northern African and also Black Sea areas. Furthermore, one of the steps can be exploring the mechanism for involving the East Adriatic Sea ports such as Albania, Bosnia and Montenegro in further cooperation with European Ports and maritime projects to reach the standards of the European regulations, through the EU funds and capacity building.

8. The concept of Port of Future and the ports' relations in Med area

8.1 Future competence and alliance between Mediterranean seaports

The Mediterranean is an especially appropriate area for transport trade. The main global maritime route crosses the Mediterranean Sea from Suez to Gibraltar; one of the centers of the global economy is situated on the Northern shore of the Mediterranean; and the EU is opening its doors to new members. Moreover, emergent economies are located in the Northeast connected with the Black Sea and Africa. They have a potential of development and strong links with European economies through Mediterranean seaports. The optimal routing decision tends to be cargo shipping through hubs, as the hub charge has decreased and its efficiency improved . All of these aspects are catalysts for the growth of the well-defined seaports on the Northern shore, in order to establish a competence between them, to attract and generate new traffic and to develop new harbors on the Southern shore coast.[51]

Harbors like Ceuta, Tangier, Djen-Djen, Bizerte, Damietta or Port Said are a new generation in the Mediterranean and will surely change the map of transport and economy in the South Mediterranean. A clever view will create a similar land bridge with Africa and the Mediterranean Sea, but unfortunately it will still take some decades.

In reality, competence between harbors is not only good for the users of their facilities; but it is also good for the whole logistic line, from inland dry ports to all seaports that have been connected by the logistic lines. We can now begin to talk about competence between logistic lines, which implies alliance between economies and territories, and between modes of transport and harbors. The sustainability of a seaport is nowadays not only in its efficiency but it also lies in the productivity of the whole logistical chain. The relation between Spanish seaports such as Barcelona, Tarragona and Valencia and Italian seaports like Genoa, Livorno, Civitaveccia, Salermo or Palermo, is a very good example of the way short sea shipping can change the aspect of transport whithin the continent. It enhances the necessity of a growth in size and in the same direction between harbors.As these chains are becoming more complex, more intricate distribution structures are needed to tailor final products in all their facets to the customer's preferences..

They propose options to introduce an integrated collaborative planning system where producers, retailers and logistic service providers work closely together through the sharing of information about production, sales and logistics.To this increasing complexity, the transport logistic chain must also add environmental and security aspects that play a very important role in the definition of the whole transport system. It may leave out of the line the seaports that will not adapt their characteristics to international regulation on these matters.

[51] OpenEditionJournal, https://journals.openedition.org/cdlm/5187?lang=en#tocto1n3

In short words, the movement of all these amounts of goods, efficiently, in time, safe, and controlled, is impossible without the support of the new communication technologies, in a world where the international trade rules are not always easy.

The Mediterranean Sea transport trade is not an exception but has its own particularities, where many asymmetries are still making differences between territories, and where many considerable changes in the near future will draw new maps of relations between growing economies. Long-term strategies cannot avoid these realities, and have to play with the political uncertainties that remain in the region.

8.2 Port Policies for future Cooperation in the Mediterranean Basin

The current intra-port competition regime that exists in the Mediterranean is incompatible with the need to gain a competitive edge over the other large geographic areas for future. In fact, the outside perception of the Mediterranean is as a single large transit area for the major routes linking the Far East, the northern range and the USA, and through which North-African and South-European markets can be reached. The intra-port competition regime is not appropriate for tapping the potential of the Mediterranean also and above all because of the limitations resulting from the lack of synergistic integrated management of its ports. Thus, new management policies need to be put in place aimed at developing a new, more efficient and competitive "Mediterranean system", that is able to establish close relationships among ports and create new synergies. Statistical analysis of the 34 ports examined here, has demonstrated that it is possible to identify alternative strategies to overcome the fierce competition between ports in the same geographic region.[52]

To have a better analysis of the port Cooperation Policies in the Mediterranean Basin, the ports are divided by clustering suggested into 9 homogeneous classes:

Cluster 1.Includes 5 ports: Alicante, La Spezia, Livorno, Naples and Venice. The variables best characterizing this cluster are organization of yard operations and type of traffic handled. All the ports in cluster 1 are regional ports and have mixed organization of yard operations. The variable for geographic location is not particularly discriminating. In terms of infrastructures, these ports can be considered as "medium sized".

Cluster 2. Includes 2 ports, Gioia Tauro and Tunis-Radès. The most discriminating variables in this case are organization of yard operations, with a 2-loop arrangement, geographic area (Tyrrhenian) and type of traffic handled (transhipment). Both ports have negative growth in the post crisis years.

[52] Mediterranean Basin: An Experimental Approach Using Cluster Analysis, https://doi.org/10.1016/j.trpro.2014.10.049

Cluster 3. Includes 2 ports, Latakia and Marseille, both regional ports and where yard operations have a 2-loop arrangement. These two ports have very similar dimensional characteristics and type and number of mechanical handling equipment.

Cluster 4. Includes 3 ports, Barcelona and Valencia and Genoa. These three ports, that operate both as transhipment and regional ports, have excellent road and rail connections. Because of their high values for size and traffic handled, they can be classified as large sized ports.

Cluster 5. Includes 3 ports: Piraeus, Thessaloniki and Izmir. They operate both as transhipment and regional ports. Traffic shows a negative trend during the crisis and subsequent years with the exception of Piraeus which, like Naples in cluster 1, has an average recovery rate of over 60% in the years 2010-11.

Cluster 6.Includes 4 ports: Damietta, Haifa, Mersin and Port Said West. Apart from geographic location, the other two variables strongly characterizing this cluster are organization of yard operations with a 3-looparrangement, and type of traffic handled (both transhipment and regional). They present similar dimensional characteristics and volume of traffic handled and can be classed as “medium sized”.

Cluster 7. Includes 3 ports, Alexandria, El Dekheila and Limassol with mixed organization of yard operations. All three are transhipment ports, but Alexandria and Limassol operating also as regional ports. Respect to layout and TEUs handled, they can be classed as medium-to-small-sized ports.

Cluster 8. Includes 6 ports: Ambarli, Algeciras, Tanger, Port Said East, Cagliari and Marsaxlokk. These six ports all handle transhipment traffic and yard operations are organized in 3 loops. As for size, the six ports do not have much in common while all exhibit a moderate recovery of traffic in the post-crisis.

Cluster 9. Includes 6 ports: Beirut, Rijeka, Taranto, Ravenna, Trieste and Vado Ligure. Yard operations have a 3-loop arrangement and the ports have similar infrastructure. Apart from Beirut, where traffic handled exceeds a million TEUs, the other ports in the cluster have small-to-medium traffic volumes.

Clearly numerous different clusters can be generated for the ports examined, depending on whether the emphasis is to be placed for example on geographic location, infrastructure, traffic handled or yard organization. In this application, in line with the collaboration policies outlined below, we opted for a scenario that made it possible to take into account the differences and similarities among the 34 ports examined, in terms of organization of port operations, geographic location and size, without neglecting their individual characteristics. The similarities and profound differences among ports that the descriptive cluster analysis produced, provide in this sense the knowledge base for formulating and proposing strategies aimed at incentivizing

and consolidating management, organizational and technological policies underpinning intra-port cooperation.

The application described aims to provide the knowledge elements underpinning the Mediterranean port system and its characteristics, with a view to stimulating the debate on issues concerning intra-port collaboration and future cooperation, the alternative to today's inefficient competition policy. Clustering into 9 different groups according to the variables used here is the first real attempt to find a way towards identifying, in the short-to-medium term, forms of collaboration that will lead to formulating a cooperation policy within the Mediterranean, already internationally agreed but yet to be translated into real actions..

8.3 The future of port networks between the Mediterranean and the Silk Road[53]

The Suez Canal has just celebrated 150 years of operations. Its 2015 enlargement established new port balances in the Mediterranean: the two records broken in terms of number of ships and goods transited (18,000 vessels and almost 1 billion tonnes) have a deeper meaning than mere statistics. A closer look at maritime areas reveals the increased importance of East-Med ports (over a 5-year period, +40% and +7% of southbound and northbound traffic, respectively) and an upward trend in container and tanker traffic which seem to indicate increased centrality of the Mare Nostrum in terms of manufacturing and energy trade flows.

Furthermore, the phenomenon of naval gigantism does not seem to stop, and the most reliable forecasts indicate further future growth. In particular, orderbooks show that 133 new containerships in the 10-23,000 TEU category will be launched by 2022 and 45 of these will belong to the 18-23,000 TEU category. Also, rumors seem to indicate that a Mega-Megacontainership will be ordered by COSCO with a capacity of 25,000 TEU. The criteria for the selection of ports in the MED area will probably become more stringent. While this analysis was undergoing, SRM found only 4 ports capable of accommodating this type of ship. Therefore, it seems clear that smaller ports will be concentrating on feeder traffic and medium-sized vessels as their core business, despite the need to implement dredging to increase capacity.

The scenarios outlined in this Report also illustrate the implementation status of China's Belt & Road Initiative which indicates the end of the previous aggressive Chinese approach to terminal acquisitions in the Mediterranean and Northern Europe. The Asian giant's position has been strengthened in the East Med (Piraeus), West Med (Valencia), access canals to the Black Sea

[53] https://www.srm-maritimeconomy.com/ and https://www.docksthefuture.eu/new-scenarios-in-the-mediterranean-suez-and-china-the-strategies-of-big-carriers-new-technologies-and-energy-routes/

(Istanbul), the Mediterranean (Suez) and in Northern Europe (Rotterdam) where intermodal capacity allows to reach the central-European markets. Further significant investments have been made in Abu Dhabi, Marseille and Malta while an MoU was signed with Italy at the end of March 2019 which will lead to investments in Italian ports (ie Genoa and Trieste) as well as in other sectors such as rail transport, intermodality and logistics. Debate on railway connections to/from China is still open in our country and there seems to be an intention not to miss out on this opportunity.

Figure 28 BRI Chinese initiative

This Report also takes a closer look at Shortsea traffic which represents one of our country's strengths. Indeed, Italy has a 36% market share in this type of traffic in the Mediterranean. Also, Ro-Ro in Italy amounts to more than 100 million tonnes of goods, 50% of which handled in the Mezzogiorno, and represents a strong sector of our maritime economy with excellent shipowners and a worldwide network of terminals. This needs to be continuously supported so as to avoid losing market shares in an area where our know-how is solid and well established.

Therefore, according to SRM's analyses, the idea of a Portuality 5.0 is the new key to interpret port roles. A modern port intending to be an active player in the international competitive situation needs to be moving faster than the industry because it needs to serve it adequately and efficiently

while contributing to the growth of the local territory through attraction of investments that create jobs and boost the economy.

The port needs to encourage the growth of businesses by offering efficiency and streamlined internationalization processes which are generally speeded up whenever ships are allowed to reach destinations in short times thanks to high-quality direct services. All of this makes the port the engine of a country's import-export.

Furthermore, a port needs to increase its ability to stimulate the creation of new businesses and start-ups. In particular, port models such as those of the Northern Range are increasing activities aimed at encouraging the growth of companies in terms of business but also of creation of companies. Another important driver is represented by intermodality which has long been hoped for in Italy but still remains a goal to be achieved since a successful integration of ports, dry ports, roads and railways has not been completed yet. An analysis carried out by SRM in collaboration with Contship Italia (Corridors and logistic efficiency of territories) revealed that only 19% of manufacturing companies in three major Italian regions use a mixed modality of transport (road-railway) to move goods between the port and their warehouses. Working on this aspect could represent the key to improving logistics in our country. Cooperation between the port and the world of economic research should also be taken into account. A modern port must be aware of the dynamics of traffic and the phenomena that surround it, while avoiding isolation and strategies unrelated to those of the national system. SRM has long been supporting the whole maritime system also through its network of partners with the aim of helping the implementation of works and research that could promote awareness and discovery of new frontiers of development and of the changes happening in the Mediterranean in terms of trade flows.

Last but not least, it is important to highlight the ability a port needs to show with regards to its role as driver of the territory. In particular, the introduction of SEZ (Special Economic Zones) in our regulatory framework has required portuality to make the effort of becoming a mainstay of the crucial connection between industry and logistics. In this way, the port becomes a catalyst to the import-export of the territory and therefore one of the main engines of economic development. Italian ports, after a difficult season determined by a complex reform which is still undergoing, are trying to find new competitive momentum and the new presidents are working hard to design and implement new strategies through the identification of the role that Port Network Authorities will intend to play in this situation. Our ports need new stimuli and renewed awareness of the importance of logistics and intermodality in pursuit of a role at the service of industry and tourism supporting maritime operators who wish to further develop. In this context the Mezzogiorno, which activates about 50% of port traffic of the country and whose two thirds of international trade are carried out by sea, needs to be put in a significant position with appropriate investments and strategies. Southern Italy boasts a geographic position close to the

Suez Canal and on the routes connecting the markets of Northern Europe, the Middle and Far East. This is an important fact to take into account when considering the role that this area can play in terms of economic growth of the country.

This is exactly the scope of SRM's contribution to a deeper understanding of such complex, articulated and constantly changing phenomena. The world of the sea moves at a fast pace and the maritime-economic aspects need continuous monitoring alongside the changes that they can produce. This Report, in fact, is only a part of the several in-depth analyses, papers, interviews that the Observatory on Maritime Transport and Logistics carries out and which it will continue to perform in order to keep the attention high on our maritime transport sector. Also, for this issue of the report, SRM has operated in synergy with national and international centres of study which have used their specific know-how to enrich and further validate the contents of these papers. SRM is a member of the Global Shipping Think Tank Alliance together with 16 other centres of research in Europe, the US and the Far East. We are proud to be the only Italian centre of maritime research, and one of the four European ones to be part of this important network. We have also established relations with the KLU-Kuhne Logistics University of Hamburg, the Universities of Rotterdam and Antwerp and with the OECD.
Also noteworthy is another agreement signed by SRM with the Energy Department of the Polytechnic of Turin with which new global energy routes are being analysed. This year, as a sign of increased prestige for the Report, the research team can pride itself with the presence of two renowned papers elaborated by the Port Network Authorities of the Central Tyrrhenian Sea and Northern Adriatic Sea. These institutions have demonstrated to share our point of view in terms of the messages that this volume intends to send, as illustrated by its title which highlights a growing and increasingly central Mediterranean.

Another strength of this Report is represented by the collaboration with Sea Europe, a network comprising the main European players of the sector of shipbuilding, another significant field of the maritime chain. In conclusion, it seems crucial, for our research policy, to stay connected and to network with other Italian and foreign centres of research but also with operators who can complete the Report with their experiences so as to make this volume a reference publication for the sectors of ports and shipping. As for the structure of the Report, it is organized as follows:
The first chapter contains an analysis of the current situation with the most important economic data, international and national port traffic with details as to the ports, canal transits, short-sea, and a focus on the Suez Canal and on import-export in our country.
The second chapter takes a closer look at Ro-Ro, one of the main sectors for the Italian maritime world, by providing detailed analyses of Car Carrier vessels, which transport new cars. After that, the third chapter has been elaborated by a team comprised of members of the Polytechinc of

Hong Kong and SRM. This work takes into account current and future scenarios of Global Container Carriers through an analysis of their fleet, orderbook and financial performance while also considering the effects of the IMO Sulphur cap 2020 on reduction of Sulphur emissions from ships, a phenomenon that will significantly reshape maritime investments. This chapter is closely linked with the fourth one, elaborated by the OECD, about the Big shipping alliances. This topic has long been one of SRM's focus points as this phenomenon is markedly affecting routes and the global logistic situation. Furthermore, Sea Europe have elaborated the fifth chapter on European industry and maritime technologies, a sector that is amongst the most important ones in the world in terms of aggregate production value (€ 112.5 billion), accounting for over 23% of global production value and generating over 900,000 direct and indirect jobs. Pino Musolino, President of the Port Network Authority of the Northern Adriatic Sea (Venice and Chioggia) analyses with detail the phenomenon of China's Belt & Road Initiative, focusing on future strategies and impacts in the Mediterranean and in Italy with very interesting considerations and analyses.

In the seventh chapter, Pietro Spirito, President of the Port Network Authority of the Central Tyrrhenian Sea (Naples, Salerno, Castellammare), focuses on the energy future of ports.

The energy component is one of the crucial variables for the competitiveness of economic systems and for the structure of international trade. The maritime sector represents an important articulation of it, as a result of the exchange flows that are determined between producer and consumer countries. The eighth chapter has been elaborated by the SISI (Shanghai International Shipping Institute), one of SRM's partners. This piece of research is mainly focused on Dry Bulk, through the analysis of routes and future prospects in the Far East, as this specific sector is capable of influencing trends in the maritime trade. Finally, chapter nine has been written by the Consiglio Nazionale dei Dottori Commercialisti (National Council of Accountants) and illustrates the results of the Observatory on balance sheets of maritime businesses.

It highlights a fast-paced growth that results in increases of employment (+1.3%) and of revenues (12.6%), figures which seem even more remarkable if compared with the overall growth of turnover of Italian SMEs, which amounted to 5.3% in the same period.

We wish to conclude this introduction to the volume with a special thanks to SRM's researchers and to the partners of this project who demonstrate their faith in our work and support us in this adventure we have embarked upon. A special thanks goes to all the authors who have contributed to adding to the value of this research.

Hoping we have been able to provide factual support to those convinced that the development of the economy of maritime transport and logistics is a priority for our entire country. The challenge is still ongoing.

Long Term Strategic Implications[54]

In short words, the enthusiasm of port authorities to attract Chinese capital speaks for itself. European ports are likely to continue benefiting from the growth of trade with China and will compete to attract container traffic. Eurasian trains may arouse the imagination but the supremacy of maritime trade for EU-China relations is not going to be threatened any time soon: around 65% of EU-China trade in goods is transported by sea, against 2% by rail.Nevertheless, Chinese investment in Mediterranean ports raises issues with regards to European competitiveness, and how to deal with China's naval power.

At the level of companies, the European rise of COSCO and China Merchant Group raise two important questions for Europe's maritime economic actors: to what extent the two Chinese companies will be able to dictate the terms of business to their European partners, and the lack of a reciprocal treatment in China.

But one level up from the strategic perspective in Beijing on China's national interests, port investment is part of the wider goal of developing the country's blue economy to a global leadership position. The State Oceanic Administration calculates China's "blue GDP" at 10% of the country's total GDP – the equivalent of the Mexican economy. The notion includes fisheries, shipbuilding, offshore oil and gas exploitation, maritime engineering, maritime biology pharmacy, renewable energies, the services industry with coastal and sea tourism and public transportation, but also maritime finance. The big picture surrounding investment in ports is captured in the Five-year plan for China's blue economy issued by the SOA and the National Development and Reform Commission. It is thus important for Europeans to also think port management and control in terms of the long-term competitiveness of Europe's maritime actors vis-à-vis China.

On the security side, the long-term question is whether China will have an interest to develop a naval presence in the Mediterranean, where the Chinese navy has conducted joint exercises with a number of partners in recent years, including Russia. Both Chinese foreign and defense policies include doctrines to defend the country's "overseas interests", a concept that justifies the ongoing construction of the PLA Navy's first outpost in Djibouti. That the number of such facilities will grow is not vague speculation fueled by a China threat theory, but a well-articulated policy promoted by Xi Jinping.

8.4 Impacts of COVID19 on Ports and Maritime Transport in Mediterranean Region[55]

Around 80 percent of global trade is transported by commercial shipping and intra-mediterranean maritime trade flows account for nearly 25% of global traffic volume.

[54] https://www.ispionline.it/en/pubblicazione/blue-china-mediterranean-beyond-port-management-22161

[55] https://ufmsecretariat.org/impacts-covid-ports-maritime-transport-mediterranean/

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The maritime industry is playing an essential role in the short-term emergency response to the COVID-19, by facilitating transport of vital commodities and products. Despite the current difficult times, a vast majority of ports have succeeded to stay open to cargo operations. However, most of them still remain closed to passenger traffic. Mid and long-term recovery will need to further enhance sustainability and resilience of the maritime transport sector as a whole, for sustaining jobs, international trade, and global economy, as much as possible.

In view of the disruption generated by the COVID-19 pandemic on the maritime networks, the Unio for Mediterranean and the MEDports Association co-hosted a webinar with key sectorial partners (list below) to discuss how to enhance sustainability and resilience of ports and maritime transport in the Mediterranean region during and after the pandemic.

The Mediterranean Sea has been a critical maritime and commercial route for millennia and today. It is home to 87 ports of various sizes and strengths, serving local, regional and international markets. The COVID-19 pandemic has showcased the vulnerability of maritime networks, port efficiency, and hinterland connectivity in the Mediterranean to crisis situations. As a vital enabler of smooth functioning of international supply chains, the maritime industry should focus on building sustainability and resilience, including to ecological disasters and pandemics like COVID-19, as well as enhancing efficiency and operations, to remain viable and competitive on the global market.

It was concluded that, with due regard to the protection of public health, ports must remain fully operational with all regular services in place, guaranteeing complete functionality of supply chains. Governments were called upon to support shipping, ports and transport operators in favour of best practices. Participants reiterated that the maritime transportation system will only be sustainable as long as it provides safe, efficient and reliable transport of goods across the world, while minimizing pollution, maximizing energy efficiency and ensuring resource conservation. It was underlined that, in the maritime sector, resilience means that ports, and the organizations that depend on ports, can adapt to changing conditions and, when disruptions occur, they can recover quickly and resume business stronger than before. ***Furthermore, it was noted that the COVID-19 pandemic could represent an opportunity for the maritime industry to change the way the industry operates so as to effectively contribute to broader systemic resilience.***

8.5 Future professional profiles in Mediterranean Ports

In 2019, a survey on the most requested professional profiles in Mediterranean ports was conducted by **MEDports Association**'s Employment, Training and Maritime Expertise (ETME) Committee. The survey was answered by 14 ports and 50 trainees from the Arab Academy of Science, Technology and Maritime Transport (Egypt). The survey identified profiles needed in ports in four main areas: port management, IT, environment and city port, port construction and security and safety.

The ETME Committee decided in its meeting on April 15th 2020 to continue working on this topic focusing on the future professional profiles and areas of expertise not covered by training institutes today. Seven profiles were highlighted as very relevant by participants. These profiles are not covered or deficiently covered by current training programs. We have worked on the detailed definition of these profiles and added an additional one on Onshore-Power-Supply bearing in mind the increasing relevance of this topic.

These job profiles will be key for the future development of Mediterranean ports and they will contribute greatly to their efficiency and competitiveness in a changing environment. The adaptation by ports to new market requirements is a key element for ports' success and their contribution to the society which may be threatened by the lack of the required training.

Therefore, *we strongly invite training institutions to develop a comprehensive training offer in order to cover the needs of job profiles of the future in Mediterranean Port Authorities.* Specific training modules will have to be designed for each member of the teams supporting the positions described on this document which belong mostly to managerial positions.

Professional profiles identified

Big Data Analyst

Job Title: Big Data Analyst	
Area of Expertise: Big Data management, IT.	
Tasks and responsibilities	• Selecting, designing, developing and managing tools directed to make efficient use of all the enormous amount of data generated daily by port operations. • Effectively analysing and processing data to be one of the main inputs in order to assess the technical performance of the port and institution forecast operations and make recommendations on system improvements. • Implementation of services, profiling source information and executing big data processes.
Qualifications	• Education degree in management information systems, computer science, or a related discipline to work as a big data analyst. • Quantitative Training with a solid understanding of basic statistics.
Knowledge	• Well aware of database modelling tools and programs. • Programming and Coding knowledge at least Python, Java, C++, SQL • Know about scripting languages. • Data warehousing; Experience with relational and non -relational database systems. • Define verification procedures and data limitations. • Understand Quantitative Aptitude and Statistics. • Knowledge of Statistics and linear algebra. • Business Knowledge.
Skills	• Must be able to develop solutions for real-time distributed data processing, as well as computational pipelines • Excellent technical abilities, • Strong interpersonal skills in order to communicate with colleagues, • Organizational management and effective project management abilities in order to oversee multiple projects. • Fluency in English is mandatory (French, Mandarin and/or other language are appreciated). • Stay up to date with blogs, news, journals, MOOCS and listening to podcasts.
Attitude	• Well-ordered mind logic thinking with paying attention to details • Ability to learn new skills. • Being able to work in a team. • Analytical ability. • Credibility and transparency.

Cybersecurity Manager

Job Title: Cybersecurity Manager	
Area of Expertise: Cybersecurity, legal aspects of IT	
Tasks and responsibilities	• Protect the organization's data from misuse, theft and corruption in order to ensure de continuity of operations. • To define the security policies and ensure compliance with the implementation of security plans. • Risk assessment, planification and implementation of security measures and tools; monitor Internal and External Policy Compliance; regulate access to information and training staff on proper use of information systems; define the procedures to take place in case of an intrusion. • Ensure the rapid recovery of the organization operations.
Qualifications	Education degree: • Information technology. • Computer science, engineering or a related discipline. • Other Certificates Java, CISSP, CEH, and Comp TIA Security.
Knowledge	• Programming, coding and tracing knowledge. • Define Data risk assessment. • Manage critical data and clarity around information-driven processes across key business areas. • Knowledge of system security, and data assurance. • Understand data architecture, administration, and management of operating systems. • Awareness of common web vulnerabilities.
Skills	• Strong interpersonal and persuasion ability. • Data risk assessment and analysis. • Problem-solving and analytical ability. • Commitment to continuous development and continuing education, to stay on top of IT and cybersecurity trends. • Fluency in English is mandatory (French, Mandarin and/or other languages are appreciated).
Attitude	• A collaborative work style. • Ability to clearly articulate different concepts. • Good and active listener. • Engage well with colleagues. • Logic Thinking and tracing.

Manager of Sincromodality and Intermodal Networks

Job Title: Manager of sincromodality and intermodal networks	
Area of Expertise: Intermodal connectivity, Logistics	
Tasks and responsibilities	• Developing, managing and monitoring infrastructure, commercial and operational aspects of the intermodal network that connects the port area to inland and short sea locations which consists of a network of facilities distributed in the hinterland and short sea locations and connected to the port by intermodal corridors (rail, short sea, road and air transport services). Promotes and participates in the development of railway and short sea services; as well as in the management of terminals Participated by the port authority and/or third parties- and in the analysis of competition and potential new developments. Monitors and promotes the infrastructure needed for the operational and commercial viability of the services (port and inland terminals, railway infrastructure, road connections, etc.). Working hand in hand with the national infrastructure agencies in order to coordinate schedules of rail and short sea services and to solve incidents that affect the reliability of the services, such as delays, accidents and infrastructure damages. Works with rail and short sea operators, shipping lines and maritime agencies, logistics operators and shippers in order to be able to adapt the services provided by inland terminals to their requirements.
Qualifications **Knowledge**	• Degree level or hold relevant qualifications/experience on ports, logistics and rail sector. • Experiences in working with rail and short sea operators, shipping lines and maritime agencies, logistics operators and shippers in order to be able to adapt the services provided by inland terminals to their requirements. • Understand different modalities of transport such as air, sea, or intermodal freight transport. Specialize in one of the modalities and possess a deeper knowledge of the details and procedures of that modality. • Wide Knowledge of Multimodal transports Elements That Benefit for: reducing transport cost, Improvement of the product's path from the manufacturer to the customer, Minimizing delivery time, Creating more loading opportunities, Reducing the risk of damage to Cargo. • Supply chain Knowledge; The flow of goods in the supply chain, movement and storage of raw materials, work-in-process inventory, and Door to Door Methodology. • Acquainted with new developments and innovation concerning inland and sea transportation. • Know current and future intermodal options and alternatives such as the piggybacking system, the road-rail system, fishy back system, low body systems or the push-pull cargo sprinter. • Ideally he / she should be part of the port's top management in order to be able to interact effectively with the national infrastructure managers and agencies.

Skills	• Being acquainted with new developments and innovation concerning inland and sea transportation. • Organizational management and effective project management abilities in order to oversee multiple projects. • Problem-solving and analytical ability. • Ability to influence others and leading cross-functional teams • Strong commercial orientation. Financial competenes • Interact effectively with the national infrastructure managers and agencies. • Fluency in English is mandatory (French, Mandarin and/or other language are appreciated).
Attitude	• Availability to travel. • Ability to lead cross-functional teams. • Logic thinking Analytical ability. • Keen on being updated with all new developments and innovation concerning inland and sea transportation. • Ability to work under stress. • Enterprising and Conventional. • Credibility and loyalty to the organization. • Adapt actively to different work environments.

Cold Supply Chain Expert

Job Title: Cold Supply Chain Expert	
Area of Expertise: Supply Chain Management	
Tasks and Responsibilities	• Ensure the performance of a cold supply chain from order to shipment. • Collect and analyze supply chain data to recommend improvements to boost performance and reduce costs through the coordination with other professionals to implement changes and new systems. • Work in a supervisory capacity; oversee a variety of different companies within the cold supply chain to ensure that the overall process runs smoothly. • Involve in the development and implementation of projects and policies to achieve a smooth transit of goods through the port. • Serve as a liaison between the port authority and cold supply chains representatives. • Conduct data analysis to improve supply chain operations to increase efficiency and reduce costs. • Construct appropriate forecasts to identify key changes that will impact supply chains services and infrastructure requirements in the future. • Act as an interface between the private and public sectors, communicate issues and appropriately resolve customer requests. • Coordinate with other professionals to implement changes and new systems.

Qualifications	• Supply Chain Management, Finance, engineering or similar fields. • Postgraduate studies on Intl. Business/trade and/or maritime sector. • At least 5 years in logistics/freight forwarder/climate controlled warehouses companies.
Knowledge	• Know about Supply Chain Management. • Understanding of Finance. • Identify Hazard analysis and critical control points. • Knowing product specific quality control and assurance standards. • Operational understanding of the safety precautions to be taken for product handling.
Skills **Attitudes**	• Identify organization's policies and procedures. • Microsoft Office Applications, especially excel. • Familiarity with supply chain processes (e.g. inventory planning, warehouse management. • Knowledge of ERP systems (SAP, Big Data, IoT, Qlik, Microsoft or • similar). Communication or marketing knowledge. • Excellent analytical skills, including the ability to evaluate complex situations and make clear, logical recommendations to address the challenges those situations present. • Negotiation and Excellent written and verbal communication skills in order to build strong work relationships with suppliers, customers and his team. • Solid understanding of his various Tasks related to cold supply chains and it components and information. • Good organizational skills, strong attention to detail and ability to prioritize tasks. • Excellent written and verbal communication • skills. Problem-solving aptitude. • Fluency in English is mandatory (French, Mandarin and/or other language are appreciated). • Understand various business environments. • Ability to negotiate and build strong work relationships with suppliers, Customers and his team. • Solid understanding of his job related components and • information. Goal oriented. • Multitasking ability. • Attention to details. • Credibility and transparency

Energy Transition Manager

Job Title: Energy transition Manager	
Area of Expertise: Energy transition	
Tasks and Responsibilities	• Coordinate the collective efforts of the organization towards while balancing the need for the obtention of energy. • Constant correspondence with a multitude of interested parties such as electricity providers and agencies, terminals, shipping lines, other ports. • Coordinate the different port teams (basically operations, infrastructure, finance and commercial) in the projects design and lead the transition. • Initiate, design, facilitate and coordinate projects to accelerate the energy transition through innovation and collaborative solutions. • Communicate proactively with stakeholders to maximize output, engagement, success and relevance of projects. • Develop complete project plans and associated communications initiatives. • Facilitate project workshops. • Develop and deliver reports and presentations. • Communicate key project results to stakeholders. • Report directly to the port's top management.
Qualifications	• University Degree, Engineering, Technology, Management. • At least 4-6 years' experience as project manager or similar.
Knowledge	• Environmental knowledge (Energy systems, integrations of energy systems,), sector operations processes. • Knowledge of current issues relating to climate change, mining and energy, clean technologies and transitions. • Define developing and implementing campaign strategies relating to climate change, environmental conservation and sustainable development. • Identify operations of the company in order to recommend changes to energy transition, and manage the steps required. • Knowledge and understanding within areas like energy, digitalization, business development, innovation, transformation, strategy implementation and change.
Skills	• Advance skills in advocacy, community outreach, multi-management, and various organizations. • Strong empowerment in order to lead the port's main areas in the transformation. • comparative analysis and synthesis capabilities, • planning and time management skills, • Analytics. • Environmental knowledge or technical skill on environmental issues • Ability to successfully initiate, facilitate, plan and manage e.g. business, energy and digitalization projects. • Strong communication capabilities and talent for building network and trusted relationship. • Fluency in English is mandatory (French, Mandarin and/or other language are appreciated). • Organizational skills.
Attitudes	• Credibility and Transparency.

	• Confidentiality. • Well organized and structured. • Initiative. • Understanding the importance of creating good working environment and strong teams. • Multi-tasking ability.

Onshore-Power-Supply Manager

Job Title: Onshore-Power-Supply Manager	
Area of Expertise: Onshore-Power-Supply	
Tasks and responsibilities	• Initiate, design, facilitate and coordinate projects to implement and run systems in ports • Create and oversee the implementation of short and long-term projects and strategies to implement OPS solutions in ports • Calculate the budget, project energy savings, and identify the goals for each project. • Project energy savings, and calculate emissions savings and external costs of potential emission savings. • Undertaking feasibility studies for designing and installing OPS in ports. • Analyse vessel call data to calculate energy demand, • Calculate cost benefits and operating costs. • Keep up to date with legislation affecting OPS, such as the EU Emissions Trading System (EU ETS). • Report to the port's energy transition manager.
Qualifications	• Degree in Marine engineering degree with strong focus on energy systems, smart grid, renewable energy, climate change and processes of change.
Knowledge	• Knowledge of technical methods to reduce the energy consumption of anchored ships such as converting the power generation source from the ship's to alternative energy supply methods. • Well aware of emission reduction methods for anchoring ships such as land-based and ship-based reduction Systems. • Understand ports sustainability management and operations concepts especially resilient infrastructure and equipment • Deep knowledge and up to date with international regulations and IMO Conventions related to port environment , bunkering and sulphur emission reduction. • Advanced Knowledge of occupational health, safety and security in ports.

Skills	• Highly organized individuals who can prioritize tasks and complete multiple simultaneous projects on deadlines. • Technical skills (control systems, distribution systems, power electronic and micro-grid and smart grid). • Highly analytical Skills. • Project Management.

	• Decision-making capacity. • Transparency. • Confidentiality. • Foreign languages, especially English.
Attitudes	• Multitasking ability. • Well organized. • Initiative. • Transparency. • Confidentiality.

Circular Economy Manager

Job Title: Circular Economy Manager	
Area of Expertise: Energy transition and city port	
Tasks and responsibilities	• Enabler of change, to help to reduce waste, increase energy efficiency promote responsible water use – all as part of a journey towards a low-carbon, sustainable economy in all port community. • Develop and oversee the implementation of short and long-term projects and strategies to implement the circularity strategy. • Set the overall strategy; including planning, developing and implementing a portfolio of projects and activities to support the circular economy. • Develop strong relationships with external stakeholders to identify interventions and assistance mechanisms to improve the delivery of projects. • Understand current and future legislative and policy drivers relating to the circular economy. • Contact the interested players is compulsory in order to coordinate tasks and implementing the new systems.
Qualifications	• Educated to degree level or equivalent in a relevant discipline and/or relevant professional experience.
Knowledge	• Define all processes and activities of your organization using the Circular Thinking. • Understand all businesses of the organization and be able to identify areas for possible circular improvement. • Understanding of Finance. • Knowledge of project design and management in terms of recycling and reducing process waste. • Knowledge of increasing process efficiency, reducing costs and, consequently, through reduction on energy costs and raw materials acquisition as well as increasing efficiency in production processes and higher product added value. • Evidence of successfully engaging with different stakeholders and creating shared vision across groups. Ability to find and make relevant new contacts.

Skills	• High emotional intelligence across cultures. • Capacity to work independently, proactively address problems and meet deadlines. • Engaging communicator across cultures both in person and in writing, abilityto adjust style of communication to suit audience. • Comfortable speaking to large audiences and running workshops with diverse stakeholders. • Ability to manage multiple project tasks and ad hoc demands simultaneously. Thrives when working in a collaborative environment and understands that the ebb and flow of team priorities may require "all hands on-deck" at times. • Excellent verbal and written communications skills in English are critical, fluency in additional languages is an advantage

Attitudes	• Multi-tasking ability. • Enthusiastic about his working environment. • Stress management • ability. Conflict resolving • ability. Awareness of the importance of his communications abilities and its • effect on achieving job goals. Can work well independently and in teams.

Common skills to all positions

All these areas to be covered in ports in the coming years will require new staff or newly trained personnel from the port authorities with some skills and education areas that are common to all the sectors and positions identified.

General skills:

- Strong IT background -knowledge
- Capacity to work in multidisciplinary ecosystems
- English and second language Chinese, French, Arabic, Spanish
- Analytical and problem-solving skills
- Organizational management and effective project management abilities in order to oversee multiple projects
- Project management skills to manage a budget and cope with practical issues
- Ability to influence others and leading cross-functional teams
- Excellent numeracy and literacy skills for analysing and interpreting quantitative and qualitative data, carrying out research, writing reports and making recommendations.
- Microsoft applications
- Knowledge of international trade/business and the maritime sector

Skillsea in his report point for global trends together with skill that considered for them to be important future skills and competence.

Global trends:

- Sustainability (i)
- Collaboration of clusters (ii)
- Digitalisation (iii)

(i) Sustainability Trends

The Interational Maritime Organization (IMO) has reached an agreement on a strategy for the reduction of CO2 emissions from shipping. Its Marine Environment Protection Committee (MEPC) announced that member state delegates have agreed on **a target to cut the shipping sector's overall CO2 output by 50% by 2050**, to begin emissions reductions as soon as possible, and to pursue efforts to phase out carbon emissions entirely.

The 50% CO2 reduction goal is roughly in line with a proposal endorsed by the International Chamber of Shipping. To achieve **such a reduction** will mean **major improvements in logistics, hydrodynamics, machinery and fuel**. Within fuel we will see a number of sources as LNG/LPG, electric systems, biofuels, synthetic fuel and hydrogen. Such **improvements will have to be implemented in a significant scale by 2030** if there is to be the necessary impact by 2050.

We believe a **reduction of speed from 25 to 15 knots** will typically **reduce the fuel consumption by 60%** but can only be effective if delivery obligations are maintained.

The CO2 reduction targets as referenced cannot be achieved by one single technology. **A range of areas must be improved**, such as:

- Logistics: reduction of speed, ship size, utilisation of ships, reduction of waiting times, optimum routeing
- Hydrodynamics: optimum design of hull, hull fouling and cleaning
- Machinery: use of surplus heat, optimisation of machinery, batteries, etc.
- Fuel and energy sources: LNG/LPG, batteries, biofuel, synthetic fuel, hydrogen, etc.
- System for effective harbour operations.

(ii) Collaboration on clusters

Strong maritime cities and clusters are expected to grow. **Cities with good maritime education and training, combined with surrounding industrial clusters** of advanced companies, will have a precondition to **develop new competencies for the maritime industry's future workforce**. Within maritime cities and corresponding industrial clusters there are complementary competence profiles around the world. However, a **unique opportunity** for maritime cities and clusters is to achieve a **close cooperation** and thereby **encourage collaboration** and specialisation. Unique competencies and thereby education programmes and training will be nurtured in these collaborated clusters.

The **quality and variety of maritime education institutions**, as well as industrial clusters with the necessary density of companies, are **key to attractiveness**. Clusters of companies, competing and cooperating, support innovation and access to talents.

Hence, close links between educational centres, shipowners and manufacturers are critical for the strength of such a R&D development strategy. This not only will offer benefits to Europe the world will be able to connected.

Openness and information-sharing are particularly important, both for **reducing transaction costs** and even more important for knowledge-flow and innovation.

(iii) Digital transformation and innovation opportunities

Opportunities in shipping:

- Autonomy: autonomous ships are new concepts that will challenge the conventional methods for designing, testing and operation of ships.
- Dispersed crew and remote operation: enabled by improved connectivity and autonomous functions
- Cargo tracking and cargo condition monitoring
- Logistics and value chain: seafarers increasingly need to understand and operate in a fully integrated logistics environment.
- Smart port operations: sensors will collect, process and analyse real-time data to check availability of berths and other data points such as weather, tide, clearance etc.
- E-brokerage platforms
- Smarter commerce with blockchain: potential to generate new innovative channels for the development and deployment of logistics applications or solutions
- Anticipatory shipping: Amazon is developing capabilities to build predictive analytics around consumer shopping behaviour.

- Blockchain: impact of blockchain technology is expected to provide a broader reach to track right and creating an unprecedented transparency within the entire supply chain system
- Optimal routeing
- Ship operations performance: digital twins can be used to optimise operations by extensive use of data.

The digital transformation and distributed technologies change our societies and the maritime business. The **gap between common practice, competence and future opportunities is observed to be growing**. Skills **supporting business development** taking advantage of technology **will be important**. **Work tasks** will increasingly be **transferred** from **the ship to shore-based control centres**. **Advanced skills in analytics and use of data** in optimisation of the fleet **will be needed**. All in all, the **maritime professionals** (both seagoing and shore-based) **need in-depth understanding of the complex systems** onboard to be able to serve the needed redundancy of all systems.

This survey was conducted through the identified stakeholders mencioned in the sections aboved in order to understand the more important themes for the ports. In our consultation 80% of the respondents are extremely connected with port activities which make this conclusions reliable.

The Docks the Future project aims among several objetives for the transferability between ports of successful iniciatives, the findings of the consultation are aligned with that and show that there is a general concensus for increasing the project transferability from research to deployment they also agree on make the EU a frontrunner in low and zero carbon technolgies something that has been done and supported by European Commision as we can see in European Green Deal communication.

The perception of the experts indicate that is important not only accept energy transition towards new energy store facilities and energy production but also they consider an important point reducing emissions. However, the use of solar power was one of the points where was some dispersion.

Resilience against climate change is not new and European Sea Ports Organisation has working on that topic with more than 90% of the stakeholders agreeing on increase resilience against climate changes.

A number between 75%-90% of the respondents of this consultation seems to care in an important way for:

- Modal shift in transport from roads and air to ferries and short sea shipping;
- EU cohesion on all transport system and an integrated multi-modal transport approach;
- Incentivise investment in the digital future;
- Raising the environmental profile/performance of ports and promoting innovation in sustainability;
- Introduction of human centred strive new technology;
- Predictability and consistency from European institutions in terms of legislation;
- Harmonization of education and training of port workers in EU;
- Focus on (ICT) education and training;
- Make stronger concession agreements and include KPI's about sustainability;

- Improving environmental, energy and port performance in a systematic and standardised approach;
- Incentivise investment in the digital future;
- Support circular economy schemes and promotion of more logistics spaces.

By ranking stakeholders preferences there are issues that at least the most part believe are of foremost importance like involve other actors in the education and training planning or incentivise investment in the digital future. On the other hand they consider lessmost importance actively promote the possibilities of careers in ports or energy savings.

Topics that did not stand out and that were classified with the same rank of importance was waste emission from industry, cargo waste and polluter pays.

Regarding the open-ended responses some stakeholders highlighted the relations and interactions between Port-City, better streamline supply demands and port operations or incentivise bussinesss working in port related sector to work closely.

Finally, two open responses must be included given their good feedback:

“The port of the future should also invest in smart and innovative technologies to improve security at port facilities. Creation of smart docs with state of art technology to inspect high risk cargo.”

“Ports have an increasing role to play beyond being hubs for transport and logistics. With an ever increasing use of the maritime space for economic activities, they are key players to make sure that this happens in an integrated and sustainable way - the blue economy.”

ANNEX VI – Clustered Projects

Name	Short description
SUPPORT - Security UPgrade for PORTs	'Security upgrade for ports' (SUPPORT) project planned to improve European port security. The consortium aimed to provide security upgrade solutions involving legal, organisational and technological factors.
NEWS - Development of a Next generation European Inland Waterway Ship and logistics system	NEWS' principal objective is to increase (container) transport flows on inland waterways (especially the Danube)
TEFLES - Technologies and Scenarios For Low Emissions Shipping	TEFLES addresses both sea and at port emissions scenarios by developing after treatment technologies and combining a selection of innovative and promising technologies with potential high impact, integrating them and assessing their impact with models on sea and port operation scenarios
Zero Emission Ferries - a green link across the Öresund	Covers the introduction and testing of new and innovative concept and technology by converting two existing complex RoPax ships - originally driven by marine gasoil - to plug-in all electric powered operation using exclusively batteries
AEOLIX- Architecture for EurOpean Logistics Information eXchange	AEOLIX will establish a cloud-based collaborative logistics ecosystem for configuring and managing (logistics-related) information pipelines.
ITN - Intermodal rail freight Twin hub Network Northwest Europe	The aim of the project is to make intermodal rail transport in, from and to North West Europe (NWE) more competitive, in particular between the Dutch and the Belgian seaports and European inland terminals,
EFFISEC - Efficient Integrated Security Checkpoints	The global objective of EFFISEC, a mission oriented project, is to deliver to border authorities more efficient technological equipment
Promotion of multimodal connectivity and enhancement of landside & seaside accessibility	The PAC2 cluster brings together the PATCH (Ports Adapting To Change) and C2C (Connect to Compete) transportation projects to raise awareness of their best practices and development potentials on multi modal connectivity in the 2 Seas macro region's Small and Medium Sized (SMS) ports
C-BORD - effective Container inspection at BORDer control points	C-BORD Toolbox and Framework will address all these targets and enable customs to deploy comprehensive cost-effective container NII solutions to potentially protect all EU sea- and land-borders, satisfying a large range of container NII needs
FUTUREMED - Freight and passengers sUpporting infomobiliTy systems for a sUstainable	The main idea of the project is to improve the competitiveness of port systems in the MED area by improving accessibility through technology and procedural innovations, and guaranteeing sustainability of transport.

impRovEment of the competitiveness of port-hinterland systems of the MED area	
5G Industrial Environment Trial Platform launched in the Port of Hamburg	The Port of Hamburg is the testing ground for 5G, the next generation mobile standard that is set to transform communications.
First e-charging of commercial vessel at Greek port	Aims to reduce emissions in ports and to reduce operating costs.
TiPA PROJECT - EU TIDAL PROJECT	This project will validate in a real-world environment, an innovative direct drive Power Take-Off (PTO) for a tidal turbine that will move tidal energy a step closer to competing on a commercial basis with other renewable sources of energy generation.
Connected Technology Truck Convoy Testing	Trucks equipped and tested with connected technology trial convoy driving at the Port of Rotterdam (december 2018) in a bid to make the logistics sector more efficient, safe and sustainable.
EU CISE 2020 - EfficienSea2	EU CISE 2020 is an important step towards the accomplishment of the European roadmap for CISE; the project attains the widest possible experimental environment of innovative and collaborative processes between European maritime institutions.
EfficienSea2 project	EfficienSea2 has been a demonstrator in the Arctic and Baltic Sea and the first generation of a coherent e-Navigation solution.
PROMINENT	Address the key needs for technological development, as well as the barriers to innovation and greening in the European inland navigation sector.
SUNRISE	Five federated underwater communication networks, deployed by consortium partners, in diverse environments (Mediterranean, Ocean, Black Sea, Lakes, Canals), web-accessible and interfaced with existing FIRE facilities to experiment with Future Internet technologies.
CBRNE Detection in Containers	The threat of CBRNE (Chemical, Biological, Radiological, Nuclear and Explosives) components used by terrorists is major concerns for EU and worldwide security.
STM Validation	STM is creating a new paradigm for maritime information sharing offering tomorrow´s digital infrastructure for shipping.
GoLNG	Project "Go LNG" is a response to the ever-changing situation on the LNG market. It is focused on the development of demand and accessibility of LNG in the Baltic Sea Region (BSR).

POSEIDON MED	POSEIDON MED is the LNG bunkering initiative from fellow EU countries in the Eastern Mediterranean and Adriatic Sea led by QEnergy Europe and organised by top experts in marine energy, gas and finance sectors.
LOGIMATIC -Tight integration of EGNSS and on-board sensors for port vehicle automation	LOGIMATIC proposes an ad-hoc advanced location and navigation solution to enable the automation of existing port vehicles with a significantly lower cost which will allow short-medium term investments until the whole port fleet is renewed with totally autonomous vehicles in the long term.
EU-PORTRAITS (EUropean PORTWorkers TRAIning Scheme)	EU-PORTRAItS aims to examine the "map" of the EU ports 'human capital' in relation to the sector's current and future needs &requirements for well educated, trained &qualified staff, who can ensure safe & efficient operations in EU ports, securing EU ports' industry competitiveness.
PORTOPIA (Ports Observatory for Performance Indicator Analysis)	PORTOPIA aims to develop, next to extensions of existing indicators within the different perspectives of port performance, innovative approaches for the industry's stakeholders
DOCKINGMONITOR	DockingMonitor - development of automated combined berthing aid and drift monitoring system for large ships, particularly oil and LNG gas tankers
ROMP (Rome's Mediterranean Ports)	RoMP re-interprets the character and roles of Roman Mediterranean ports, recognizing that no single source of evidence is sufficient to meet this challenge.
GREEN EFFORTS (Green and Effective Operations at Terminals and in Ports)	"GREEN EFFORTS aimed at making terminals and ports a better place to work and to live with" as carbon footprint mitigation was the objective specified by the European Commission
ECOHUBS	Designed to support "Resource Efficient Europe", the flagship initiative of the Europe 2020 Strategy, EcoHubs has researched and developed the tools required for sustainable freight transport and logistics networks as part of a smart, safe, environmentally friendly and inclusive EU economy.
CARGO-ANTS	Cargo-ANTs project, "Cargo handling by Automated Next generation Transportation Systems for ports and terminals", aims to face two opposite constraints affecting nowadays world of container handling: the continuous growth in global trade and the new stringent environmental regulations, as demanded by a higher claim for sustainability.
SAIL	An EU initiative developed a combined tool for managing separate port terminals. Optimising the intermodal transport between such port areas is cost effective and at the same time reduces the related environmental impact.

Civitas PORTIS : PORT-Cities: Integrating Sustainability	Civitas PORTIS designs, demonstrates and evaluates integrated sets of sustainable mobility measures in 5 major port cities located on the North Sea (Aberdeen and Antwerp), the Mediterranean Sea (Trieste), the Black Sea (Constanta), and Baltic Sea (Klaipeda).
LoCOPS (Low Cost Onshore Power Supply)	The main objective of this project is to supply and demonstrate a competitive shore power supply also called Onshore Power Supply (OPS) related to providing electricity for cruise ships when docked in port.
LEAWIND	The primary LEANWIND objective is to provide cost reductions across the offshore wind farm lifecycle and supply chain through the application of lean principles and the development of state of the art technologies and tools.
SAURON	SAURON project proposes the holistic situation awareness concept as an integrated, scalable and yet installation-specific solution for protecting EU ports and its surroundings. This solution combines the more advanced physical SA features with the newest techniques in prevention, detection and mitigation of cyber-threats, including the synthetic cyber space understanding through the use of new visualization techniques (immersive interfaces, cyber 3D models and so on).
CTA-VLC COMPARISON (Catania and Valencia's way to modernity. A multidisciplinary comparison between two port cities within Mediterranean Europe (1850-1915)	This project compares the two cities of Catania and Valencia in order to theorise a new growth model related to industrialisation and maritime
HiSea (High Resolution Copernicus-Based Information Services at Sea for Ports and Aquaculture)	The Sentinel missions and Copernicus Services provide a global view of environmental parameters of prime importance for climate and environmental research
AFRIGOS (African Governance and Space: Transport Corridors, Border Towns and Port Cities in Transition)	AFRIGOS investigates the process of 'respacing' Africa, a political drive towards regional and continental integration, on the one hand, and the re-casting of Africa's engagement with the global economy, on the other.
MedRoute (On the route of multiculturalism(s). Marking and hybridizing identities in the late 17th	This project aims to analyze the phenomenon of multiculturalism in four Mediterranean port cities of the late seventeenth and the early eighteenth centuries.

and early 18th centuries Mediterranean port cities)	
IMPRESSIVE (Integrated Marine Pollution Risk assessment and Emergency management Support Service In ports and coastal enVironmEnts)	IMPRESSIVE project focuses in developing a universal-relocatable platform for real time management of marine pollution events in the wider area of EU harbors and their vicinities, easy to manipulate and use from the harbor control post. EO monitoring and advanced modeling of these areas
BTPin (Commercialising Innovative and Market Disruptive Pin Technology for Improving Heavy Machine Operations in Port, Mining and Construction Industries. Phase 1.)	Bondura Technology (BT) manufactures tailored pin tool solutions
POR2CORE-AGCT	The Core network port of Rijeka is the largest maritime port of Croatia. The action aims at upgrading the railway connection between Rijeka and the Adriatic Gate Container Terminal
PAN-LNG-4-DANUBE	The Action's overall objective is to foster LNG use in inland navigation sector across the Danube, therefore contributing to the European alternative fuels implementation strategy
GAINN4MOS - Sustainable LNG Operations for Ports and Shipping - Innovative Pilot Actions	The GAINN global project aims at supporting EU Member States policy-makers, ports and shipowners operating in the EU Atlantic and Mediterranean countries to comply with Marpol Annex VI and Directive 2012/33/EU in the most efficient way
2016-PL-SA-0011 The small-scale LNG Reloading Terminal in Gdansk and bunkering services	The Action aims at assessing the feasibility for the construction of a small-scale LNG reloading terminal in the port of Gdansk and of LNG bunkering vessels as well as at launching the related preparatory activities
Go4Synergy in LNG	The objective of this Action is to carry out a study aimed at creating a pilot deployment of a motorway of the sea link between a small scale LNG-to-container transhipment facility in Zeebrugge (BE) and a ship bunkering facility in Gothenburg (SE).
DOOR2LNG Upgrade of the maritime link integrated in the multimodal container transport routes	This action will environmentally upgrade two MoS container transport links between the TEN-T core ports of Helsinki (Finland), Rotterdam (the Netherlands) and Teesport (United Kingdom) and will ensure their compliance to the environmental regulation beyond the existing requirements.

Blue Baltics LNG infrastructure facility deployment in the Baltic Sea Region	Maritime LNG Mobile Multifunctional Refilling Station-MMRS" will be developed which will connect the Floating Storage and Regasification Unit (FSRU) to the LNG Reloading Station in Klaipeda and will enable LNG vessel bunkering.
cHAMeleon	cHAMeleon investigates technological and operational options for carrying out improvements on Liquefied Natural Gas (LNG) infrastructure, including vehicles, and LNG logistics service focused on bringing installation and operational costs down and making LNG an attractive commercial viable alternative fuel.
2016-MT-SA-0005 Technical Study and Cost-Benefit Analysis for the Development of LNG as a Marine Fuel in Malta	This Action "Technical Study and Cost-Benefit Analysis for the Development of LNG as a Marine Fuel in Malta" aims at assessing the optimal infrastructure solutions for the development of maritime LNG bunkering in Malta
CO2REOPT Coordination of core European supply chains using Optimization	The CO2REOPT project aims at optimizing core supply chains by developing decision support systems for the coordination and synchronization of transports from a supply chain perspective.
Twin – Port 2	This action is the second stage of a global project aiming at fostering greater cross-border cooperation between Finland and Estonia through developing and upgrading the MoS link between the ports of Helsinki and Tallinn
NAPA4CORE (Improving North Adriatic ports' maritime accessibility and hinterland connections to the Core Network)	The Action aims to improve maritime and land accessibility of ports of Trieste and Koper situated on the Baltic-Adriatic and Mediterranean Core Network Corridors
ELEMED ELectrification of the Eastern MEDiterranean area (use of Cold Ironing and electricity as a propulsion alternative)	The specific objective of the Action is to analyse and assess all necessary requirements for facilitating the introduction of cold ironing in three ports of the South East Mediterranean area: Port of Piraeus (Greece), Port of Killini (Greece) and Port of Limassol (Cyprus).
Zero Emission Ferries - a green link across the Öresund	The Action will upgrade environmentally a very busy maritime link, connecting the comprehensive TEN-T network ports of Helsingör (Denmark) and Helsingborg (Sweden).
CLEANPORT Alternative Fuels and Solutions for Port's Cold-Ironing: Standardisation of Regulatory Framework and Demonstration of Feasible Exploitation	The overall objective is to demonstrate a viable clean alternative maritime power system consisting of on board gas auxiliary generation with Natural Gas (NG) and LNG (Liquefied Natural Gas).

RCMS Rethinking Container Management Systems	Robotic Container Management System
The Northern ScanMed Ports - Sustainable Maritime Links	The overall objective of the action is to improve energy-efficiency in port operations and shipping, provide onshore power and reception of ship waste and waste water.
Upgrading and sustaining the competitive core Baltic MoS link Helsinki-Lubeck	The action has two objectives. On one hand, to increase the productivity and capacity of the MoS link and service related terminal operations in the TEN-T core ports of Lübeck-Travemünde in Germany and Helsinki-Vuosaari in Finland. On the other hand, to reduce the environmental impact of ship operations
Biscay Line - Multiple port Finland-Estonia-Belgium-Spain long distance MoS, relevant to many core network corridors	This action will improve operations and handling capacity, as well as competitiveness of the EU ports of Antwerp and Bilbao, contributing to the achievement of a European maritime transport space without barriers. And, reduce the environmental impact of the RoRo vessels traffic and ensure compliance of the maritime service with international regulations.
SEKRET Life LIFE12 ENV/IT/000442 Sediment ElectroKinetic REmediation Technology for heavy metal pollution removal	The project will demonstrate that sediment dredged from port waters, and characterised by heavy metal and hydrocarbon concentrations above acceptable standards, can be treated in a specifically equipped Confined Disposal Facility using electrokinetic remediation (EKR).
Completion of Ploče Gateway Project - reconstruction and construction of a link road to Ploče port and Ploče town	Completion of corridor Vc Budapest – Osijek – Sarajevo – Ploče on comprehensive TEN-T network and connecting the town and port of Ploče with motorway A1 Zagreb – Split – Dubrovnik
TRIUMPH II Trimodal transshipmentpoint inland port	The goal of the project 'TRIUMPH II' is to enhance attractiveness of multimodal freight transport by reducing complexity.
GUIDEPORT Integrated Accessibility & Routing Guidance Platform for Safe Multimodal Transport in Sustainable Smart Ports & Regions	GUIDEPORT's general aim is to render the involved ports more appealing to passengers and logistic companies, increasing their competitiveness as well as offer a better quality of life for the residents of urban areas near ports.
ARGES pAssengeRs and loGistics information Exchange System	Facing the various challenges generated by the technological, economical and regulatory changes, the Port Authorities are becoming an active and cohesive part of the superior level institutions trying to be pioneers in the Euro-Mediterranean area as regards the implementation of the Community directives.

FMCONTAINERS Fast Moving Containers Caming Solutions	A new design for the standard container so that twistlocks are no longer required and a new type of spreader (the grabbing component) that can handle both our new container design and the current standard ISO containers.
AUTOPORT	The background of the project is to develop the technologies needed for a fully automated stowage on roll-on/roll-off ships in order to improve the logistic flow, reduce stowage times and maximize the efficiency of the space occupation in hold.
SETRACOM Securing Transit Containers	The project is aiming to improve the containers' tracking through systematic approach and standardized security procedures that will enable the immediate and automatic identification and tracking of a sealed container during its transportation between different container terminals.
MED-PCS PROMOTION OF PORT COMMUNITY SYSTEM IN MEDITERRANEAN TRAFFIC	Achieving an effective implementation of the PORT COMMUNITY SYSTEM (PCS) in 4 Mediterranean ports.
HABITAT Port traffic optimization system	The project focused on the research, development of prototypes, testing and validation of an integrated port system in order to control and support maritime navigation in last mile operations.
MEDNET Mediterranean Network for Custom Procedures and Simplification of Clearance in Ports	The proposed project aims to establish and operate a network of port authorities and transport experts in the Mediterranean region
CFAEFFIPLAT	Constitution of a transnational network dedicated to the promotion and development of the Atlantic rail corridor for freight combinated with ports and multimodal logistics platforms in the Atlantic Area, in order to boost development, planning and implementation of railway infrastructure for the transport of goods, including the necessary infrastructure to connect to ports and promote competitive and efficient intermodal service transports
GAIA - GENERALISED AUTOMATIC EXCHANGE OF PORT INFORMATION AREA	The project is based on a comprehensive vision of the Adriatic port system, which integrates many actors that operate between the two side of Adriatic sea
INWAPO Upgrading of Inland Waterway and Sea Ports	Main aim of INWAPO project is to activate this unexploited potential of waterborne transport in central Europe and also the role of the river and sea ports to achieve better inter-modality of inland and sea ports

ADB multiplatform Adriatic - Danube - Black Sea multimodal platform	The idea of the project is to develop and promote environmentally friendly, multimodal transport solutions from the ports in the SEE programme area (Black Sea, Aegean, Adriatic) to inland countries and regions along a selected pilot transnational network.
CiELo City-Port Eco Logistic	CIELO will deploy specific actions to provide a detailed analysis of the problems related to accessibility; studying the modalities to enhance the interconnection between city's "hotspots"
3D printing in the port of Rotterdam	The Fieldlab will be located in the Innovation Dock at RDM Rotterdam, the site of choice for innovation in the Rotterdam port area, where companies, researchers and students work together on shaping the new manufacturing industry.
Copenhagen-Malmo Port focusing on industrial symbiosis	CMP is getting to grips with what is known as industrial symbiosis. It involves a new type of cooperation that generates greater efficiencies and more improvements
EMMA	Project EMMA will tackle the challenges & opportunities focusing on inland- & river-sea shipping, increase the modal share of inland- & river-sea shipping: to, from & between BSR countries and, foster a better integration of inland- & river-sea shipping in the BSR transport chains and EU Strategy for the BSR
The feasibility of Carbon capture and storage (CCS) in Rotterdam	Store CO_2 in empty oil and gas fields in the North Sea seabed. . Their ambition is to store 2 million tonnes of CO_2 per year from 2020 on, a total that will run up to 5 million tonnes per year by 2030.
Port of Amsterdam, the perfect hub for circular economy	provide startups and scaleups with opportunities to connect with other circular and biobased initiatives and with other industries through cross-overs, allowing you to find new synergies across the entire value chain
ELEMED project	Aims at studying all technical, regulatory, safety and financial issues related to the shore produced electricity and electric propulsion for vessels in Eastern Mediterranean region.
NoMEPorts project	The NoMEPorts project (Noise Management in European Ports) has been the port sector's EC LIFE funded initiative targeting the management of noise generation and brelated annoyance caused to people living around and in proximity to seaport areas.
PORT INTEGRATION	Multi-modal innovation for sustainable maritime & hinterland transport structures is designed to identify, exchange & transfer best practices in the transport sector with the aim of an overall integration of related policies.

TENTacle	TENTacle focusses on sustainable growth and territorial cooperation in the Baltic Sea Region
SCANDRIA	Sustainable and Multimodal Transport Actions in the Scandinavian-Adriatic Corridor
NSB CoRe	The Interreg Baltic Sea Region Project "North Sea Baltic Connector of Regions (NSB CoRe)“ promotes a sustainable transport accessibility of the eastern Baltic Sea States (Poland and Baltic States) with Northern Europe.
SWIFTLY Green	SWIFTLY Green (Sweden-Italy Freight Transport and Logistics Green Corridor) is a European project aiming to develop a toolbox for green corridors.
B2MoS	The Business to Motorways of the Sea (B2MOS) global project aims to provide a suitable array of measures in order for ports to become efficient gateways for short sea shipping in order to compete on more door-to-door corridors and facilitate the development of TEN-T Motorways of the Sea network connecting Europe.
ECLUSE innitiative	‘ECLUSE’ will be sluiced from the Indaver and SLECO waste-to-energy plant to companies in the port.
Antwerp Blockchain pilot Projet	Pilot project was begun for the digital exchange of phytosanitary certificates for apples being shipped from New Zealand to Europe.
Amoras project – Vamoras	This joint project by the Flemish government and Antwerp Port Authority offers a sustainable solution for processing and disposal of dredger spoil from the port.
CLINSH	The main objective of CLINSH is to improve air quality in urban areas by accelerating emission reductions in Inland Waterway Transport
RePort	The RePort project aims at reducing the air pollutant and acoustic emissions at the Port, in order to improve the air quality of Barcelona.
Ravenna Port Hub: infrastructural works	The Global Project (GP) comprises the following interventions: Marine port infrastructure; Land side port infrastructure; Port accessibility
INES - Implementing new environmental solutions in the Port of Genova	The Action aims at the improvement of waste management efficiency as well as the reduction of air pollutants and noise, which will also satisfy urban communities.
GAINN4MOS	GAINN4MOS aims to improve the Motorways of the Sea network in 6 Member States (Spain, France, Croatia, Italy, Portugal and Slovenia) by carrying out engineering studies on ship retrofitting and/or newbuildings, port LNG infrastructures, bunkering stations and a large set of pilot projects.

MoS 24	MoS 24 is a Pilot Action whose main objective is to enhance the strategic role of the Corridor 24 (Railway axis Lyon/Genova-Basel-Duisburg-Rotterdam/Antwerpen
CODE24	Aimed at a joint integrated approach towards the future development of the TEN-T core network corridor Rhine-Alpine and intended the interconnection of economic development, spatial, transport and ecological planning and thus, addressing urgent conflicts of capacity, sustainability and quality of life along the corridor.
Regulation (EU) 2017/352 of the European Parliament and the Council of Ministers establishing a framework for the provision of port services and common rules on the financial transparency of port	The aim is to level the playing field in the sector, protect port operators against uncertainties and create a climate more conducive to efficient public and private investments
Commission Regulation (EU) 2017/1084 of 14 June 2017 amending Regulation (EU) No 651/2014 as regards aid for port and airport infrastructure, notification thresholds for aid for culture and heritage conservation and for aid for sport and multifunctional recreational infrastructures, and regional operating aid schemes for outermost regions and amending Regulation (EU) No 702/2014 as regards the calculation of eligible costs (Text with EEA relevance.)	Member States can now make public investments of up to €150 million in sea ports and up to €50 million in inland ports with full legal certainty and without prior control by the Commission. The Regulation allows public authorities to cover the costs of dredging in ports and access waterways
Promotion and support of the European social dialogue between port workers and their employees and of training.	The social partners' main aim is to develop guidelines for the establishment of training requirements that take into consideration the future training needs of the sector in light of technological and logistical changes and changes in customer demand.
Regulation (EU) No 1315/2013 of the European Parliament and	Support to better planning, financing and funding of port infrastructure and their connexions in the trans-European network.

of the Council of 11 December 2013 on Union guidelines for the development of the trans-European transport network and repealing Decision No 661/2010/EU Text with EEA relevance	
DIRECTIVE 2000/59/EC OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 27 November 2000 on port reception facilities for ship-generated waste and cargo residues	The present legislative framework ensuring a consistent reduction in marine pollution by requiring provision of adequate waste reception facilities in all EU ports, including recreational ports and marinas, is established in Directive 2000/59/EC. It also provides instruments to ensure that all ships visiting EU ports deliver their waste to these facilities before their departure from them.
Commission Directive (EU) 2015/2087 of 18 November 2015 amending Annex II to Directive 2000/59/EC of the European Parliament and the Council on port reception facilities for ship-generated waste and cargo residues (Text with EEA relevance)	amending Annex II to Directive 2000/59/EC of the European Parliament and the Council on port reception facilities for ship-generated waste and cargo residues
ESPO (European Sea Ports Organisation), 2007. ESPO Code of Practice on the Birds and Habitats Directives. ESPO, Brussels.	Code of Practice on the EU Birds and Habitats Directives, ESPO's newcomer in a long-standing series of environmental publications.
ESPO (European Sea Ports Organisation), 2010. ESPO Code of Practice on Societal Integration of Ports. ESPO, Brussels	This code of practice brings together practical experience in the field of societal integration of ports together, based on the co-operation project 'People around Ports' that ran from 2009 to 2010.
IMO (International Maritime Organisation), 2004. International Ship and Port Facility Security (ISPS) Code.	The International Ship and Port Facility Security (ISPS) Code is an amendment to the Safety of Life at Sea (SOLAS) Convention (1974/1988) on minimum security arrangements for ships, ports and government agencies.
UN/CEFACT (2005): Recommendation and Guidelines on establishing a Single Window to enhance the efficient	The need for simplification and harmonization is particularly evident in the preparation and submission of the extensive range of information and documents required by governmental authorities to comply with import,

exchange of information between trade and government	export and transit-related regulations. These requirements place a heavy burden on the resources of companies and can constitute a serious barrier to the development and efficiency of international trade, especially for Small and Medium Enterprises (SMEs).
DIRECTIVE 2014/25/EU OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 26 February 2014 on procurement by entities operating in the water, energy, transport and postal services sectors and repealing Directive 2004/17/EC	Directive 2014/23/EC on the award of concession contracts (March 2014) – 2 years for Member States to transpose
Reporting Formalities Directive 2010/65/EU for the establishment of the National Single Windows.	The objective of the RFD is to simplify and harmonise the administrative procedures applied to maritime transport and it sets an obligation for Member States to establish National Single Windows (NSW) for reporting formalities from ships arriving in and/or departing from ports by 1 June 2015 for the 14 reporting formalities listed in the Annex of the RFD.
DIRECTIVE 2014/94/EU OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 22 October 2014 on the deployment of alternative fuels infrastructure	The European directive on the deployment of the alternative fuels' infrastructure (Directive 2014/94/EU) was published in 2014 as part of the 'Clean Power for Transport' package. Natural gas - compressed natural gas (CNG) and liquefied natural gas (LNG) - is one of the alternative fuels that is addressed in this directive
DIRECTIVE 2005/65/EC OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 26 October 2005 on enhancing port security	On the 26th October 2005, Directive 2005/65/EC was introduced, expanding requirements for maritime security beyond the boundaries of the port facility to cover the whole port area.
Directive 2001/96/EC of the European Parliament and of the Council of 4 December 2001 establishing harmonised requirements and procedures for the safe loading and unloading of bulk carriers	The purpose of this Directive is to enhance the safety of bulk carriers calling at terminals in the Member States in order to load or unload solid bulk cargoes, by reducing the risks of excessive stresses and physical damage to the ship's structure during loading or unloading.
COUNCIL DIRECTIVE of 12 June 1989 on the introduction of measures to encourage improvementsin the	The object of this Directive is to introduce measuresto encourage improvements in the safety and health of workers at work.

safety and health of workers at work	
DIRECTIVE 2005/44/EC OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 7 September 2005 on harmonised river information services (RIS) on inland waterways in the Community	This Directive applies to the implementation and operation of RIS on all inland waterways of the Member States of class IV and above which are linked by a waterway of class IV or above to a waterway of class IV or above of another Member State, including the ports on such waterways as referred to in Decision No 1346/2001/EC of the European Parliament and of the Council of 22 May 2001 amending Decision No 1692/96/EC as regards seaports, inland ports and intermodal terminals as well as project No 8 in Annex III (3).
ISO 50001	ISO 50001 supports organizations in all sectors to use energy more efficiently, through the development of an energy management system (EnMS).
ISO 14001	ISO 14000 family - Environmental management at portss introduced in 1996, with the EMS at its heart, is to enable an organisation to continually evaluate the impact of its activities, products and services on the environment.
eco-Management and Audit Scheme (EMAS)	The Eco-Management and Audit Scheme (EMAS) is a voluntary environmental management instrument, which was developed in 1993 by the European Commission.
PORT OF GÄVLE-UTILIZING WASTE TO CREATE NEW PORT LAND BASED ON CIRCULAR ECONOMY	Most recent port expansion and the major dredging and land creation project that has been undertaken in the Port of Gävle since 2007.
'Building with Nature'-ECOSHAPE	EcoShape develops and shares knowledge about Building with Nature: a new approach to hydraulic engineering that harnesses the forces of nature to benefit environment, economy and society.
PÉÉPOS project	Project was initiated by Atlantic Port of Bordeaux in order to guide the industrial-port stakeholders through their energy transition process.
Smart Port in Antwerp - Blockchain	"Smart Port" is part of a five-pronged programme being developed by the city of Antwerp to become a European leader for the Internet of Things.
Green Marine	Green Marine is an environmental certification program for the North American marine industry.
ALICE Roadmap toward Zero Logistics Emissions	The Roadmap builds on 5 solution types to reduce emissions; involves government, private sector, research and civil society; and requires collaboration between these stakeholders to realize the sector transition towards zero emissions logistics.

SOUNDREP	SOUNDREP, with the purpose of improving the safety of navigation and the protection of the marine environment in the Sound area.
AIVP	AIVP -Plan the city with the port; guide of good practices
SUMPORT	SUMPORT is an Interreg Project and will allow some of the participating MED port cities to elaborate, update or harmonize their own Sustainable Urban Mobility Plans.
FINEST	To better serve the expanding traffic, five new smart mobility solutions are being tested in pilot projects at downtown passenger terminals of the ports of Helsinki and Tallinn.
Green Cruise Port	GREEN CRUISE PORT (GCP) is a project in the EU Interreg Baltic Sea Region Programme 2014-2020. GREEN CRUISE PORT elaborates a multidimensional strategic approach for a sustainable and qualitative future development for cruise shipping in port areas.
Maritime Connectivity Platform (MCP)	MCP (formerly known as the Maritime Cloud) is a communication framework enabling efficient, secure, reliable and seamless electronic information exchange between all authorized maritime stakeholders across available communication systems.
STEAM project	The general objective of the STEAM (Sea Traffic management in the EAstern Mediterranean) project is the efficient management of sea traffic in the Eastern Mediterranean sea, while at the same time ensuring safety and environmental sustainability
NxtPort	NxtPort's main goal is to unlock the potential of sharing existing data amongst the port's players
CoRISMa	CoRISMa has built on the already widely available RIS-related infrastructure and systems and has succeeded in putting the spotlight firmly on the wide range of services that RIS can offer to support and enhance inland navigation
Duisport Inland Port Pilot	The duisport pilot will demonstrate the use of big data solutions for the proactive management of bi-modal terminal operations as well as for predictive maintenance of terminal equipment
SYNCHRONET project	SYNCHRO-NET will demonstrate how a powerful and innovative synchromodal supply chain eco-NET can catalyse the uptake of the slow steaming concept and synchro-modality, guaranteeing cost-effective robust solutions that de-stress the supply chain to reduce emissions and costs for logistics operations while simultaneously increasing reliability and service levels for logistics users

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Docks the Future Documents	
Deliverable 1.1	Desktop analysis of the concept including EU Policies
Deliverable 1.2	Stakeholders consultation
Deliverable 1.3	Maritime traffic analysis and forecast review - key results
Deliverable 1.4	Analysis of macro trends and perspectives - key results
Deliverable 1.5	Port of the Future concepts, topics and projects - draft for experts validation
Deliverable 1.6	Port of the Future concepts, topics and projects – consolidated versions
Deliverable 2.1	Clustering Methodology
Deliverable 2.2	Clustered Projects guidance document
Deliverable 5.2	Port of the Future DSS Tool
Deliverable 5.3	Transferability analysis
Deliverable 5.4	Port of the Future training package
Deliverable 5.5	R&D and Policy recommendations
Deliverable 5.6	Port of the Future Network of Excellence
Deliverable 6.1	International Consultancy Committee meeting document
Deliverable 6.2	International Consultancy Committee meeting document
Deliverable 6.3	International Consultancy Committee meeting document