

BEAT PROJECT

WP3_ activity 3.1._activity deliverable 3.1.1

Report on technology assessment of firms in the blue
sector and blue value chain description

(28-02-2019)

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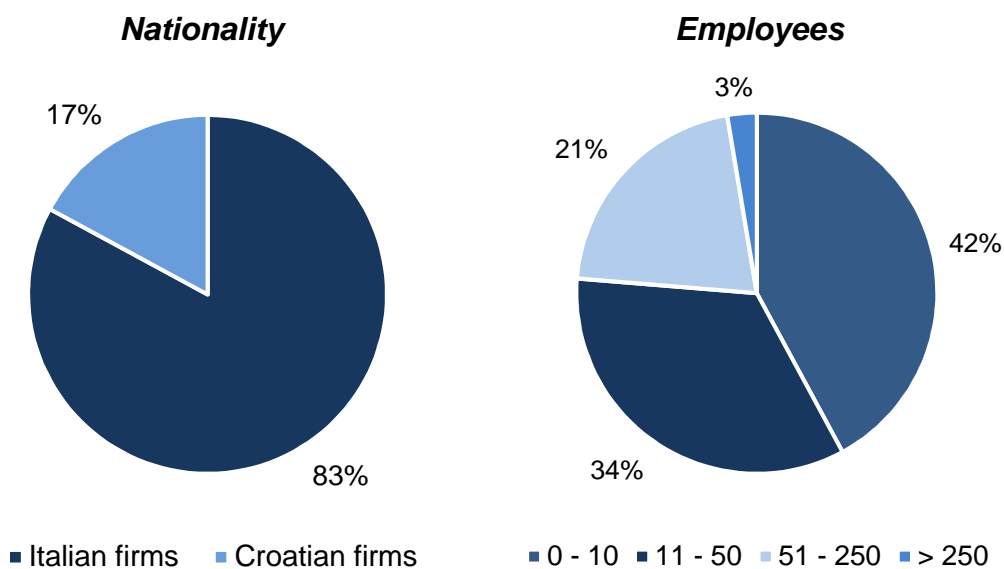
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3.1. Innovation and Technological competences of firms in the blue sector

The Innovation and Technological competences of Italian and Croatian firms that operate in the blue sector and specifically in the shipbuilding and related sectors, was assessed through a questionnaire that aimed to evaluate either the technological innovation firms offer as the technological innovation firms wish to develop. In addition, the questionnaire, aimed also to evaluate which types of collaborative relationships firms already have, as well as the collaboration they would activate in order to improve their business areas and activities and what are the challenges of Blue Economy. Finally, before the evaluation of variables related to the innovation and collaboration, firms specified, in the questionnaire, the number of employees and the areas of GVC they operate.

The objective of the survey was also to evaluate if there are linkages among the different sectors that can be useful for the development of a trans-national (Italy-Croatia) cluster, which could promote the blue activities in the North Adriatic Sea Region and the growth of firms engaged in this area. Specifically, we collected 92 questionnaires, 79 from Italian firms (68 collected online and 11 picked up during the benchmarking analysis) and 13 from Croatian firms (picked up during the benchmarking analysis). For the analysis, we excluded 16 firms as they not have any relationships with the Blue Economy, therefore the useful firms were 76. Figure 1 shows the sample composition in terms of nationality and firm' size.

Figure 1: *Sample*



Following the recent research on Maritime Cluster Development (Pinto, Cruz & Combe, 2015), to evaluating the possible connections that firms of shipbuilding and related sectors may have among them and the technological innovations they could “share” for their growth, we grouped firms in macro-areas, considering a top-down approach regard the different Shipbuilding GVC industries/activities (see table 1).

Table 1: *Sample composition regard the areas of GVC*

Macro-area	GVC industries/activities	Firm' size (employees)				Total (%)*
		0-10	11-50	51-250	>250	
Project development	<ul style="list-style-type: none"> Consulting/training/design services (KIBS) 	6	1	4	-	11 (14%)
Engines & Navigation	<ul style="list-style-type: none"> Propulsion & Power systems Automation, navigation & communication systems 	4	5	-	1	10 (13%)
Materials & equipment	<ul style="list-style-type: none"> Materials Mechanical components Other equipment/components Outfitting 	6	7	6	-	19 (25%)
Boats equipment	<ul style="list-style-type: none"> Leisure vessels equipment Commercial ships equipment Other boats equipment Other auxiliary products 	2	4	2	1	9 (12%)
Shipbuilding	<ul style="list-style-type: none"> Boats building Repairing and maintenance 	1	1	2	-	4 (5%)
Mobility & tourism	<ul style="list-style-type: none"> Mobility services Tourism services 	11	8	2	-	21 (28%)
Other services	<ul style="list-style-type: none"> Port authorities Commercial & broker services Other services 	2	-	-	-	2 (3%)

* N = 76.

Table 1 reveals that the sample comprised a significant proportion of the different industries related to the blue sector. In this way, from the analysis of firm’s Innovation and Technological

competences, we analyzed can if there are business needs that could be overcome through the development of collaborations among the different actors of the two Countries.

3.1.1 Results of innovation assessment

Regarding the assessment of Innovation and Technological competences we asked to the firms (1) which types of technological innovations they are interested in developing and/or adopting and (2) the technological innovations they currently offer. Tables 2 and 3 show the main types of technological innovations firms aim to develop/adopt as well as those they offer.

Table 2: *Main technological innovations firms aim to develop/adopt*

Main technologies/innovations	%*	Type of technologies/innovations
Efficiency	41.7%	Business processes efficiency
		Energy efficiency
Environmental sustainability	37.5%	Improve sustainability
		Reducing environmental impacts
		Reducing hazardous emissions
		Reducing waste
		Use of alternative energy sources
Product innovation	20.8%	Product development & improvement
		Product customization
		New propulsion system (electric & hydrogen engines)
		Innovations for the naval engineering
Process innovation	18.8%	Improve production processes
		Improve work-time process
		Improve performance analysis process
		Improve data information and management
Business management	12.5%	End-lifecycle management
		Improve services and competitiveness
		Logistics and transport/shipping
Industry 4.0	10.4%	Robotics, Automation, Business intelligence, 3D technologies
Customer service	4.2%	Improve customer service

* N = 48; multiple responses.

Table 3: *Main technological innovations firms offer*

Main technologies/innovations	%*	Type of technologies/innovations
Environmental sustainability	37.5%	Reduction of hazardous emissions
		Reduction of environmental impacts
		Renewable energy sources
		Waste re-using
Innovative products	21.1%	Innovative products and materials for higher performance
		Innovative engines & propulsion
		Sustainable products
Innovative processes	21.1%	Process optimization & Lean processes
		Business model innovations
		Process automation
Efficiency	15.8%	Technologies for energy efficiency
		Efficiency through automation
		High efficiency applications
Business management	13.2%	IT systems for real time monitoring & management
Industry 4.0	7.9%	Automation, 3D scanning, Big data, IoT, AI, Cybersecurity protection, Cloud computing and Network virtualization

* N = 38; multiple choices.

Through a *content analysis* methodology (Krippendorf, 2004) we assessed all the response collected by the firms and we extracted some relevant results. The main technological innovation firms aim to develop and to adopt (table 2) regard the possibility to improve their *efficiency*, in terms of business processes and of energy consumption. The latter is strictly linked to the second type of innovation that is the improving of *environmental sustainability*, through the reducing of hazardous emissions and of waste and the use of alternative sources of energy power. Others types of innovations regard the *product* and *process innovation* that may assure improved performance in terms of quality and of time-working or monitoring activities. Finally, firms would like to develop technological innovations linked to the technological advances of *business management*. In particular, firms would like to improve their technological asset (also with the adoption of Industry 4.0 technologies) in order to improve all business activities, customer service included.

From the viewpoint of technological competences (table 3), firms offer innovations in the same areas, specifically: (1) *Environmental sustainability*, (2) *Innovative products* and (3) *processes*, (4) *Efficiency* and (5) *Business management*, as the new technologies (*Industry 4.0*).

The results of analysis (table 2 and 3) highlight that firms aim to develop and/or adopt some types of technological innovations offered by others firms, therefore the firm’s technological advances could improve through the activation of collaborative relationships among the different sectors.

In this sense, table 4 reports the main technological innovations firms would like to develop and the technological innovations they offer taking into consideration the macro-areas of Shipbuilding GVC. Results of analysis confirm the results presented in the tables above and specifically that firms of all GVC areas (upstream and downstream) aim to develop/adopt some types of technologies that other firms of the same industries and of other industries offer.

Table 4: *Technological innovations in the different Shipbuilding GVC areas*

GVC Macro-area	Main technologies to develop	Main technologies offered
Project development	Innovative solutions to improve shipbuilding processes	Advanced technologies that improve efficiency and sustainability
		Industry 4.0 technologies
Engines & Navigation	Improve engine efficiency	Process optimization through integrated management systems
	Reducing environmental impacts	Sustainable engines
	Improve navigation	Shipping management systems
Materials & equipment	Improving process efficiency	Reducing environmental impacts
	Reducing environmental impacts	Sustainable products
	Improve product performance & customization	Process innovation systems & Innovative products
Boats equipment	Product & Process innovation	Innovative products & processes
Shipbuilding	Process efficiency	Innovative processes that improve efficiency and sustainability
	Sustainability	
Mobility & tourism	Improving efficiency	Renewable energy sources
	Improving waste management & reducing environmental impacts	Reducing environmental impacts
	Improve business management & customer service	Advanced IT systems for business management
Other services	Products and business innovations	Sustainability

This result is very interesting in terms of cluster development. Indeed cluster is “a manifestation of the economy in which proximity amplifies all the existing constraints to innovation and the increase of economic performance” (Porter, 1998, p. 79).

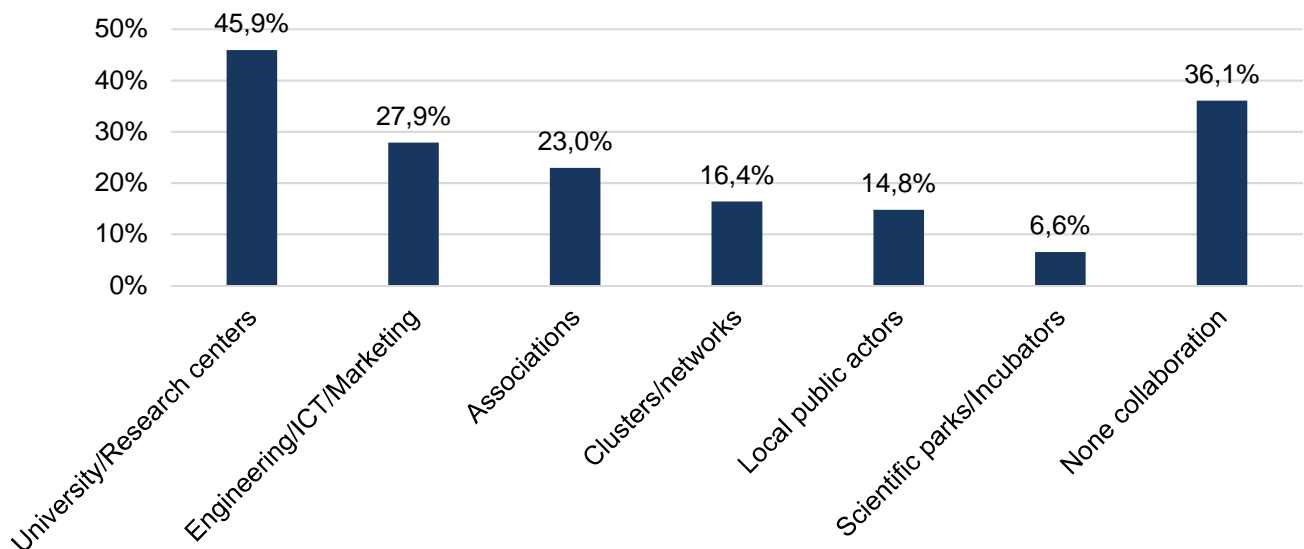
In this regard, firms of the same GVC should interact in order to improve their innovative performances (in terms of products and processes) and growth.

In order to get higher interactions it is necessary to understand the types of collaborations firms already have and with which types of organizations, in order to define a relational system and the main actors useful to activate new other interactions (Nadvi & Halder, 2005). In this sense, we performed the analysis of collaboration firms have and aim to have for the innovation and business growth.

3.1.2 Results of collaboration for products and process innovation

With the aim to evaluate the collaboration that firms of Shipbuilding GVC and Blue industries consider useful for the development of new technologies, products and processes, we asked three different questions. Firstly, we asked to the firms to mark if they have relationships with (at least) one of the organizations shown in the figure 1.

Figure 1: Collaborations for new technologies development

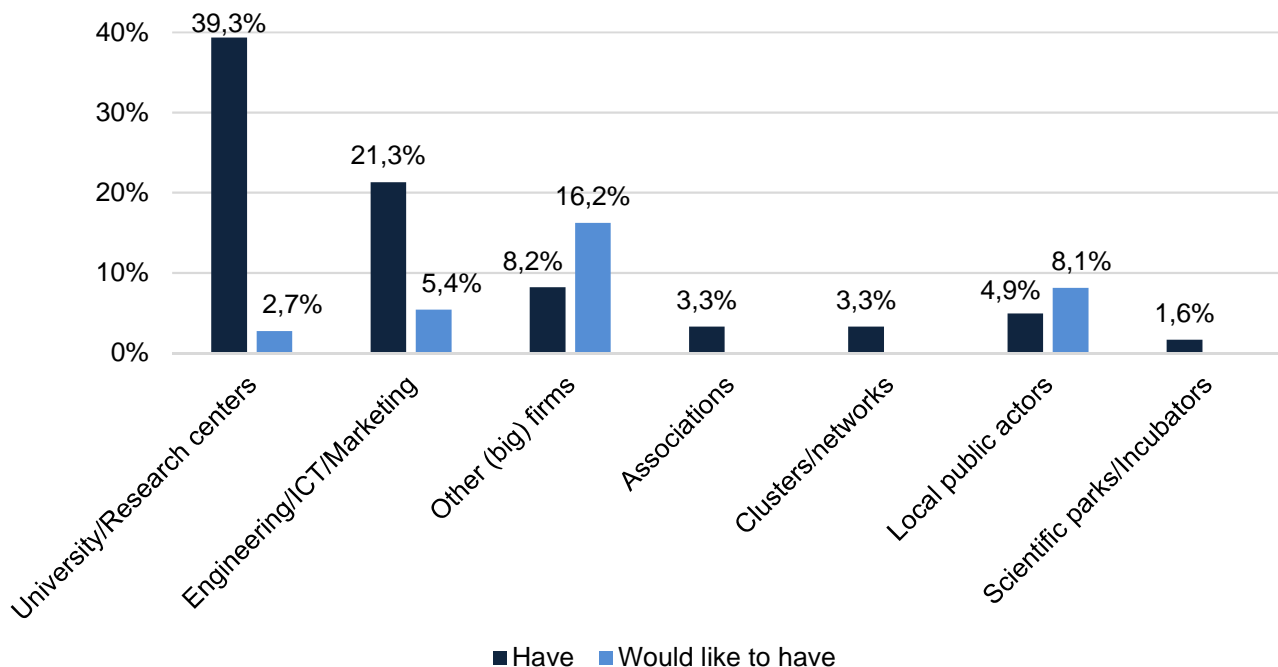


Results show that firms principally have relationships with Universities and Research centers (45.9%) and with companies that offer engineering, ICT and marketing services (27.9%). For the cluster development, these types of relationships have a key role because assure to the firms the transfer of knowledge that foster the innovation processes (De Marchi & Grandinetti, 2016).

Research on GVC shown that firms are interested in finding efficiency, but they are also driven by innovation-seeking strategies through relationships, as the knowledge shared may open new opportunities for product innovation and market interaction (Chiarvesio, Di Maria & Micelli, 2010).

Results show also that one third of the sample (36.1%) not have any relationships with the listed organizations. The cluster development needs of relationships among the different actors (Capestro et al., 2014). It is necessary to identify the organizations that may promote linkages among the different actors. In this regard, we asked to the firms to indicate the main organizations with which they collaborate and/or they would like to collaborate in order to develop new products and processes (see figure 2).

Figure 2: Collaborations (have – would like to have) for product/process innovation



Results reported in the figure 2 show that for the development of new products and of new processes, firms collaborate principally with those actors that offer high-intensive knowledge services, in other words the so-called KIBS (knowledge intensive business services) (that are Universities/Research centers (39.3%) and the consulting companies in the fields of engineering, ICT and marketing services (21.3%). Moreover, both the Italian and Croatian firms principally collaborate with the local Institutions and organizations.

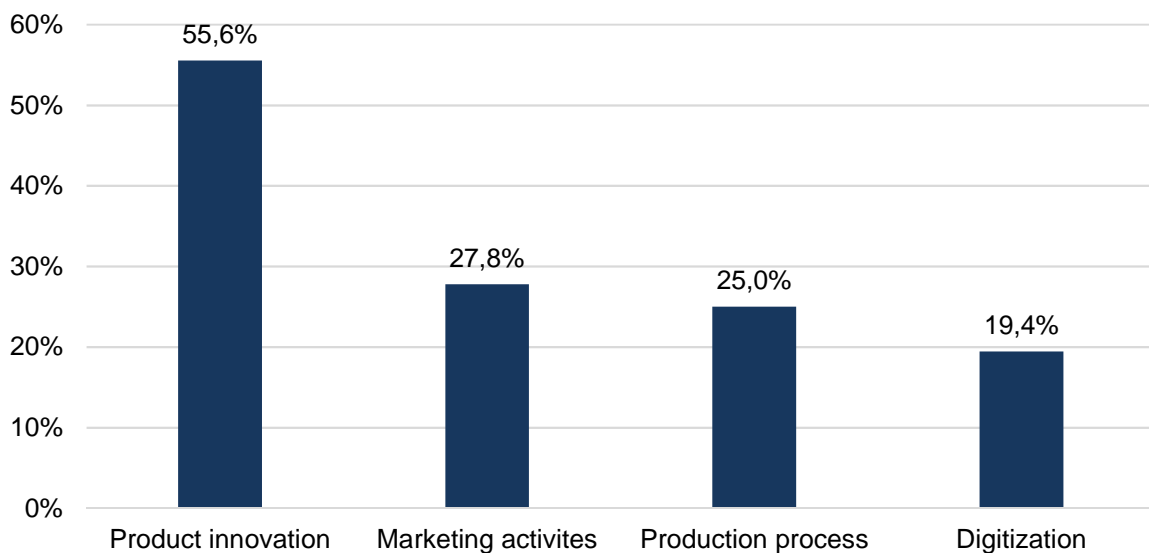
On the side of the collaboration that firms would like to activate in order to foster the product and process innovation, results show that they would like to collaborate essentially with the other (big) firms (16.2%) (i.e Fincantieri).

The results of analysis about the collaboration for firm’s innovation advances highlight the key role that some types of actors – KIBS – may have in promoting the development of a relational system among the firms of the different Shipbuilding GVC sectors. Inter-firms relationships are centrals for the development of a cluster, as they allow firms to share knowledge that improve their innovativeness capability (Grandinetti, 2011).

As last step on analysis, we asked to the firms to define which are, referring to the Blue Economy, the main business areas that they want to develop through collaboration, and the main challenges of Blue Economy.

Figure 3 shows the main business areas firms would like to develop through collaborations

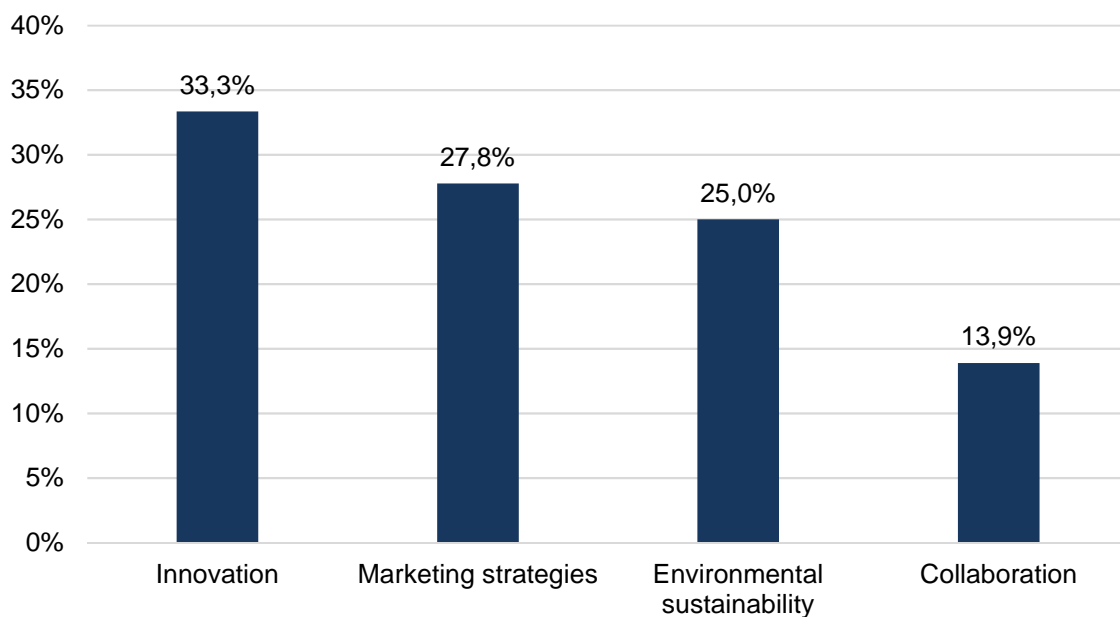
Figure 3: *Business areas to develop through collaborations in the field of Blue Economy*



Firms of the Shipbuilding GVC aim to develop through collaborations the marketing area regarding the product innovation (55.6%), in terms of design and new products development, and the marketing activities (27.8%) related to the business promotion and new markets development. In addition, firms aim to improve the production processes (25.0%) and activate the digitization process through the adoption on new technologies, such as the Industry 4.0 technologies.

From the side of challenges of the Blue Economy, as reported in the figure 4, firms evaluate the innovation (33.3%) processes (in terms of product and business innovation) the most important challenge that firms link also to the improving of environmental sustainability (25.0%). Instead, from the viewpoint of marketing strategies (27.8%) firms aim to improve all the marketing activities, also through the collaboration with partners (13.9%) that have a strategic role for the entry in new markets and promote sustainability.

Figure 4: Blue Economy challenges



3.1.3 Strategic directions

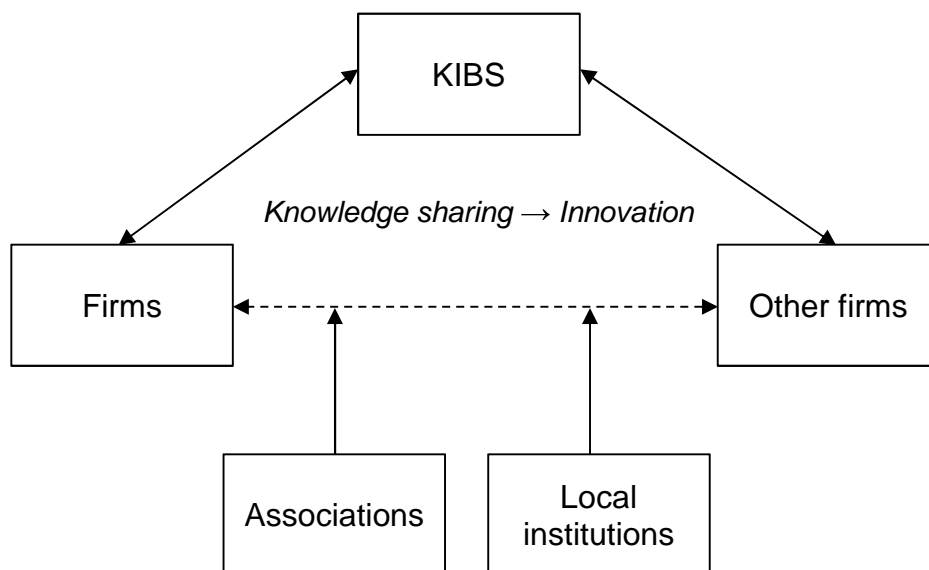
The survey allows us to get some important information about innovations and technological competences of firms in the blue sector as well as the collaborations that may support the

development of a trans-national cluster in the Blue Economy. The results of the analysis can be summarized in the following key-points:

- firms aim to develop/adopt technologies that support them to improve *efficiency, environmental sustainability, product-process innovation* and *business management*;
- the technologies that firms aims to develop/adopt are offered by other firms, therefore a collaboration among them could improve the firm's innovation processes;
- the interactions among the different GVC areas could assure the technological advances firms want to achieve;
- the technological innovations that companies aim to develop/adopt are directly linked to the business areas that they want to develop through collaborations;
- collaborations are strategically important for the development of new technologies, new products and processes;
- firms collaborate principally with KIBS (universities/research centers and engineering/ICT/marketing service providers);
- firms would like to cooperate with other firms, especially with the big ones reference player;
- KIBS could support the connections among the different firms, promoting the development of the cluster.

Figure 5 shows a theoretical framework that show how promote a cluster development in terms of technological innovations.

Figure 5: *Theoretical framework for cluster development*



KIBS (not only Universities-Research centers and Consulting companies, but also Scientific parks and firms Incubators) that are the main actors with which the different firms have relationships in order to foster the innovation processes, could promote the interactions among the different firms and, therefore, the development of the cluster. In this way, the knowledge shared during the interactions could favor the firm's innovation processes and their business growth. Associations and Local institutions could encourage the inter-firms interactions. The process should concern Italian and Croatian firms, for the development of a trans-national cluster that could assure the development of new markets.

3.2 Blue value chain

In order to analyze and quantify the blue sector in the two countries analyzed we adopt the Global Value Chain (GVC) framework. Developed in the academic world since the seminal contribution by professor Gary Gereffi in the 2000s, such a framework has been increasingly adopted by practitioners and policy makers in order to understand the organization of industries at the international level. GVC framework is particularly relevant to understand how global industries, such as the blue sector are organized. Indeed by focusing on the sequences of value-added activities, on the actors performing them, on the nature of the relationship in place ("governance") and on the dynamics of value capturing ("upgrading") allows having an holistic view of industries (Gereffi and Fernandez-Stark 2016).

The first needed element to apply the GVC framework, and to identify the evolution of industries, its trend and organization is the development of the input-output structure of the GVC, identifying the core activities that are bringing a product (i.e. a ship) from initial conception to the consumer's hands, which allow to identify the different value adding process that bring to product realization. In this sense, GVC is spanning different industries, representing an overarching classification that allows a broader comprehension of the activities needed to provide a product or service. Such a framework is particularly useful as it jointly identifies the type of companies involved in the industry, a very useful element to identify the 'size' of each segment of the GVC – i.e. how many firms are engaged and what amount of employment they are generating – so as the key actors in those segments, the 'lead firms' – i.e. the most influential firms, usually the largest one, which are influencing the development of that industry and determining its innovation trajectories.

Figure 6: The blue economy Global Value Chain

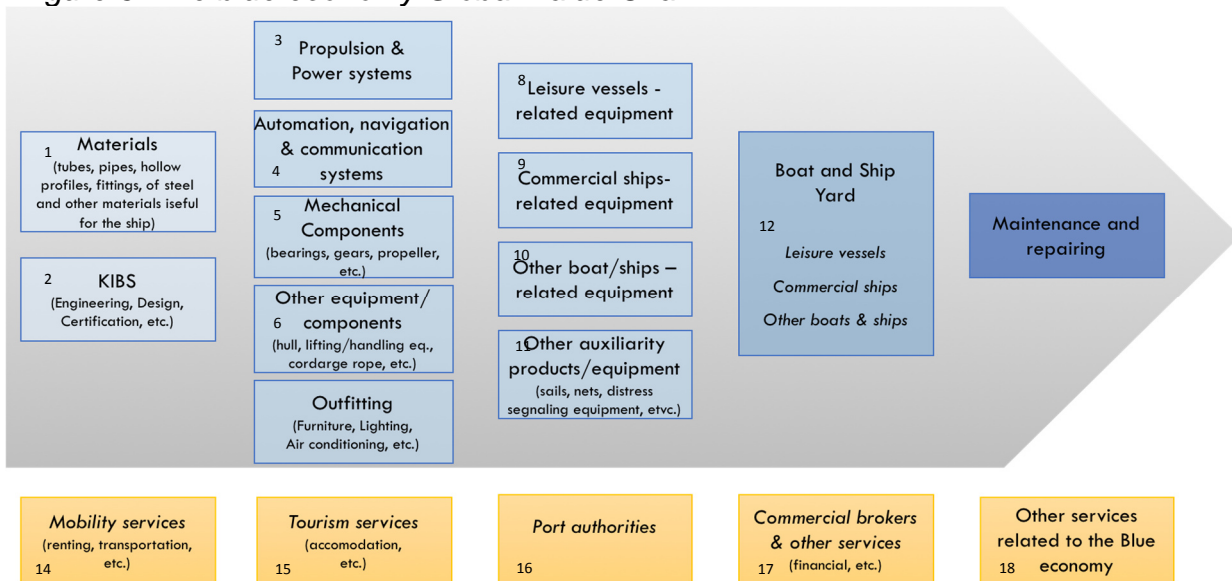


Figure 6 reports the blue economy global value chain, which we developed capitalizing existing research and based on our own understanding of the blue economy¹, as for discussions and interviews with key informant. Such a figure has been developed according to the standards of the GVC literature, therefore including both:

- activities that are directly and primarily contributing to the realization of the production of boat and ships. Such activities are reported in blue in the figure and are grouped in different columns, to represent their logical sequence i.e. starting from the input toward final production and beyond;
- other activities whose output is not directly contributing to the realization of ships or boats, yet are strongly connected to this industry, because they are providing complementary products/services (i.e. tourism services, especially important if considering cruise ships production). Such industries are reported in yellow in the figure.

¹ Key literature adopted include: UCINA and Fondazione Edison (2017) 'La Nautica in Cifre. Analisi del mercato per l'anno 2016'; Fondazione Symbola, Ucina Confindustria Nautica, Mare Nostrum Network, "Filiera Nautica – Analisi dell'indotto economico e occupazionale attivato dall'industria nautica in Italia."; BALance Technology Consulting GmbH, Shipyard Economics Ltd., MC Marketing Consulting (2014) "Final Report Annex 3. European Marine Supplies Industry – Identification of Major Players, Examples for Market Consolidation, System Suppliers, M&A and Globalisation"; BALance Technology Consulting GmbH, Shipyard Economics Ltd., MC Marketing Consulting (2014), "Final Report Annex 1 Structure of the Marine Supplies Industry".: GVC and KIET, (2017) "Chapter 4: Korea and the Shipbuilding Global Value Chain"

As for the first activities, the value chain is comprised of three major phases: pre-production, production and post-production, which can be further disentangled in different steps, as in the following.

Pre-production activities include the phases of design and project management, plus the production of materials and components, an in particular:

1. Materials, including basic 'inputs' or components which include mostly metal (steel)/alloy, paint/coatings and pipes and other materials useful for the ship;
2. Consulting/Training firms, being Knowledge Intensive Business Services (KIBS) that are providing services related with the ship design and the production planning & engineering, the provision of certifications and the materials planning & procurement.

Production phases includes the hull construction and equipment systems purchasing and integration, regarding both the structure (the hull production and the outfitting) and the 'platform' (i.e. mechanical or electronical the systems/equipment); (especially for stages 8 to 12) the relative importance of those activities and the technologies and processes adopted varies depending of the ship type. The phases can be defined in the following:

3. Propulsion and power systems;
4. Automation, navigation and communication systems;
5. Mechanical components (e.g. bearings, gears, propeller, ...);
6. Other equipment/components (e.g. hulls, lifting/handling equipment, ...);
7. Outfitting (e.g. furniture, lighting, air conditioning, ...);
8. Leisure vessels-related equipment;
9. Commercial ships -related equipment;
10. Other boats/ships-related equipment;
11. Other auxiliary products/equipment (e.g. sails, nets, distress, signaling equipment, cordage ...).
12. Boat and Ship refers to the leisure vessels, commercial ships, and other boats & ships and regards the assembly and integration of the 'final product'. It might be as diverse types of vessels as containerships and cargos, special-duties offshore, bulkers, tankers and chemical carriers, passengers and large ferries, navy-submarines, sailing yachts, tugs and supply vessels, fishing vessels. Such step of the value chain considers both the hull blocking & assembly and the outfitting/system integration.

Finally, post-production activities are considered, including:

13. Maintenance and repairing of existing vessels, so as the conversion, the decommissioning& shipbreaking, the recycling and the disposal.

As for the supporting industries and activities, many activities could be envisioned; the most relevant ones, for their contributions to the boat and ship building and blue economy value chain are:

14. Mobility-related services (e.g. renting, transportation,)
15. Tourism-related services (e.g. accommodation)
16. Port authorities
17. Commercial brokers and related services (e.g., financial services)
18. Other services related to the Blue Economy, which might include a vast group of firms).

3.2.1 Actors in the global value chain

Following the GVC methodology, an important element is the possibility to identify which firms are specialized in each step of the GVC and which are the most important firms in relation to the before mentioned steps and in particularly for the central one being the boat and ship yards. Accordingly, in the following we are going to a) identify how many firms are active in each step of the value chain; and afterwards on b) which are the major companies in each of (the most important) steps of the chain.

In order to identify how many firms are active in each segment, we first consider the existing documentation in order to analyze the relevance of the two VCs and their composition across the countries of interest for the project (Italy and Croatia). However, while there are reports that are attempting to evaluate how many firms are active in activity 12 (i.e. Boat and ship yards) in one or the other country², there are no existing studies that are evaluating the full magnitude of this VC, that is to say considering also for the other segments. Furthermore, no existing studies had the regional detail needed. We have therefore performed an *ad hoc* empirical analysis to proxy for the number of firms and employees in each segment in the geographical areas considered in the BEAT project.

Considering that data availability differ across, the two countries, we have adopted a specific methodology for each country. For Italy, as first step we have identified which industry code composes each stage of the GVC, then we have considered the 4 digits NACE codes and, when possible or useful, we have also considered the more fine-grained 6 digits ATECO

² For Example Export Finland, 'Maritime Offshore Market Snapshot'; UCINA and Fondazione Edison (2017) 'La Nautica in Cifre. Analisi del mercato per l'anno 2016'; Fondazione Symbola, Ucina Confindustria Nautica, Mare Nostrum Network, "Filiera Nautica – Analisi dell'indotto economico e occupazionale attivato dall'industria nautica in Italia."; Hadii N., Tomi, M., Vladimir, N., Ostoji, S., & Senjanovi, I. (2015). Current state and perspectives of the Croatian shipbuilding industry. *Journal of Naval Architecture and Marine Engineering*, 12(1), 33-42.

codes. This process of analysis is in line with the results produced in other EU projects³. See the Annex A for the full lists of ATECO codes identified.

Using those codes, we have searched for the number of companies via the database AIDA Van Dijk, which is reporting balance sheet data on limited liability companies only, the subgroup of companies responsible for the largest share of the overall turnover. The same source has been used to seek the number of employees working in the industries considered. The following Table is reporting the number of active firms and employees in each of the step of the GVC for both Veneto and Friuli Venezia Giulia. Please note that some industry codes are part of more than one box (for example the code 26.11 - Manufacture of electronic components, is considered both in the step 7, 'Outfitting' and in the step 8, 'Leisure-related equipment'). Also, please note that for some steps – e.g., Materials (1), KIBS (2), outfitting (7), other equipment (8) – it is not possible to disentangle if firms are part or not of the Ship and Boat value chain, as they might be working for other industries as well – for examples design companies (KIBS, step 2) might be working for the boat and ship industries or for the footwear ones); therefore just a fraction of those companies/employees might be working predominantly for the boat and ship building value chains. Codes in bold in the figure are those for which, instead, figures are fully related to the boat and ship building value chains (i.e. codes 12, 14, 16, 18). Focusing specifically on those codes, it is possible to affirm that both Italian regions holds an important number of companies, which might be potentially involved in the development of a cross border cluster. In general, Veneto a larger number of firms is located, yet often having a smaller average size, as for number of employees. This is particularly evident for the Boat and Shipyard step of the GVC (12); an evidence connected with the presence of a lead firm: Fincantieri. Apart for this very large company that together with Apuania made up almost the 90% of the total employment in the shipyard industry, according to data from Business Finland.

Table 5 – Firms and employees in each step of the GVC in Italy (Veneto and Friuli V.G.)

GVC step		Veneto		Friuli Venezia Giulia		Total	
		Firms	Empl.	Firms	Empl.	Firms	Empl.
1	Materials	795	18,771	96	3,366	891	22,137
2	KIBS	5,907	15,355	1,227	3,010	7,134	18,365
3	Propulsion	414	10,901	68	2,278	482	13,179
4	Automation, Navigation	1,222	17,577	233	4,706	1,455	22,283
5	Mechanical components	728	16,589	69	1,467	797	18,056

³ See BALance Technology Consulting GmbH, Shipyard Economics Ltd., MC Marketing Consulting (2014), "Final Report Annex 1 Structure of the Marine Supplies Industry".

6	Other equipment	410	10,349	77	2,550	487	12,899
7	Outfitting	5,490	98,300	870	28,511	6,360	126,811
8-9-10	Leisure-Commercials-Other boat equipment	3,620	52,931	648	15,136	4,268	68,067
11	Other auxiliary products/equipment	1,602	24,322	225	4,475	1,827	28,797
12	Boat and Shipyard	911	11,274	621	17,504	1,532	28,778
13	Maintenance and repairing	464	2,667	112	684	576	3,351
14	Mobility services	715	12,019	157	1,923	872	13,942
15	Tourism services	12,277	44,370	2,506	10,577	14,783	54,947
16	Port authorities	1	4,220	1	-	2	4,220
17	Commercial brokers & other services	786	2,488	211	672	997	3,160
18	Other services of Blue Economy	179	1,648	34	1,052	213	2,700

For the Croatian side, as no useful data-source has been identified, we have instead identified the firms active in the blue economy based on the insights of industry experts. The full list of firms identified can be seen in the BEAT Project report (Activity 3.1. Assessment of conditions for transnational cluster development_DM 3.1.2, list of organizations). The following table report how those firms can be associated to each step of the value chain. As far as the service industries are considered, KIBS firms (2) are focusing on crew and vessel management and on ship inspections; mobility services (14), the most numerous group are mooring, pilot and tug service; port operators; cargo control and inspection; logistics and freight forwarding. Tourism services (15) include instead marinas and nautical tourism. Port authorities (16) embrace the services related to the port activities managed by Authorities. Commercial brokers and other services (17) includes ship and cargo agents, maritime insurance and ship supply service. Finally, other sservices related to the blue economy (18) regards he ship cleaning and waste disposal.

By comparing this chart with the one related to Veneto and Friuli-Venezia Giulia, it can be easily seen that complementarities arise, across the two countries, in terms of industry specialization in the boat and shipyard value chain and the blue economy in general.

Table 6 - Firms in each step of the GVC in Croatia

GVC step	Firms
1	Materials
2	KIBS
3	Propulsion
4	Automation, Navigation
5	Mechanical components

6	Other equipment	
7	Outfitting	
8-9-10	Leisure-Commercials-Other boat equipment	119
11	Other auxiliary products/equipment	
12	Boat and Shipyard	100
13	Maintenance and repairing	119
14	Mobility services	184
15	Tourism services	102
16	Port authorities	29
17	Commercial brokers & other services	68
18	Other services of Blue Economy	17

Another important element that can be grasped thanks to the GVC analysis, regards the most influential actors of the GVC, the so-called lead firms. Such firms are usually having a large market share and have a key role in determining the development trajectories of their specific industries and/or in the overall GVC. In order to identify the most important lead firms in the blue economy/ship and boatbuilding VC, in this study we can capitalize knowledge that has been developed within previous European Projects, i.e. the project “competitive position and future opportunities of the European marine supplies industry”⁴ so as other international projects⁵. Accordingly, lead firms are identified, for each of the steps of the GVCs. While most of them are located in Northern European Countries (mostly Norway and Germany) or in Asia they often have subsidiaries in Italy as well (e.g. in the cases of ABB Marine, Consilium, SAM Electronics, TTS Group, Wärtsilä). As for the Italian context, it is important to mention two firms, Fincantieri, being a public shipyard (12) and Saipem, a large, international turnkey contractor in the oil & gas industry, leader company in the provision of engineering, procurement, project management and construction services with distinctive capabilities in the design and the execution of large-scale offshore and onshore projects.

Table 7 – Global lead firms in the GVC

GVC step.	Firms
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⁴ BALance Technology Consulting GmbH, Shipyard Economics Ltd., MC Marketing Consulting (2014), “Final Report Annex 3. European Marine Supplies Industry – Identification of Major Players, Examples for Market Consolidation, System Suppliers, M&A and Globalisation”.

⁵ GVC and KIET, (2017) “Chapter 4: Korea and the Shipbuilding Global Value Chain”

1	Materials	Coating: AkzoNobel (Netherlands), Hempel (Denmark), Chogoku Marine Paints (Japan), Jotun Paints (Norway), PPG Coatings (Belgium), Sigma Samsung Coatings (Korea), Subsea Industries (Belgium); Steel: Central Industry Group (Netherlands), Scana Industrier (Norway), Muehlhan (Germany)
2	KIBS	Saipem (Italy), Tyco Marine (UK); Technip (France); Aker Solutions (Norway)
3	Propulsion	ABB (Finland, Norway), Rolls Royce (UK), Wartsila (Finland), MAN Diesel and turbo, Brunvoll, MAN Diesel (Germany), Wartsila (Finland), Bosch Rexroth (Germany), Schottel (Germany)
4	Automation, Navigation	Kongsberg Maritime (Norway); Siemens (Germany); ABB (Finland/Norway/Switz.); Wartsila/SAM Electronics (Netherlands); Imtech Marine (Netherlands); SperryMarine/Northrup Grumman (UK) ; Caterpillar Marine Power Systems (US), GE (US), Rolls Royce (UK/US), TECO Westinghouse (US), ABB (Switz), Sulzer (Switz), Stadt (Norway), Schottel (Germany), Volvo Penta (Sweden), Siemens (Germany)
6	Other equipment	Schneider Electric (France), Survitec Group (UK), Siemens (Germany)
8-9-10	Leisure-Commercials-Other boat equipment	Cargotec (Finland); Liebherr (Germany); TTS Group (Norway); Scana Industrier (Norway); Bosch Rexroth (Germany), Central Industry Group (Netherlands), Huisman (Netherlands), Imtech Marina (Netherlands)
11	Other auxiliary products/equipment	HVAC: Bronswerk Marine (Canada); Ballast water treatment/emission control: Alpha Laval (Denmark), Wartsila Hamworthy (UK); Autronica Fire & Security (Norway); Winches: Bosch Rexroth (Germany),
12	Boat and Shipyard	Hyundai Heavy Industry, Daewoo, Samsung, Imabari, Shanghai Waigaoqiao; Hyundai Heavy Industries (HHI), Daewoo (DSME), Imabari Shipbuilding, China State Shipbuilding Corp., China COSCO

3.3 Institutional conditions and business framework

This section describes the institutional conditions and the business framework that characterize the blue sector and specifically the level of integration already achieved from an economic and institutional point of view between the two countries.

3.3.1. Business framework

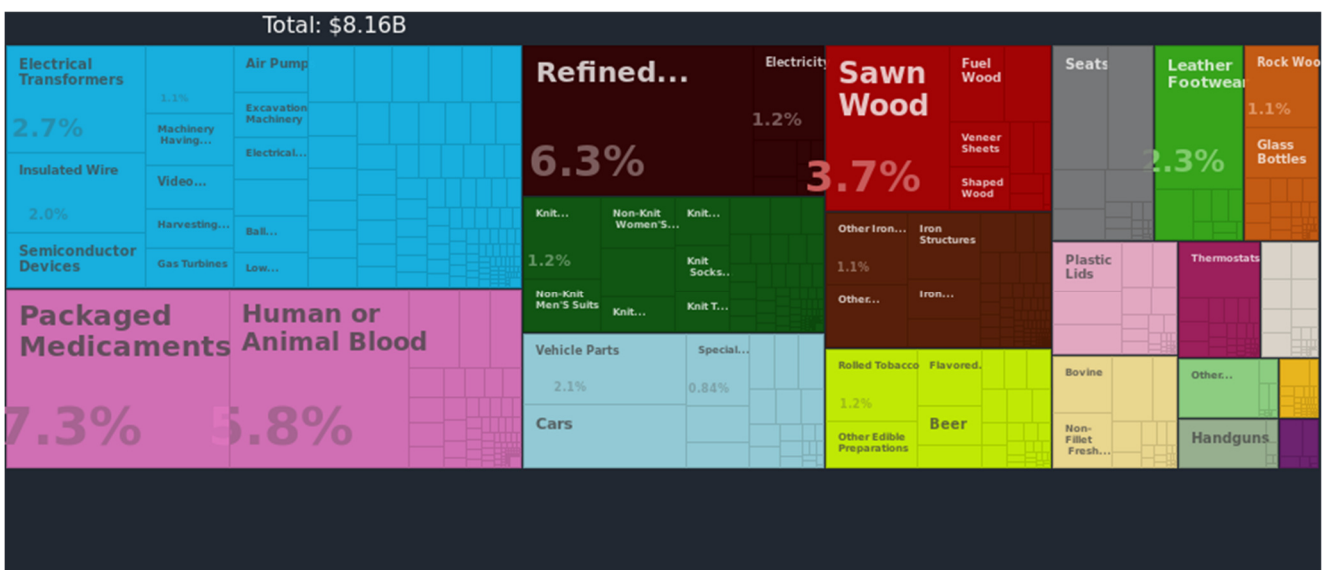
In addition to the analysis of the blue value chain presented in the previous section, additional information on the business framework are presented to further analyze the technological and business context in which Italian and Croatian firms operate.

3.3.1.1 Trade between Croatia and Italy

Export – Croatia

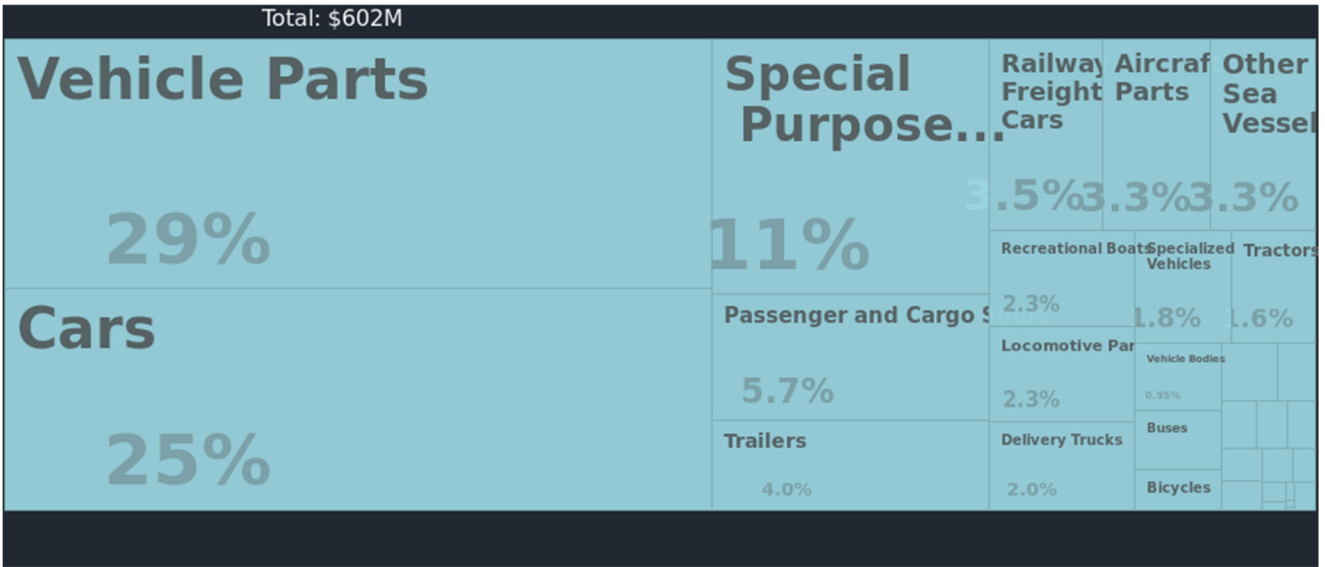
In 2017 Croatia exported \$8.16B (92nd largest exporter in the world). During the last five years the exports of Croatia have decreased at an annualized rate of -8.4%, from \$12.8B in 2012 to \$8.16B in 2017. The picture shows the total export and the dimension of transport (within which we can include shipbuilding industry – in light blue).

Table 8 – Croatia: Export



<https://atlas.media.mit.edu/en/profile/country/hrv/>

Table 9 – Croatia: Export related to transportation



<https://atlas.media.mit.edu/en/profile/country/hrv/>

Import Croatia

In 2017 Croatia imported \$14.5B, making it the 79th largest importer in the world. During the last five years the imports of Croatia have decreased at an annualized rate of -6.5%, from \$20.3B in 2012 to \$14.5B in 2017.

Table 10 – Croatia: Import

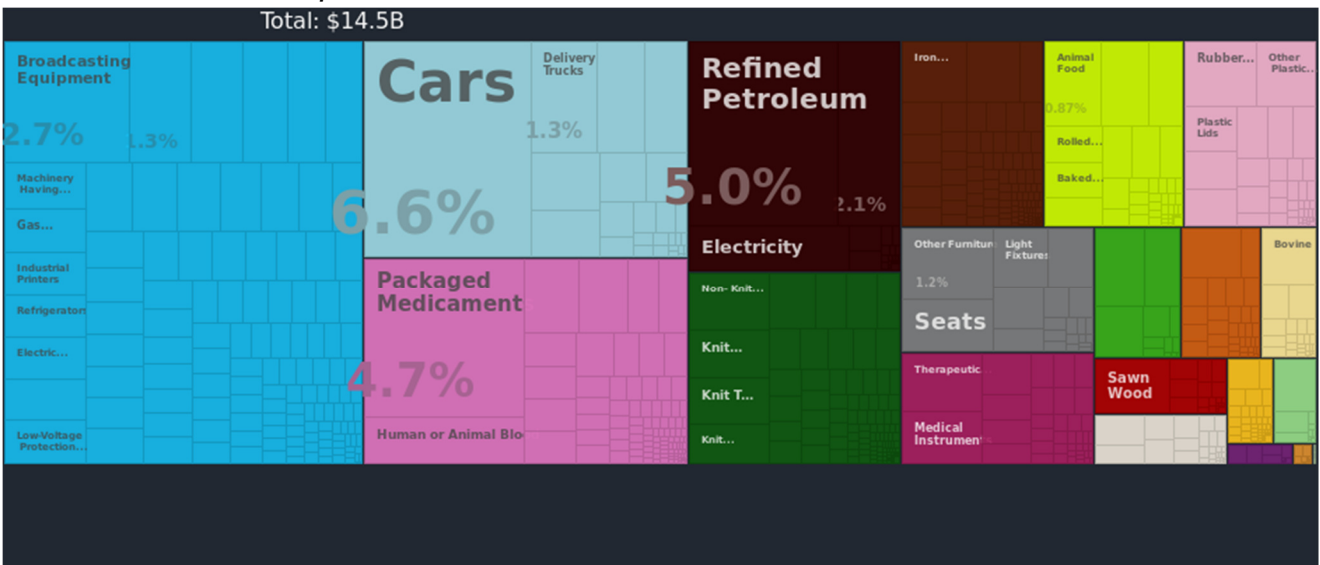
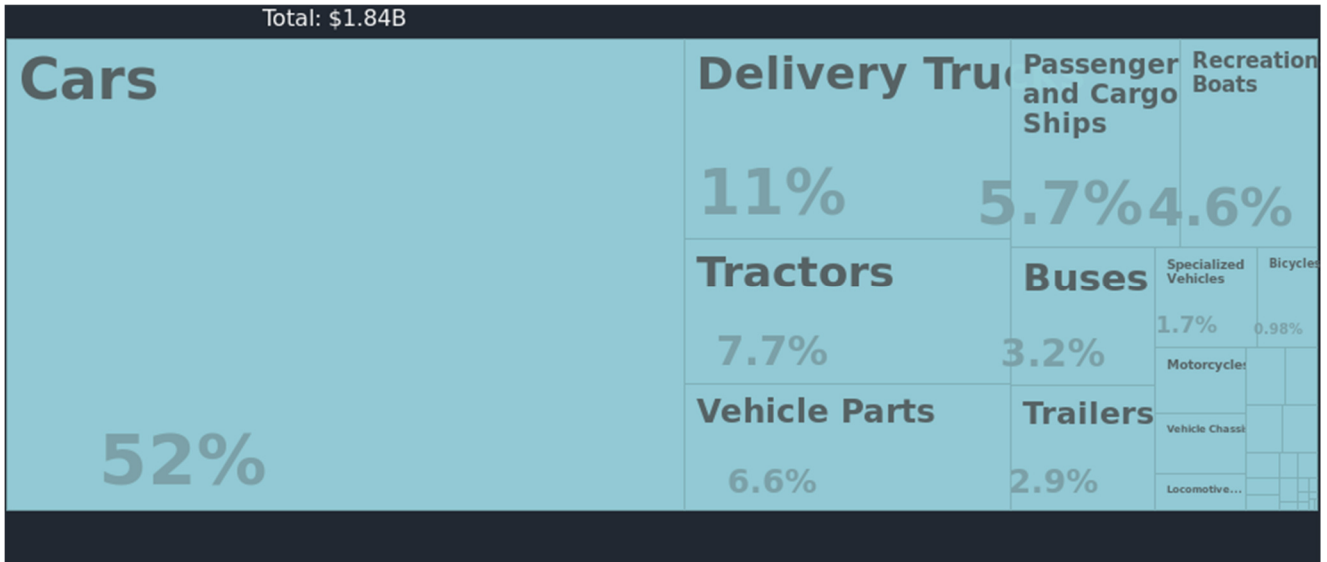


Table 11 – Croatia: Import related to transportation

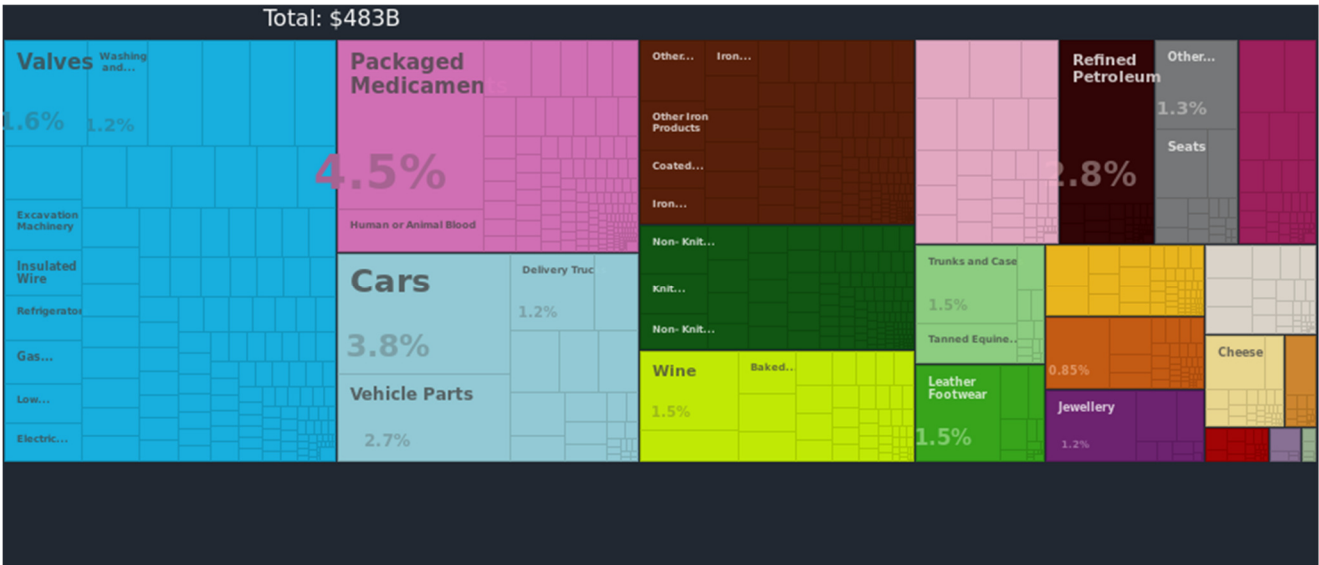


Italy counts about 13% of the total Croatian Export (1B\$) and about 14% of the total Croatian Import (2B\$).

Export Italy

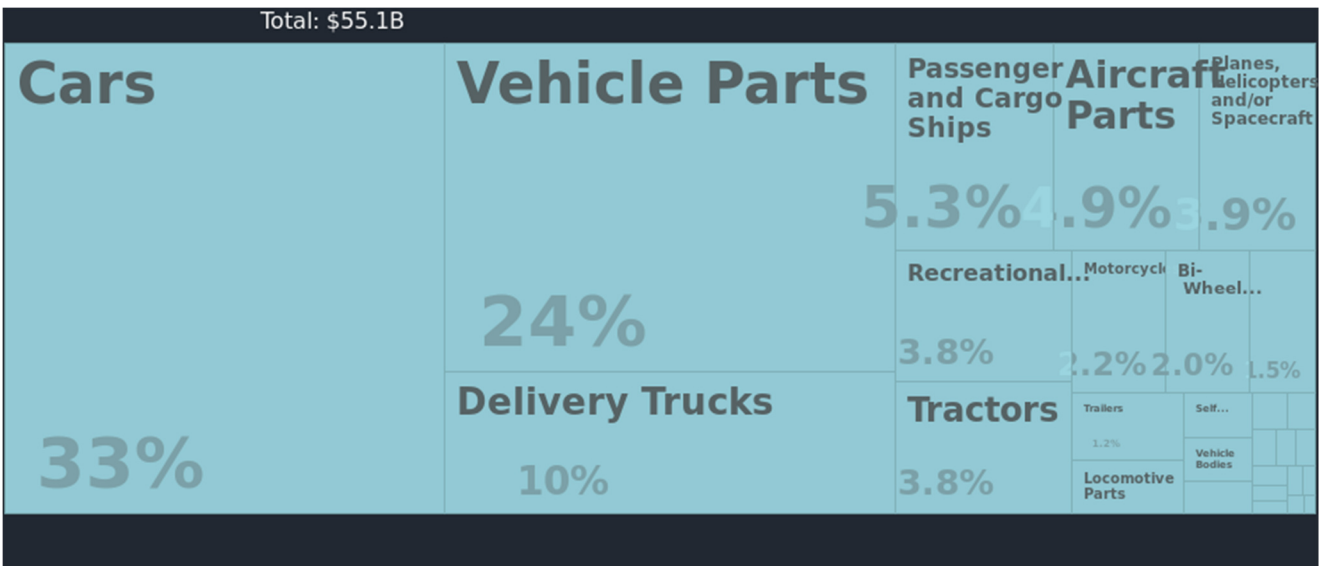
In 2017 Italy exported \$482B, making it the 7th largest exporter in the world. The most recent exports are led by Packaged Medicaments which represent 4.5% of the total exports of Italy, followed by Cars, which account for 3.83% (source: atlas.media.mit.edu)

Table 12 – Italy: Export



<https://atlas.media.mit.edu/en/profile/country/ita/>

Table 13 – Italy: Export related to transportation

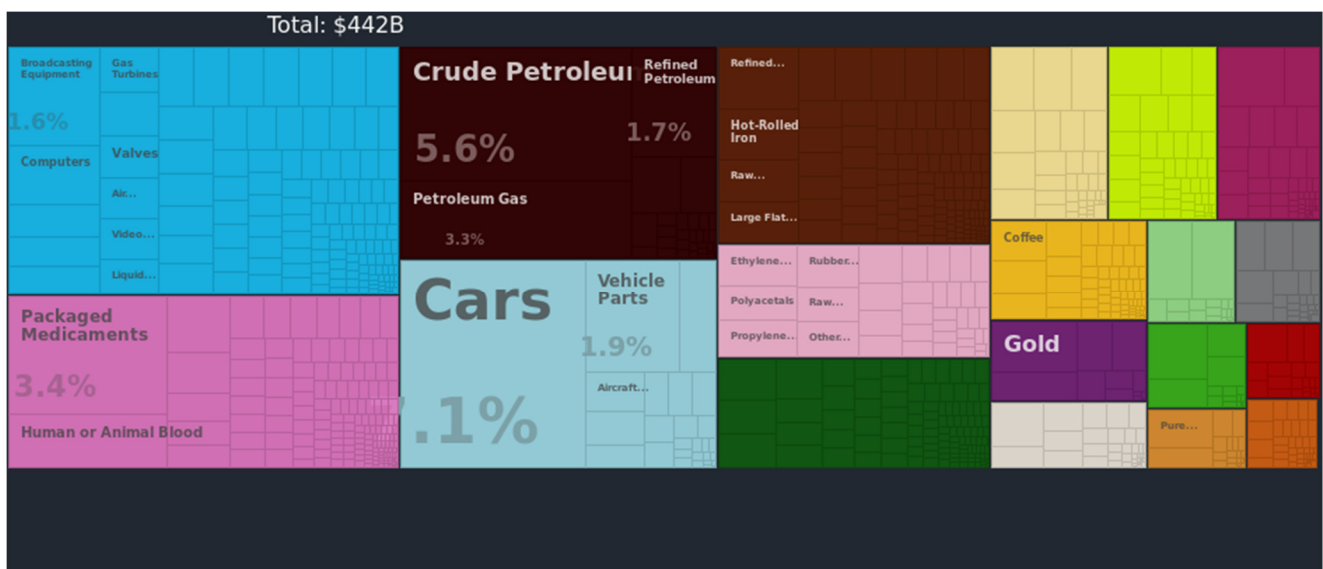


<https://atlas.media.mit.edu/en/profile/country/ita/>

Import Italy

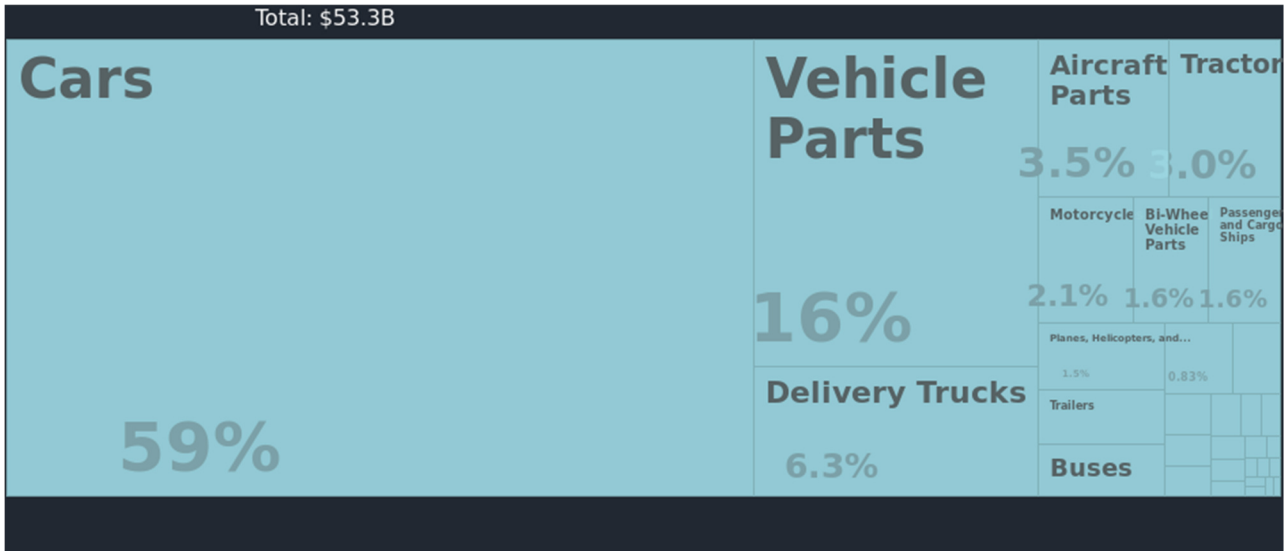
In 2017 Italy imported \$441B, making it the 10th largest importer in the world. During the last five years the imports of Italy have decreased at an annualized rate of -1.4%, from \$474B in 2012 to \$441B in 2017 (source: atlas.media.mit.edu)

Table 14 – Italy: Import



<https://atlas.media.mit.edu/en/profile/country/ita/>

Table 15 – Italy: Import related to transportation



<https://atlas.media.mit.edu/en/profile/country/ita/>

Italy is the first export country of destination for Croatia, with \$2,140,701,201 in 2017 and the second import country (after Germany), with \$3,165,174,941 in 2017.

Top 10 Croatian imports from Italy (2017) (<http://www.worldsrichestcountries.com/top-croatia-imports.html> - Data source: Trade Map, International Trade Centre, www.intracen.org/marketanalysis):

1. Machinery: \$343.6 million
2. Mineral fuels including oil: \$309.7 million
3. Knit or crochet clothing: \$272.8 million
4. Iron and steel: \$194.1 million
5. Electronic equipment: \$173 million
6. Plastics: \$149.7 million
7. Iron or steel products: \$130.9 million
8. Vehicles: \$91.1 million
9. Paper: \$83.9 million
10. Organic chemicals: \$73.2 million

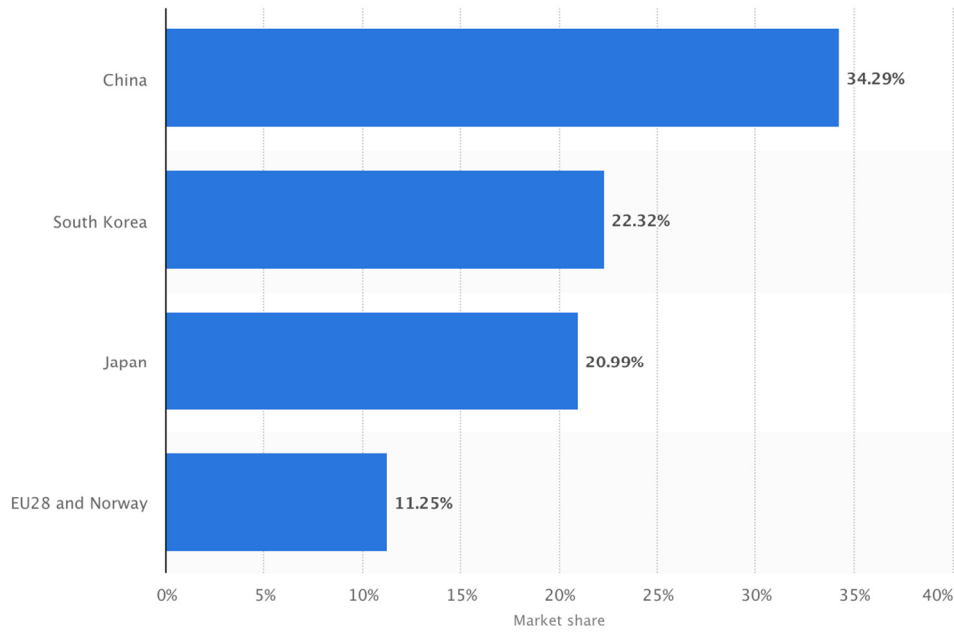
Top 10 Croatian export to Italy (2017) (<http://www.worldsrichestcountries.com/top-croatia-imports.html> - Data source: Trade Map, International Trade Centre, www.intracen.org/marketanalysis):

1. Mineral fuels including oil: \$260.4 million
2. Wood: \$245 million
3. Knit or crochet clothing: \$237.1 million
4. Electronic equipment: \$127.9 million
5. Machinery: \$111.6 million
6. Cereals: \$108.7 million
7. Iron or steel products: \$101.2 million
8. Plastics: \$86.1 million
9. Fish: \$71.2 million
10. Clothing (not knit or crochet): \$62.6 million

The shipbuilding sector has quite similar weights between the two countries in terms of export (5.7% Croatian export of passenger and shipping cargos vs. 5.3% Italian export). Nevertheless, the characteristics of the products between the two countries are not the same. Shipbuilding is one of the most important manufacturing industries in Croatia, with high impact on the Croatian economy through its production, maintenance, repairing and installation activities (Hadžić et al., 2005). As far as the Italian context is concerned, the maritime industry counts for 1.92% of the National GDP (2016 data – Source UCINA) and a global turnover of about 3.44 Bln Euro (2016 data – Source UCINA).

From the import-export analysis emerges that Italy and Croatia are both producers when considering for the shipbuilding and maritime but there is limited level of integration as far as the blue value chain is concerned. Most of the markets for both the countries in the sector analyzed are outside EU.

Figure 16 - Regional breakdown of the global shipbuilding market between January and June 2017, based on orders



Data visualized by  + a b l e a u

© Statista 2019

Figure 17 - World Ranking Of The Top Ten Countries By Market Share Of The Nautical Sector (Years 2009 and 2014, percentage of total world exports in the sector)

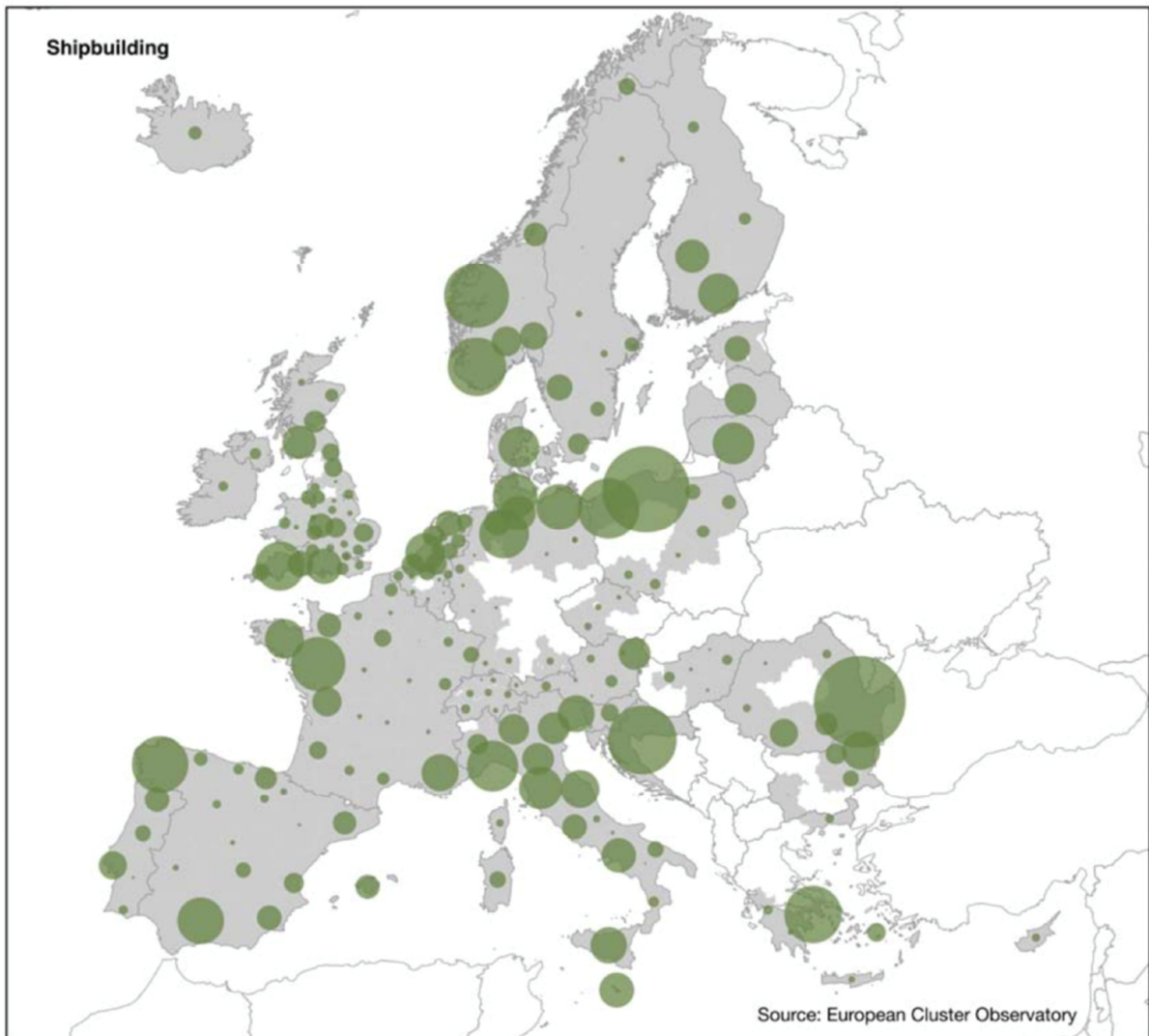


Source: UCINA – Fondazione Symbola, 2018

3.3.3.2 Clusters

At the European level the shipbuilding industry show high levels of geographical agglomeration.

Figure 18 – Shipbuilding industry regional employment concentration



Source: Giovacchini, Sersic, 2012

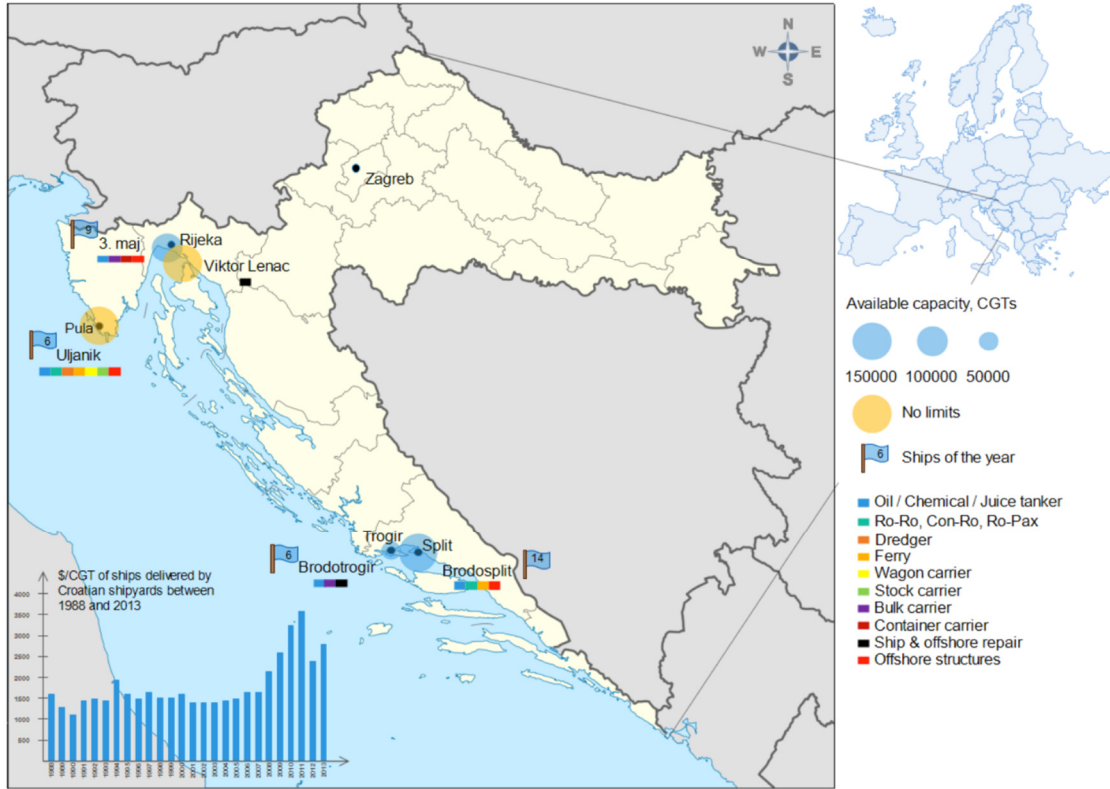
According to the analysis of Giovacchini and Sersic (2012), Croatia ranks 3rd in Europe for agglomeration based on employment, while Friuli Venezia Giulia ranks 25th.

Table 15 – Europe’s Top 25 regions for shipbuilding industries employment clusters

Region	SI Rank	Employment	European Share	SI LQ
South-Est, RO (Constanta)	1	25,113	7.21%	10.17
Pomorskie, PL (Gdansk)	2	22,718	6.53%	23.87
Croatia	3	14,167	4.07%	7.56
Vestlandet, NO	4	12,582	3.61%	15.78
Zachodniopomorskie, PL	5	11,265	3.24%	16.41
Agder og Rogaland, NO	6	10,239	2.94%	15.15
Attiki, GR	7	9,818	2.82%	2.74
Galicia, ES	8	9,567	2.75%	4.12
Pays de la Loire, FR	9	8,790	2.52%	3.94
Liguria, IT	10	7,787	2.24%	7.52
Niedersachsen, DE	11	7,415	2.13%	1.43
Devon, UK	12	7,214	2.07%	7.57
Andalucía, ES	13	6,484	1.86%	1.05
Mecklenburg-Vorpommern, DE	14	6,292	1.81%	5.76
Schleswig-Holstein, DE	15	6,037	1.73%	3.48
Toscana, IT	16	5,611	1.61%	2.08
Lithuania	17	5,240	1.51%	2.99
Denmark	18	4,965	1.43%	0.99
Etelä-Suomi/Åland, FI	19	4,958	1.42%	2.81
South-Holland, NL	20	4,615	1.33%	1.43
Bretagne, FR	21	4,586	1.32%	2.49
Marche, IT	22	4,469	1.28%	3.82
Severoiztochen, BG	23	4,311	1.24%	3.92
Provence-Alpes-Côte d'Azur, FR	24	4,124	1.18%	1.45
Friuli-Venezia Giulia, IT	25	4,107	1.18%	4.62

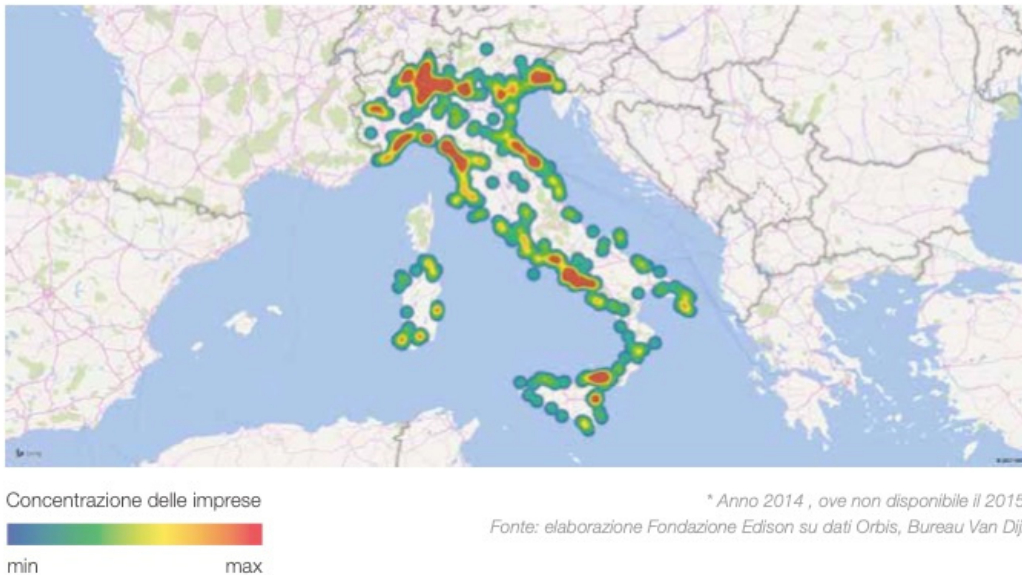
Source: Giovacchini, Sersic, 2012

Figure 19: geographical position, production capacities and prosperities of large Croatian shipyards



Source: Hadžić et al., 2005.

Figure 20: Location of nautical companies (code 3012) in Italy: year 2015*



Source: UCINA, 2016

At the same time, within each country multiple clusters in the shipbuilding sector have been developed, with different characteristics and maturity. Those clusters become the starting point for the promotion of collaboration among firms and with other key stakeholders. Clusters are either the outcome of place-based dynamics or the results of explicit policy interventions.

Table 16: Clusters

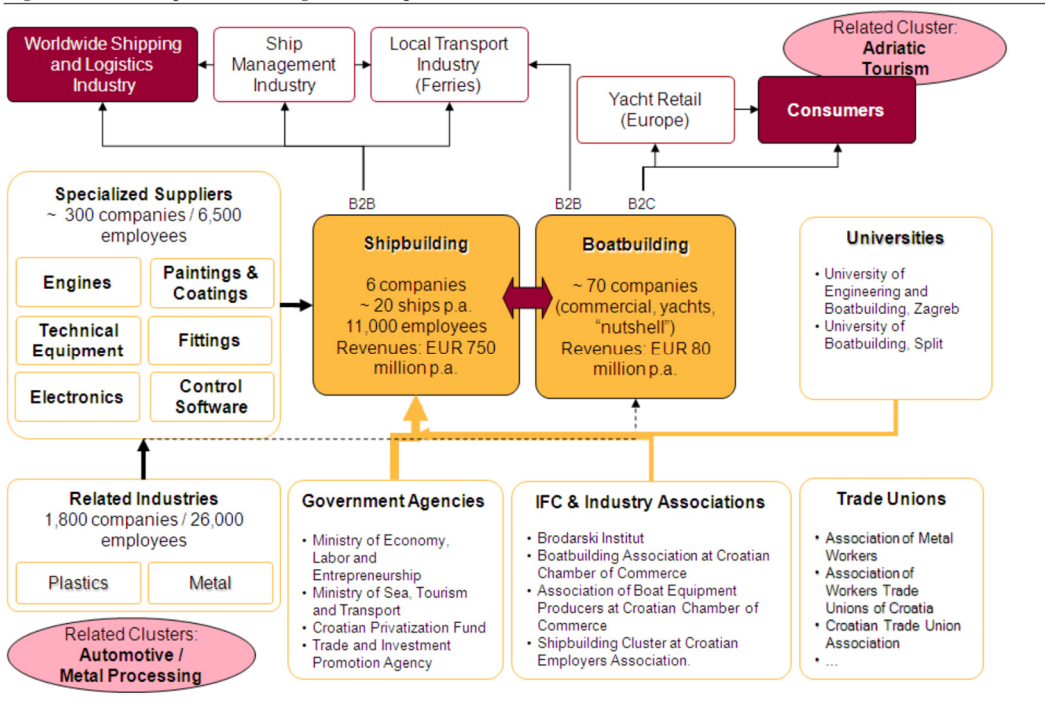
Sea-basin and country	Name of cluster	Cluster life cycle	Cluster base	Main comments
Adriatic-Ionian				
Croatia	Brodogradevni Cluster	Growing	Place-based	<ul style="list-style-type: none"> • Shipbuilding cluster based in Split • Synergies between manufacturers of small boats and equipment • Important availability of specialised and matching/appropriate skills • High relevance and use of research expertise and appropriate infrastructure • Important level of international competitiveness of products and services offered by the cluster • Relatively high and very balanced engagement of private, public and research bodies
Italy	MareFVG	Mature	Policy	<ul style="list-style-type: none"> • Shipbuilding and nautical cluster based in Friuli Venezia Giulia • Important availability of specialised and matching/appropriate skills, as well as educational programmes • High relevance and use of research expertise and appropriate infrastructure

				<ul style="list-style-type: none"> • High level of local, but also international demand for services/products provided by companies in the cluster, but moderate level of local and international competition • Important influence of cluster on public and private sector • Still limited levels of new businesses formation, despite a good availability of business incubators • Remarkable and balanced level of engagement of private, public and research bodies
Slovenia-Italy- Croatia	NAPA - North Adriatic Ports Association	Emerging	Policy-based	<ul style="list-style-type: none"> • Cross-border cluster of the ports in Italy, Slovenia and Croatia promoting themselves as an alternative to the North-European ports • Development of markets, environmental protection, safety and information technology • Promotion of coordination planning of road, rail and maritime infrastructure, and harmonisation of regulation • High level of international, but also local, demand for services/products provided by companies in the cluster

Source: Ecorys, 2014

Figure 21: Shipbuilding cluster map in Croatia

Fig. 8: Croatian Ship & Boatbuilding Cluster Map



Source: Balaj et al. 2009

Table 17: Clusters in Croatia and Italy (source: Blue Tech Project)

CLUSTER	
Name of the cluster	<i>Adriatic maritime cluster (Jadranski pomorski klaster) - Croatia</i>
Territorial dimension of the cluster	<i>National</i>
Reference economic sectors	<i>Boat construction and repair, boat building, technologies related to ship and boat building</i>
Description of activities	<p><i>Representation: cooperation with representatives of public administration, participation in activities with an emphasis on operational programs in the framework of the financial period of the EU 2014-2020, networking with business partners, organizing meetings for the exchange of information</i></p> <p><i>Animation of the territory: research and development in the areas of "green" transportation, advanced structures of transport, smart and safe transportation system, innovative transport services, the development of research in the maritime sector with focus on small shipbuilding companies in cooperation with R&D, increasing the availability, use and quality of information and communication technologies</i></p> <p><i>Culture and training: investment in education and job creation, promoting digital inclusion society, promoting the idea of social entrepreneurship and social responsibility Services: implementation of joint projects to improve the competitiveness of small and medium enterprises with particular emphasis on innovation and transfer of new technologies</i></p>
Description of services provided	<i>Supporting activities related to the development of the maritime sector, with particular emphasis on small shipbuilding sector, organizing and coordinating the activities of the cluster, promotion</i>

	<p><i>of cluster activities and its members, improving the competitiveness of the maritime sector companies, exchange of information on possible support programs and projects, cooperation with research organizations</i></p>
<p>Description of main networking processes</p>	<p><i>Because of the joint action, the project coordinator will be able to raise funds for building a modern and energy-efficient hall with technical equipment that will allow a broader scope of research and production of each member. Due to the possibility of working on one, common area, the acquaintance between individual companies will increase and they will be able to exchange knowledge and experience.</i></p>
<p>Presence and role of leader enterprises</p>	<p><i>Navalis shipbuilding and engineering: Engineering company which provides engineering solutions in ship construction and piping, offshore and inshore constructions. They provide a wide range of services, from concept design, various calculations, basic engineering to detail engineering and production.</i></p> <p><i>Riva boat: Focuses on construction, design and repair of boats.</i></p>
<p>Presence and role of leader research actors</p>	<p>Chrom Nautica Ltd.: Specialized company for the production of stainless steel equipment for ships, steel fences and everything that can be made from stainless steel materials. Manikela Ltd.: Company specialized in building, repairs and maintenance of plastic boats.</p> <p>Faculty of Maritime studies - University of Split: University in the field of maritime sailing, marine engineering, marine electrotechnical and information Technology as well as maritime systems and processes.</p> <p>CroNoMar - Inavis Maritime Innovation Centre: CroNoMar supports innovation in the maritime/marine sector by providing collaboration with globally oriented companies, associations,</p>

	clusters, educational institutions, R&D sector, and individuals with knowledge and skills in this area.
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CLUSTER	
Name of the cluster	<i>Cluster of maritime technologies of Friuli Venezia Giulia Region Maritime Technology Cluster FVG (Italy)</i>
Territorial dimension of the cluster	Regional
Reference economic sectors	Technologies related to ship and boat building, offshore and respective production chains, transport, logistics, navigation services and pleasure crafting
Description of activities	<p>Representation: supporting administration in the definition of policies and practices for the territory, increase national and international cooperation, increase perception of activities towards external actors and increase the visibility in the territorial cooperation context.</p> <p>Technological and training observatory: technologies and peculiar skills, trajectories for the development and education needs identification.</p> <p>Animation of the territory: strengthening of research system in support of enterprises even through realization of network activities, enhance research results, support enterprises to access capital and act in supporting of training needs of the territory.</p> <p>Culture and training: identify and deal with territorial training lacks, set up permanent educational/training paths and diffuse the sea culture even through specific guidance.</p> <p>Services: support development of research and innovation projects.</p>
Description of	Project management service: support to associates and stakeholders for

services provided	project development and partner seek activities, guidance for participation to calls, drafting project proposals, relations with funding agency, support in project management, results dissemination and communication activities.
Description of main networking processes	<p>Set up and continuous monitoring of maritime technologies regional forums, finalized to provide constant update of regional smart specialization strategy.</p> <p>Coordination role of the Working Group Maritime Mobility in the “National Transport Cluster Italia 2020” framework.</p> <p>Participation and support to BLUEMED Initiative activities and to cooperation activities in the Adriatic-Ionian, Black Sea and Eastern Mediterranean areas.</p>
Presence and role of leader enterprises	<p>Fincantieri: one of the largest shipbuilders in the world is active in the design and construction of highly complex vessels with high added value, merchant and naval ships, and from offshore to mega-yachts. World leader in the cruise and naval fields. Monte Carlo Yachts: founded by the French Beneteau group, the world’s leading maker of sailing boats, is a world reference player for production of FRP motoryachts from 65 up to 105 foote.</p> <p>Wärtsilä Italy: is part of Wärtsilä Corporation, a Finnish company, leader in complete lifecycle power solutions for the global marine and energy markets. In Trieste, the product portfolio comprises the families of 4-stroke engine products as well as propulsion products and service.</p> <p>Lloyd’s Register EMEA: world leading classification society with a technical office in Trieste specialized in design review of passenger ships and mega yachts.</p> <p>The above-mentioned actors represent the reference players at regional level for development and preservation of the strategic production chains for the territory. Furthermore, they provide a primary importance support in</p>

	the definition of technological trajectories and medium-long term trends.
Presence and role of leader research actors	<p>University of Trieste: university relevant at national level for the Adriatic-Ionian area in the field of naval engineering.</p> <p>University of Udine: reference university in the field of mechanics and engine plants applied to maritime sector.</p> <p>International School for Advances Studies (SISSA): international school and excellence center in the field of mathematics applied to engineering.</p> <p>National Institute of Oceanography and Experimental Geophysics (OGS): is an internationally oriented public research institution focusing on marine and blue technologies fields.</p> <p>CETENA: is a research member company of the FINCANTIERI group and works on basic research, industrial research and development in the sector of nautical construction and propulsion and consultancy in the nautical sector.</p> <p>The above-mentioned actors are the reference players for the development of several collaboration activities between public and private sector at regional, national and European level.</p>

CLUSTER	
Name of the cluster	<i>Cluster Arredo e Sistema Casa</i> <i>[Furniture Cluster and Home system] - Italy</i>
Territorial dimension of the cluster	Regional
Reference economic	Furniture Cluster and Home system

sectors	
Description of activities	<p>The “Cluster Arredo”, identified by regional regulation 03/2015 is the Innovation Pole of the home system’s cluster and implements initiatives for the development and the management of the latter. Aimed to increase innovative activities through promotion, facilities sharing, exchange and transfer of competences and knowledge, contributing efficiently to network creation, information diffusion and collaboration among enterprises and other actors that make part of the cluster.</p> <p>Furthermore, cluster’s aims identified in the statute are the following: promotion of productive systems competitive evolution, provide services supporting innovation processes of enterprises, clusters, districts, enterprise networks and any other aggregation entity, specifically operating in the field of wood furniture and home system.</p>
Description of services provided	<p>The cluster Arredo is providing the following services to the enterprises:</p> <p>CERTIFICATIONS: training and management of single or multiple certifications under the FSC® and PEFC™ standards and the international regulation ISO 9001.</p> <p>ENTERPRISE’S NETWORKS: advising support for establishment, management and development of enterprises networks.</p> <p>INTERNATIONALISATION: coordination of aggregate promotional commercialization initiatives at national and international level, through participation to fairs, business event and/or temporary showrooms.</p> <p>3D: model realization, visual display units and 3d configurators for preventive visualization of products, details and accessories. CLUSTER MARKETING: creation and development of new synergies with new actors in the field of district animation, in order to make them available to enterprises of the respective production chain.</p>
Description of main networking	<p>Establishment and monitoring of Home System focus groups finalized to provide a constant update of the regional S3.</p>

processes	
Presence and role of leader enterprises	Many excellences are operating in the region and have strengthened important market shares through stressing their actions on research and innovation. The following actors are mentioned as examples of main players – Friul Intagli Industries SpA, Calligaris SpA, Snaidero Rino SpA, Valcucine SpA, Moroso SpA.
Presence and role of leader research actors	<p>CATAS SPA: reference player at national level for testing and analysis on furniture products. Many collaborations have been established with the center:</p> <ul style="list-style-type: none"> • – LCA carried out on 5 different sessions; • – Paints LCA; <p>– Lab for packaging testing.</p>

CLUSTER	
Name of the cluster	<p>Agenzia per lo sviluppo del Distretto della componentistica e termoelettromeccanica COMET –</p> <p>[Agency for the Development of components and thermoelectromechanics COMET] - Italy</p>
Territorial dimension of the cluster	Regional
Reference economic sectors	Mechanics, components, electrical appliances, aerospace and automotive

<p>Description of activities</p>	<ul style="list-style-type: none"> - Animation of the territory: finalized to cooperation with institutions and entrepreneurial projects; - Evaluation of public projects program compatibility with regulations and strategic paths, in order to make them aligned with regional resources; - Monitoring and study of main provisions relevant for modification in the district organization and in relation to competitive advantages sources; - Promotion of production culture as primary resource to be safeguarded, promoted and developed; - Increase enterprises and enterprise's aggregation competences and innovation propensity, during all phases of the production chain; - Strengthen enterprises and enterprises aggregations market approach, without any distinction in relation to the role played in the production chain; - Services oriented to promote and animate productive districts, management of enterprise's networks, cluster management and management of any enterprise aggregation or enterprise in itself; - Assistance and consulting regarding new organizational models, management and control of business process; - Consulting for realization of investigation surveys on traditional and rising markets, realization of studies and market analysis for identification of targeted areas and sectors.
<p>Description of services provides</p>	<ul style="list-style-type: none"> - Consulting, assistance and management over entrepreneurial or territorial marketing activities; - Assistance, support and training in the field of certifications; - Assistance, promotion and management of enterprise aggregations; - Assistance, training and consulting over procedures and necessary steps for setting up cluster, business networks and any other enterprise aggregation; - Guidance and assistance to enterprises for information and

	communication technologies diffusion.
Description of main networking processes	Monitoring metal mechanics forums in order to provide a constant integration of the regional Smart Specialization Strategy. Collaboration with the Italian Technology Cluster “Intelligent Factories” with the aim of sharing research infrastructure and contribute to define a national Roadmap directed to increase Italian competitiveness in research and manufacturing innovation.
Presence and role of leader enterprises	<p>Some examples of Cluster’s leaders enterprises are following: Cimolai Spa: Cimolai Spa is one of the more advanced enterprises in the field of metal constructions. Working in Italy and abroad, is specialized in construction of: bridges, viaducts, stadiums, civil and industrial buildings, military infrastructures, welded beams for offshore and maritime industry, stainless steel floodgates for tanker ships, cylindrical and polygonal utility poles for electric lines and telecommunications, large diameter and thickness pipes and ship’s hulls.</p> <p>Electrolux Spa: Swedish multinational home appliance manufactures headquartered in Stockholm is the world largest producer for household applications and working fields.</p> <p>Brovedani Group Spa: the group have available advanced productive and control systems for manufacturing mechanical components with high quality standards rates and high technological specialization. Advanced engineering services are provided in order to develop tailored process-products, realized through design and realization of custom machines, integrated multi-technologies and outsourcing management of productive lines.</p> <p>Danieli Spa: iron and steel plant’s production leader, with specific focus on long products sector.</p> <p>Gruppo Cividale Spa: one of the main producer of special steel and cast irons forged and casted.</p>
Presence and role of leader	<p>University of Udine: reference university in the field of mechanical engineering.</p> <p>University of Trieste: reference university in the field of mechanical</p>

research actors	<p>engineering.</p> <p>LAMA FVG: advanced mechatronic center for industrial innovation. CTN Intelligent Factories: Italian Technology Cluster recognized by the Ministry. Technology Pole “Andrea Galvani”: incubator, center for technology transfer.</p> <p>Area Science Park: Consortium for Scientific and Technologic Research of Trieste.</p>
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CLUSTER	
Name of the cluster	Cluster “Trasporti Italia 2020” [National Technology Cluster for Surface Mobility] - Italy
Territorial dimension of the cluster	National - Italy
Reference economic sectors	Research and innovation applied to the following sectors: rail, road and maritime transport, and intelligent transport systems.
Description of activities	<ul style="list-style-type: none"> -Development and valorization of excellence niches present on the national basis; -Identification of possible solutions answering specific production chain problems through development of long view networks with other aggregations, finalized to support synergies and enhance outcomes transfer towards production activities; -Enhance synergies among industry, research centers and public administrations; -Diffusion of best practices and technologies; -Strengthening collaboration and cooperation networks on international level;

	<ul style="list-style-type: none"> -Support specialized training and formation in scientific, technological, economic and social fields; - Coordinate a public-private consortium focused on the development of national technological clusters; -Collaborate in order to support national and regional research and innovation policies.
Description of services provided	<ul style="list-style-type: none"> - Supporting national and regional policies in the field of research and innovation and smart specialization strategies; - Specialized training activities in complementary areas to cluster's reference sectors; - Animation of the territory in terms of research and valorization.
Description of main networking processes	<ul style="list-style-type: none"> - Coordination with regional and national government bodies in the field of research and innovation and smart specialization strategies; - Cluster "Trasporti Italia 2020" is the linking and gathering tool for Italian transport related clusters.
Presence and role of leader enterprises	<p>AnsaldoBreda: rail transport company collaborating with the cluster to identify trends and technology trajectories.</p> <p>Azimut Benetti: boatbuilding and yachting company collaborating with the cluster to identify trends and technology trajectories. Fincantieri: shipbuilding company collaborating with the cluster to identify trend and technology trajectories.</p> <p>Iveco: company of the automotive sector collaborating with the cluster to identify trends and technology trajectories.</p> <p>Magneti Marelli: company of the automotive sector collaborating with the cluster to identify trends and technology trajectories.</p> <hr style="width: 20%; margin-left: 0;"/>
Presence and role of leader research	<p>Centro Ricerche Fiat: actor collaborating with the cluster to identify</p>

actors	<p>trends and technology trajectories.</p> <p>CETENA: actor collaborating with the cluster to identify trends and technology trajectories.</p> <p>CNR (National Research Council): actor collaborating with the cluster to identify trend and technology trajectories.</p> <p>10 associated Italian universities are collaborating with the cluster to identify trends and technology trajectories.</p>
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3.3.2 Institutional conditions

Project-based collaboration

Within the Interreg Italy-Croatia ERDF program 2014-2020 multiple projects have been approved oriented to support transnational collaboration across the two countries and focus on the maritime and naval sector.

Specifically Standard + projects aims at capitalizing previous collaboration activities developed within IPA Adriatic Cross border cooperation (2007-2013) and ADRION program thus suggesting the positive outcomes achieved and the opportunity to foster networking and research activities between Italian and Croatian actors.

BEAT and its related previous projects BlueTech and Cluster Club

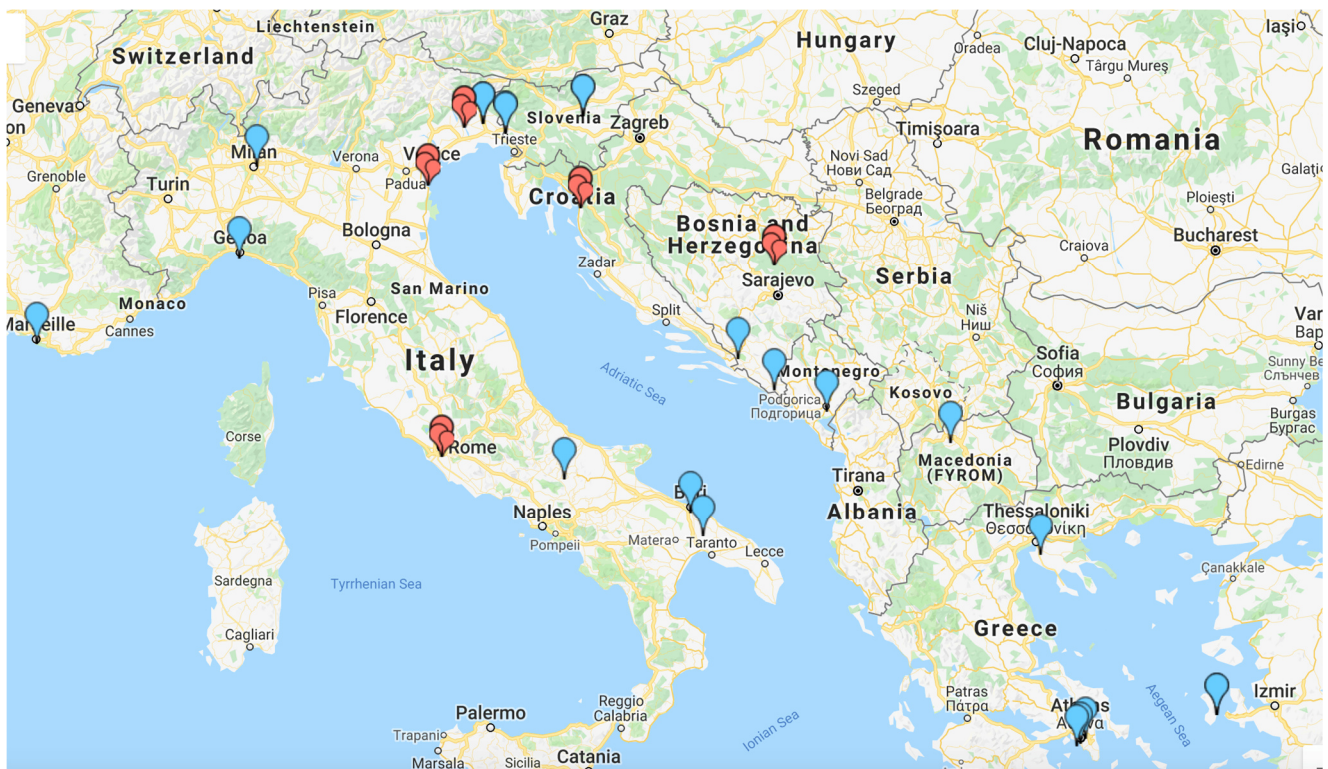
The BEAT project (Standard + PA1 innovation) is capitalizing the research on blue (green) technologies developed by the BlueTech project and aims at creating the opportunities for knowledge transfer among Enterprises and Universities for the formal establishment of the cross-border cluster. The project foster the development of innovation solutions and cooperation among the innovation actors in the Area by the means of developing cross-border cluster in blue technologies in shipbuilding sector.

The BLUE TECH Adrion Cluster project capitalized the results of three projects co-financed in the 2007-2013 IPA CBC programme (Cluster Club, ADRI Mob and Smart Inno), in order to share knowledge, good practices and relational networks to verify the feasibility of a macro-regional Cluster on green shipbuilding technologies. The project aimed at strengthening the

economy and social bodies in the Adriatic area, through innovation and increasing of competitiveness of the productive system.

BlueTech mapped key actors involved in the innovation processes in the blue sector.

Figure 21: Clusters mapped in BlueTech



<http://www.bluetechproject.eu/innovation-map>

The previous project - Cluster Club - aimed at improving the innovation's possibility of territorial and productive system through cooperation, business opportunities and market research. It aimed also at accelerating the creation and reinforcing of cluster's system, in particular the creation of SMEs network, Public Administration, public and private institutes of research, consumers and potential products and services purchasers and related associations of the Adriatic Basin. Through the partnership composed by different institutions: Chambers of Commerce and Chambers of Economy, Regional Development Agencies from Croatia, Albania, Bosnia Herzegovina, Greece and Serbia, the project valorized the different

information of the development skills of clusters in a strategic cross-border integrated framework.

Table 18: List of other projects approved in Interreg Italy-Croatia ERDF program 2014-2020 related to the blue economy / blue value chain

N.	Project title	Project description	Focus	Link
1	BLUE KEP Blue Knowledge Exchange Program and integration of education systems in the cross border area	The project is capitalizing the results and methodological approach of the IPA Adriatic project KEPASS aimed at strengthening and harmonization of the technical educational system in the nautical and maritime sector and standardization of school curricula and methods for recognition of professional knowledge of students. The expected results are better prepared labour force and creation of new skills	Standard + PA 1 innovation	http://www.italy-croatia.eu/sites/default/files/blue-kep_27707584_2.pdf
2	AdriaMORE Adriatic DSS exploitation for MONitoring and Risk management of coastal Extreme weather and flooding	The AdriaMORE project is capitalizing the results of IPA Adriatic ADRIARadNet and CapRadNet and aims to improve the existing platform integrated hydro-meteorological risk management of the cross-border coastal areas. The project will foster the exchange of best practices of institutional governances and provide support to maritime navigation, air traffic control and urban water management authorities, whereas its outputs will be available to all citizens through the improved Decision Support Systems platform	Standard + PA 2 Safety and resilience	http://www.italy-croatia.eu/sites/default/files/adria-more_27712752_2.pdf

3	CHARGE Capitalisation and Harmonisation of the Adriatic Region Gate of Europe	CHARGE project capitalizes the results of IPA CBC Programme 2007-2013 CARICA project, aiming at promoting efficient and sustainable investments for infrastructural development of ports and logistics centers, through development of integrated action plans and financial roadmaps based on forecasted traffic flows. The project will foster the intermodality and sustainable transport connectivity in the Area while supporting the decision-making process in the adoption of infrastructure investments and pilot activities.	Standard + PA 4 Maritime Transport	http://www.italy-croatia.eu/sites/default/files/charge_27767916_1.pdf
4	ECOMOBILITY ECOlogical supporting for traffic Management in cOastal areas By using an IntelIgenTsYstem	ECOMOBILITY will foster the innovative traffic management system in the coastal areas by collecting the environmental data from monitoring stations located around the cities and streaming the information to traffic management bodies in real time thus capitalizing the main results of the POSEIDON project. The activities will be also focused on raising the knowledge about the shipping impact on the air quality and producing tools to be used in the cross-border area.	Standard + PA 4 Maritime Transport	http://www.italy-croatia.eu/sites/default/files/ecomobility_27768917_1.pdf
5	MOSES Maritime and multimodal transport Services	The project MOSES capitalizes the results of the IPA Adriatic project EA SEA-WAY, aimed to enhance the accessibility and mobility of passengers in the Adriatic area through the development of new	Standard + PA 4 Maritime Transport	http://www.italy-croatia.eu/sites/default/files/moses_27743546_1.pdf

	based on Ea Sea-way project	cross-border sustainable and integrated transport services and the improvement of related infrastructures.		
6	STEP-UP Sustainable Transport E-Planner to Upgrade the IT-HR mobility	STEP-UP project is capitalizing the results of INTERMODAL and will use the information technologies and applications to foster the multimodal passenger mobility and will identify best practices to reduce common technical and organizational problems. The project foresees 6 pilot activities that will test the implementation of the new services promoted into the mobility platform for a benefit of both - citizens and tourists - in terms of easier travel planning concerning urban, interurban and cross-border level.	Standard + PA 4 Maritime Transport	http://www.italy-croatia.eu/sites/default/files/step-up_27769468_1.pdf
7	TRANSPGOOD TRANSPORT of GOODS PLATFORM	TRANSPGOOD project is capitalizing the main results of the INTERMODADRIA project and will develop set of innovative ICT tools that will assist users in finding the best solution of transport services offer and ensure monitoring transport logistics and environmental performances demonstrating concrete benefits in transport and logistics implementations. The project aims at improving the knowledge in the transport and logistics sector by organizing the training modules and jointly define a set of outputs to improve the market, policy and	Standard + PA 4 Maritime Transport	http://www.italy-croatia.eu/sites/default/files/transpogood_27769140_1.pdf

		regulatory conditions for intermodality.		
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Additional 10 STANDARD projects have been approved in relation to the maritime transport

Figure 22: Adrion 20 programme projects



<http://www.italy-croatia.eu/content/standard-projects>

Within the Interreg ADRION program 20 projects related to the maritime industry have been approved, enhancing the cooperation between public institutions, research centers, and businesses across the two countries.

Table 19: List of projects approved in the Interreg ADRION program

Project acronym	Title	OPERATION SUMMARY	Intervention category
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<p>BLUE_BOOST</p>	<p>BOOSTing the innovation potential of the triple helix of Adriatic-Ionian traditional and emerging BLUE growth sectors through an open source/knowledge sharing and community based approach</p>	<p>The 7 regional maritime territories focused by BLUE_BOOST PJT (Zadar county; Marche, F.V.G. and Apulia regions; Western Greece and Central Macedonia regions; coastal areas of Durres, Vlora, Saranda and Shengjin in Albania) are branded by the presence of maritime (from mature/growing to emerging/just aspired) clusters with high heterogeneity of activities, tangible gap in communication and interaction among their 4 strands and poor attitude to interclustering, espec. at trans-sectoral level. Thus, our proposal aims at unlocking and boosting the potential of knowledge/technology transfer, transnational and cross-sectoral cooperation of key innovation actors of traditional (primarily fisheries and ship-building) and emerging (primarily Blue technologies-including aquaculture- green shipbuilding, robotics and new materials) Blue Growth sectors by reinforcing the relationships and interactions within and among their clusters according to an open source,knowledge sharing&community based approach. The main change sought is to improve the basic conditions for bridging the gap between the 3 helixes of the focused maritime clusters between research/SMEs, users/SMEs, etc. thanks to the collaboration with the NEW INNOVATION AGENTS such as fablabs, co-working spaces, makerspaces, innovation hubs, living labs, techshops, etc. Due to such renewed flexibility, this enhanced 3 helixes approach can be naturally adopted in transnational actions for stimulation&guidance, funding (B_B TRANS. BLUE INNOVATION VOUCHER SCHEME) and networking of innovation (B_B TRANS. INNOVATION NETWORKING STRATEGY & JOINT ACTION PLAN) in order to explore possible sectoral cross-fertilizations, new ideas or expertise, new alliances and networking between individuals, communities, enterprises, organizations, institutions of the Blue Economy which deserves to be better supported, being it an economic driver and a potential generator of development and jobs.</p>	<p>63 Cluster support and business networks primarily benefiting SMEs</p>
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<p>NEORION</p>	<p>Promotion of green maritime technologies and new materials to enhance sustainable shipbuilding in Adriatic Ionian Region</p>	<p>The maritime industry has always been a key economic sector in Adriatic Ionian Region, providing thousands of high skilled jobs and opportunities for SMEs and larger enterprises such as shipyards. These days the shipbuilding industry in Europe faces fierce competition coming mainly from Turkey, S. Korea and China, where shipbuilding capacity has grown exponentially. Ship construction has also been deeply affected by the lack of effective trade rules at global level and the absence of investment initiatives. The collapse in demand since 2008 had a severe impact on employment in this sector as well. NEORION aims at establishing a transnational Cluster in the Adriatic-Ionian on Green Shipbuilding that will accelerate both the cooperation of key actors & innovation in the industry. NEORION is expected to reinforce the traditional shipbuilding sector through coordinated efforts that will facilitate the exploitation of innovative technologies and technology transfer between new complementary markets such as new materials & specialized vessels. As main outputs, the project aims at enhancing the innovation capacity of the sector, creating a sustainable shipbuilding ADRION cluster, developing tools to favor the cooperation of SMEs with research institutions and provide action plans to both foster economic growth of the sector and benefit the regional business ecosystem, through actions targeted to and initiated by representatives of the Quadruple Helix. NEORION aims at exploiting joint assets of the participating countries to eventually create a transnational innovation system for Green Shipbuilding. We argue that since Shipbuilding constitutes a major sector of EU's Blue Growth Strategy, transnational cooperation is needed to boost the performance & accelerate the EU market towards new & innovative ones. Expected impact is the creation of an ADRION Cluster that will maximize growth potential, synergies & the diversification of the Shipbuilding market.</p>	<p>63 Cluster support and business networks primarily benefiting SMEs</p>
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<p>SHIPMENT</p>	<p>StrengtHening Intellectual Property and technology transfer processes in greEn sea mobiliTy secTors</p>	<p>The SHIPMENTT project aims at establishing an innovation ecosystem focused on the green sea mobility sector (referred partially as green shipping in EUSAIR) across the ADRIAN area. In the medium-term, the aim is to enhance the investments in regional R&D and increase the competitiveness of the local SMEs. Today, the innovation activity in the region is fragmented and confined to the national borders allowing limited space for regional cooperation and economic growth. SHIPMENTT will establish a network of cooperating parties with a clear plan to shape the necessary conditions for a fruitful blue growth innovation ecosystem in the spirit of transnational cooperation. Hence, the project features partners from all 8 countries of the ADRIAN area. The project main outputs will be: 1. Direct 1:1 support on a) IP management and b) access to finance to 250 SMEs: to improve their chances of collaborating with research institutions and attracting financial resources [short-term impact] 2. Facilitation of industry-academia collaboration for 50 SMEs: via the SHIPMENTT platform [medium-term impact] 3. An all-inclusive strategy: for the development of a regional innovation ecosystem fuelled by blue-technologies in the green sea mobility field [long term impact] The project will a) design or improve tools in the IP/access2finance space, b) implement them in a pilot environment (e.g. 1:1 support and an online showroom), c) extract conclusions about the effectiveness of their use in the region's socio-economic and cultural context, and d) formulate a strategy for the long-term development of innovation conditions in the region. The project presents two novelties: 1. focuses on the green sea mobility sector that has received little attention so far internationally 2. leverages on two critical elements of business strategy and innovation management: a) Access to finance and b) IP protection and exploitation - we anticipate great returns as these elements are interrelated and jointly considered in practically all businesses today.</p>	<p>62 Technology transfer and university-enterprise cooperation primarily benefiting SMEs</p>
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<p>FUTURE 4.0</p>	<p>ManuFactUring educaTion and training governance model for IndUstry 4.0 in the Adriatic-Ionian aREa</p>	<p>The challenges brought about by the fourth industrial revolution are at the very heart of the project FUTURE 4.0. The further developmental stage in the organisation and management of the entire value chain process involved in manufacturing industry is radically changing even the concept of enterprise. EUSAIR area societies and economies are affected as well by this paradigm shift, which has effects on production, intercompany relations, human capital development. To face this, and having as specific focus Blue Economy, the shipyard & nautical logistic supply chain, the project intends to design a shared strategy to innovate companies approach to training through a Smart Learning Model enhancing shipyard competitiveness in Italy (Veneto & Apulia), Croatia, Greece and Albania. The project structure foresees the definition of a Technological Map of the Shipyard & Nautical Logistic supply chain thorough inclusive road mapping and foresight activity on technology and related competences. Results will be the lay for the designing of a knowledge, competence and skills training/learning hub (FUTURE4.0 platform) involving Universities and training orgs., companies and PAs. The platform will be part of the above-mentioned Smart Learning Model and Strategy, implemented and validated through local pilot actions, encompasses effective industrial education and training for innovation, enhancing the University-Industry cooperation. The partnership is multi actor and includes public and private bodies, universities, business supp. orgs., HE institutions active in Industry 4.0 which will cooperate together applying a Triple Helix approach. Accordingly, the project will impact on current situation stimulating a common and participatory rethinking of regional governance systems for training and innovation support towards Industry 4.0, specific for the shipyard & nautical logistic supply chain. Mutually cooperating 4 universities, PAs, business actors (Large Companies, SMEs, KIBs, Business Supp. orgs.) and R&I players will define a sectoral technological roadmap and foresight as basis for the subsequent development of a share Training Model, tested and validated through its application at each local context. FUTURE 4.0 will see the involvement of 105 companies (primary target group and beneficiaries along with PAs) of the Blue Economy in a knowledge and technology transfer tailored process, along with the production of tools and methods to facilitate a smart industrial change. Results are addressed at Adriatic-Ionian companies, human capital developers, public administrations and knowledge</p>	<p>67 SME business development, support to entrepreneurship and incubation (including support to spin offs and spin outs)</p>
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	<p>providers. Involved regions share the same challenges, as they face the same transformations and their productive systems should be more integrated. That is why the project should be realized transnationally. What is original is the combination of model design, learning actions, local action plans, profiles upskilling, within a topic - Industry 4.0 - which is brand new.</p>	
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<p>ECO-NautiNET</p>	<p>Network's support for SMEs in the Nautical sector of the Adriatic-Ionian Region</p>	<p>The project main objective is the realization of a common and innovative ADRION's Network dedicated to SMEs, Research Institutions and Business Support Organizations with aim of improving SME's competitiveness and innovation in the Nautical sector and supporting their internationalization. In particular, the main objectives are:</p> <ul style="list-style-type: none"> - to tackle the lack of innovative collaboration among SMEs across the Adriatic-Ionian area, by using existing successful experiences in the EU area in the field of network model of organization and providing to the actors involved trainings, tutoring and the latest technologies available in the nautical sector; - to realize concrete possibilities of cooperation in terms of process and products innovation among SMEs in the ADRION zone. <p>The main key output will be the ECONautiNET Network, a cooperation network among enterprises, business support organizations and research institutes. This Web platform, managed by network's brokers and coordinated through a joint management system, will have a specific focus on the ECO solutions in the nautical sector, developing a set of instruments and tools to foster innovation and internationalization of SMEs across the Adriatic-Ionian area. The target groups who will benefit from the main output are Higher Education and Research Institutes, SMEs and Business Support Organizations.</p> <p>The project main results will be:</p> <ul style="list-style-type: none"> - an effective and stable collaboration between SMEs and/or Research Institutes thanks to a common Joint Management System platform, in order to improve competitiveness and innovation in the Nautical sector; - the realization of collaborations involving mainly innovative key actors such as the Chambers of Commerce and SMEs' Association and Development Agencies, for the development of a transnational and Adriatic-Ionian common ECO-NautiNET 	<p>63 Cluster support and business networks primarily benefiting SMEs</p>
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platform, aimed to support creation and growth of networks in the ADRION area;
- to facilitate key innovation actors' work in supporting internationalization among local SMEs and ensuring common methodologies and possibilities to entrepreneurs and research institutes.
The vision of the project is to valorise the important territorial assets of Nautical Sector bringing together SMEs from different territories and deliver to them access to Best Available Technologies offered by Research Organizations increasing their competitiveness.
Business Support organisations will hold a significant role in the sustainability and expansion of the Network integrating and promoting the key figures of facilitators, tutors and brokers.

<p>Innoxenia</p>	<p>Innovation in Tourism in the Adriatic-Ionian Macroregion</p>	<p>Empowering ADRION tourism sector innovation is the way to safeguard the continuation of socio-economic growth of the area, tourism representing one of the most important industries in the area with four countries (Italy, Greece, Croatia, Slovenia) included in the world top 40 in 2015 (ref. Travel & Tourism Competitiveness Index - TTCI). Tourism in the area has to cope with changes in demand and tourist behavior, new emerging markets and socio-economic crises. The project aims at improving the innovation capability of ADRION tourism sector, relying heavily on innovative products, processes and services that can supplement natural and cultural offerings. The project will network the transnational ADRION quadruple helix tourism community into an Adriatic Ionian Tourism Technology Platform with active involvement throughout the project. A Tourism Innovation Observatory will provide a platform for modeling ADRION innovative tourism, equipped with a Tourism Innovation Decision Support System providing the ability to evaluate the impact of potential interventions on the competitiveness and sustainability of tourism destinations, structures and services. Based on a wide consensus built in the area among quadruple helix stakeholders a Strategic Agenda on Innovation in Tourism will be produced offering the strategy for tourism innovation enhancement and combined with an Action Plan issuing policy recommendations and guidelines for investments as well as potential accessible funding. It is expected that the project will simulate a paradigm shift in tourism policies and investments through its innovative approach and enrolled tools. On the other hand it is expected to provide a permanent and lasting effect in regional and local strategies on tourism by technology transfer and capacity building of both public and private sectors and leading to a regional tourism innovation system in the area.</p>	<p>67 SME business development, support to entrepreneurship and incubation (including support to spin offs and spin outs)</p>
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<p>PoWER</p>	<p>Ports as driving Wheels of Entrepreneurial Realm</p>	<p>Cultural borders & political rifts caused in the ADRION area a lack of cooperation and I&D, and a weak application of EU policies; as a result, ADRION ports, also due to small dimensions & infrastructural limits, lost their historical mission as places of exchanges, and suffer now from low modernization rate, inadequate smartness level, and unsolved issues related to sustainability and urban regeneration needs. On the other hand, ADRION ports are still complex ecosystems, offering the perfect substrate for becoming actors of the development in the area again. In this framework, PoWER aims to support the evolution of ports into Innovation Hubs, able to act as new transmission belts between regions, and to exploit their untapped entrepreneurial potential. In particular, PoWER fosters collaboration among the key-actors of the Innovation Supply Chain (ISC): cognitive institutions (schools, Universities, research bodies), enterprises and PAs, in order to turn the multi-layered challenges affecting ADRION ports into an opportunity to integrate, cross-fertilize and exploit the “power” of territories. To this extent, 6 case studies will be carried out in ADRION port areas, where an original approach will be followed by: carrying out collaborative processes applied to energy-oriented issues (energy efficiency, buildings requalification, RES, etc.) to trigger the rise of IHs; building ISCs capable to bridge ideas&production of the energy sector; merging Energy Transition & Gaming Approach as basis for co-creation and social innovation. The project outputs will be: the PoWER methodology for facilitating the collaboration between enterprises and research institutions and, in so doing, speeding up the building of ISCs; the Innovation Hubs Network (IHN);</p>	<p>62 Technology transfer and university- enterprise cooperation primarily benefiting SMEs</p>
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		<p>the IHN joint Strategy for the evolution of ports into innovation hubs, supported by an ICT Platform devoted to its implementation. These outputs will allow the members of IHN to pursue the transformation of ADRION ports into IHs as well as the further enlargement of the Network.</p>	
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<p>SEADRION</p>	<p>Fostering diffusion of Heating & Cooling technologies using the seawater pump in the Adriatic-Ionian Region</p>	<p>The recent Heating and Cooling Strategy of the European Commission indicates that emissions related to energy used for heating and cooling of buildings can be significantly reduced with technologies that use renewable energy sources and have high efficiency. SEADRION aims to identify benefits and barriers linked to the use of seawater heat pump (an innovation system that uses the thermal energy contained in a reservoir (sea) to achieve the cooling and thermal energy in the buildings), to find a system solution designed to improve the use of the seawater heat pump technology and make the building's energy self-sufficient and independent of fossil fuels.</p> <p>The project will install 3 renewable energy facilities of small- and medium-scale power in public buildings with high energy needs to make buildings self-sufficient from fossil fuels. The project will support the creation of a transnational seawater heat pump network in the ADRION region, in order to enhance the science and technology cooperation between research institutions and enterprises in ADRION region.</p> <p>Through the implementation of pilot actions aimed at testing the use of seawater heat pump system, it intends to increase the current knowledge on energy efficiency & renewable resources and define a common strategy for enhancing the use of seawater heat pump based heating and cooling technology in the ADRION region.</p>	<p>62 Technology transfer and university-enterprise cooperation primarily benefiting SMEs</p>
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<p>HarmoNIA</p>	<p>Harmonization and Networking for contaminant assessment in the Ionian and Adriatic Seas</p>	<p>The overall increase in maritime transport, coastal urbanization and the foreseen increase in offshore oil and gas extraction pose serious risks of pollution from hazardous substances for several coastal states in the whole Mediterranean, and in particular in the Adriatic - Ionian region. Countries sharing a marine region or sub-region should adopt a common approach to environmental monitoring, good environmental status definition and assessment. In the Adriatic – Ionian marine sub-regions, the level of coherence and consistency of several EU and regional environmental policies, particularly in the assessment of contamination from hazardous substances, needs a common implementation. In the framework of enhancing the capacity to tackle environmental vulnerability and safeguard ecosystem services at transnational scale, the objective of HarmoNIA is twofold: to share best practices to support the harmonized implementation of marine environmental directives in the ADRION region to strengthen the network of data infrastructures to facilitate access and re-use of marine data among countries bordering the Adriatic – Ionian Seas. Building on the EU initiative EMODnet for the management and supply of fragmented marine data, HarmoNIA will strengthen the existing transnational network of data infrastructures to facilitate access and re-use of marine data among countries bordering the Adriatic – Ionian Seas. The project will improve the coherence, among most countries bordering the Adriatic and Ionian Seas, all Contracting Parties of the Barcelona Convention, of protocols for monitoring and for assessment of contaminants in the marine environment and will facilitate data and information exchange within the region.</p>	<p>21 Water management and drinking water conservation (including river basin management, water supply, specific climate change adaptation measures, district and consumer metering, charging systems and leak reduction)</p>
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		<p>The outputs will consist in a Transnational network of institutions adopting a joint data management system for contaminants in the marine environment, and in regional strategies to improve harmonization in monitoring and assessment, and to evaluate risk of contaminant dispersion in vulnerable coastal zones from different pollution sources. HarmoNIA outputs will improve the coordination among institutions involved in MSFD and UNEP/MAP protocol implementation, local, regional and national authorities in charge of environmental assessment, management, conservation, as well as research institutions, to tackle problems related to pollution dispersal and risks on the coastal areas of the ADRIANIC region. The transnational approach will be assured by the cooperation among partners from most of the countries bordering the ADRIANIC region, with consolidated experience in marine data acquisition and management and involved in the implementation of marine environmental policies.</p>	
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<p>PORTODIMARE</p>	<p>geoPORTal of TOols & Data for sustainable Management of coAstal and maRine Environment</p>	<p>The present competition for coastal and maritime space triggered by human activities, as well as climate change effects and both natural and manmade hazards, impact coastal and marine environment, resources and ecosystems. The physical characteristics, especially the shallowness and its semi-enclosed nature, make the Adriatic and Ionian Sea even more vulnerable to these threats. This situation points out the compelling need in the Adriatic-Ionian Region for a transnational integrated and efficient planning and management of coastal and marine spaces and uses at macroregional level, able to avoid potential conflicts, create synergies and to secure a sustainable growth whilst allowing the preservation of coastal and marine ecosystems for future generations. Such effort requires fit for purpose knowledge and tools. In full compliance with the Integrated Coastal Zone Management (ICZM) and Maritime Spatial Planning (MSP) principles and policies and supporting concretely the implementation of the EUSAIR Action Plan, PORTODIMARE project aims at creating a common platform (Geoportal) for data, information and decision support tools focused on coastal and marine areas of the Adriatic-Ionian Region. The Geoportal integrates and further develops existing databases, portals and tools developed within previous EU projects by local and national administrations and by other initiatives. Through this approach, most of the available knowledge and resources will be efficiently organized and made accessible through a single virtual space, thus supporting coordinated, regionally / transnationally coherent and transparent decision-making processes, with the perspective of remaining operative and being expanded well beyond the project conclusion. The Geoportal will use, feed and support transnational cooperation networks in all the phases of its creation, from the design, to the development, to its testing phase, enabling public authorities and stakeholders to apply a coordinated, integrated and trans-boundary approach. In this view, PORTODIMARE project will test the use of the Geoportal as a concrete support for the development, in four demonstration areas, of strategies and action plans that couple environmental protection and sustainable development of sea/coast uses, within the regional and transnational framework established by Directive 2014/89/EU and EUSAIR Action Plan. More concretely, the PORTODIMARE Geoportal aims at becoming a daily working tool for decision-makers, public and private managers, practitioners, marine scientists and</p>	<p>87 Adaptation to climate change measures and prevention and management of climate related risks e.g. erosion, fires, flooding, storms and drought, including awareness raising, civil protection and disaster management systems and infrastructures</p>
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		<p>stakeholders in general, thus promoting and boosting sustainable blue growth in the Adriatic and Ionian Region.</p>	
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<p style="text-align: center;">ISTEN</p>	<p style="text-align: center;">Integrated and Sustainable Transport in Efficient Network</p>	<p>ISTEN aims at qualifying ADRION Ports as strategic nodes and hubs for the ADRION Region by setting up strategies, a transnational cooperation network and a joint action plan to improve hinterland intermodal connections, pushing in particular rail freight flows and last mile connection to the TEN-T Corridors. At present a lack of cooperation, sharing infrastructure (hard&soft) among relevant actors and massive road congestion problems, affecting links port-hinterland, are significant limits to efficiency. To date 74% of EU trade goes by ship and 37% of the total intra-EU exchange of goods (in tonne-km) goes through the EU's ports (source EC, Ports: gateways of the TEN-T). 27% of freight in EU ports is handled in Mediterranean Ports and by 2030 traffic is expected to rise by 50%. It is clear that infrastructures and transport services must be updated in order to be ready to receive this volume of freight. ISTEN involves ports from Italy, Croatia, Slovenia, Greece, Albania and Montenegro as main gateways to the TEN-T and Motorway of the Sea. Main objectives of the project are to: 1) steer priorities of involved territories by identifying integrated infrastructure planning at transnational level and consistent investment strategies; 2) provide guidelines & criteria for defining legal, technical and operational conditions useful to establish an efficient ADRION transnational network; 3) develop a specific innovative Toolbox to be used by relevant actors to analyse and define suitable conditions for establishing robust networks of stakeholders ; 4) define IT solutions and services for the communication and knowledge management; 5) capacity building in planning infrastructures and identifying measures and actions to be adopted for setting-up integrated hubs; 6) enhance the efficiency and environmental sustainability of freight logistics flows across the ADRION area.</p> <p>ISTEN final output is a strategic transnational action plan for the development of an integrated hubs network at ADRION level.</p> <p>Regional & National Authorities, as well as freight operators and other actors involved in the logistics chain will benefit from it, and will positively affect transport efficiency and environmental sustainability at ADRION region level. ISTEN aims to:</p> <ul style="list-style-type: none"> - analyse local bottlenecks in maritime-rail network, related to transnational corridors and ports; - define measures to improve rail accessibility in hinterland port context and promote 	<p style="text-align: center;">36 Multimodal transport</p>
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		<p>modal shift to the rail transport; - identify guidelines to organize transnational groups of stakeholders and an ADRION network interaction.</p>	
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<p>ADRIPASS</p>	<p>ADRIPASS – Integrating multimodal connections in the Adriatic-Ionian region</p>	<p>One of the main reasons that hamper the growth and the economic development of transport sector in ADRION region is lack of efficient maritime - hinterland connections, mainly caused by the existence of various bottlenecks at border level.</p> <p>ADRIPASS will tackle this problem by (1) analyzing physical and non-physical bottlenecks on the Trans European Transport Networks (TEN-T) corridor sections of the ADRION region, with a specific focus on those recently extended to the Western Balkans, where most Border Crossing Points (BCPs) are located and (2) by testing specific Information and Communication Technology solutions for streamlining freight transport in ADRION ports, setting standards which may be replicated to Electronic Data Interchange interfaces at BCPs.</p> <p>ADRION region will therefore benefit from the results of the above-mentioned activities thanks to the replicability of concrete project tools as the transnational action plan for transport facilitation in the Adriatic-Ionian region and the Information and Communication Technology action plan for improving multimodal transport in ADRION regions. Setting up an enduring multilevel and multidisciplinary transnational cooperation network (3), simultaneously and innovatively combining a bottom-up and top-down approach at BCPs, will then guarantee an important impact on the relevant area.</p> <p>Through the results of ADRIPASS project, and in particular through the ADRIPASS strategy for the enhancement of multimodal transport efficiency and competitiveness, planning capacities of transport stakeholders (port terminal/logistic operators, freight forwarders, railway companies) and national and European policymakers (Ministries of Transport, European Commission, TEN-T Corridor coordinators) will be significantly improved, since all of them are facing the same challenges concerning the multimodal transport accessibility and network efficiency on the TEN-T Corridor sections in the ADRION region (from the port to the hinterland). Thanks to ADRIPASS project and results the entire process of regional transport planning will be strongly supported and complemented thus allowing an harmonization with EU transport policy in the relevant area.</p>	<p>36 Multimodal transport</p>
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<p>NEWBRAIN</p>	<p>Nodes Enhancing Waterway bridging Adriatic-Ionian Network</p>	<p>NEWBRAIN project aims at boosting the relevance of the Adriatic-Ionian core nodes system for the economic and social integration of the programme area, in the framework of the European transport policy and TEN-T network as key gates connecting Central and Western Europe with the South-East Europe and Mediterranean countries.</p> <p>The project addresses various infrastructural gaps and technological, procedural and organisational bottlenecks detected at local level and impacting on the smoothness of the regional transport system, by adopting a joint and transnational approach aimed at stimulating the coordinated development of physical and non-physical infrastructure and to enhance the capacity to launch feasible investments.</p> <p>The transnational cooperation of the 9 logistics and transports nodes project partners, key institutions for the planning of infrastructural investments in transport and logistic sectors of the Adriatic-Ionian macro-region area, is expected to unlock the potential for investments through the participation to EU funding schemes for the implementation of efficient, environment-friendly and low carbon transport systems, and to ensure active and long-term cooperation in different financing initiatives.</p> <p>These results are achieved through the setting up of the Adriatic Ionian intermodal and logistic Network as stable and sustainable cooperation framework for the achievement of innovative efficient transport infrastructure and environmental friendly and low carbon transport system, agreed in the NEWBRAIN transnational strategy to be adopted by all partners. The elaboration of Action Plans in each node allows the definition of priority actions in terms of technical and financial readiness and supports the preparatory and technical studies needed to apply to main European financial programmes (e.g. CEF, EFSI, ..) through the transnational cooperation initiatives whose final scope is the concrete implementation of the Eu transport network.</p>	<p>44 Intelligent transport systems (including the introduction of demand management, tolling systems, IT monitoring control and information systems)</p>
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<p>SUPER-LNG</p>	<p>SUstainability PERformance of LNG-based maritime mobility</p>	<p>Environmental pressure in port areas and in urban areas close to ports is high owing to emissions from ships, port machinery and transport to/from the port areas. LNG is proposed as a low-carbon clean fuel for marine transport in port areas. The boost of LNG marine and terrestrial propulsion may be a key to enhance the sustainability of port areas, protecting health of population and cultural heritage. However distribution networks and port infrastructures for the bunkering of LNG-powered ships requires technologies and solutions assuring a high level of safety in touristic areas of the Adriatic and Ionian sea, avoiding trade-offs among environment protection and safety of passengers and personnel. The overall objective of the project is to increase the level of safety, environmental quality and sustainability of LNG maritime transportation in the Adriatic seas. It aims at providing a uniform framework to support the implementation of technical systems for the distribution and supply of LNG in port areas, meeting the requirements of the Seveso Directive (Directive 2012/18/EU).</p> <p>The main outputs of the project are:</p> <ol style="list-style-type: none"> 1) A strategy for harmonized guidelines for the safety assessment of LNG supply systems in the Adriatic-Ionian area, sharing experience and practices derived from safety and security directives applied in conventional facilities 2) An Action Plan, so as to share among EU the framework of the technical guidelines and best practices addressing the standardization of the technological solutions proposed for LNG supply 3) Creation of a network establishing a permanent educational system in the area of safety and forming experts for port operators, maritime educational instructions, public authorities, and other stakeholders The main beneficiaries will be regional, national and port authorities. The project will contribute to the sustainable transport and mobility solutions by supporting safe use of LNG, as a fuel, in the ADRION area. 	<p>36 Multimodal transport</p>
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<p>EnerMOB</p>	<p>Interregional Electromobility Networks for intERurban low carbon MOBility</p>	<p>In recent years, the European policies on the deployment of alternative fuels are acting as a driving force to several EU projects to promote sustainable mobility through the enabling of electric vehicles to circulate at least in urban/suburban agglomerations and other densely populated areas.</p> <p>The ADRION area is featured by an inadequate coverage and accessibility of public charging infrastructures in order to enable electric vehicles to circulate in the ADRION regions, not to mention the lack of common standards needed for the operation of such infrastructure. Such criticality generates a limitation for the medium and long range trips within the ADRION regions for the use of electric vehicles.</p> <p>In this framework, the ENERMOB project aims to study and support common solutions for electric transport systems at interurban and interregional level, by implementing pilot networks of charging infrastructures and by assessing sustainable technologies to manage energy demand of electric mobility .</p> <p>The project mainly aims to promote the use of electric vehicles in the existing regional/local transport systems of the ADRION area according to interregional common guidelines and to capitalize on experiences of already tested projects and actions by more advanced EU states. Moreover the project will develop pilot actions to test longer connections between different cities with the use of electric vehicles, by checking possible problems in the driving and charging phases. To reach the project objectives, ENERMOB involves mainly regional and local authorities that can plan and implement pilot actions and small-scale investments. Project will also focus on the implementation of coordinated strategies through the use of common technologies and standards.</p> <p>Within their main outputs, the project will develop a pilot model of transnational electric transport network connecting parallel local networks of electric vehicle supply equipment, in order to overcome interurban and interregional restrictions.</p>	<p>44 Intelligent transport systems (including the introduction of demand management, tolling systems, IT monitoring control and information systems)</p>
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<p>INTER-PASS</p>	<p>Intermodal Passengers Connectivity between Ports and Airports</p>	<p>In the Adriatic-Ionian Region there are many maritime cities which have to deal with a very high number of passengers during the peak season and in which cruise tourism is an important factor of regional and local development. However, most of these “homeports” for cruisers&ferries are suffering from lack of integration within various modes of transport, especially with regional airports. The overall objective of INTER-PASS project is to enhance the intermodal connections between ports and airports in the Adriatic–Ionian Region in order to improve the processing of passengers, mainly cruise tourists and travelers reaching tourists destinations located on Adriatic and Ionian coasts during the peak season. During 2 years of project duration, the partners will work together to concretely improve the current situation by contributing to a higher transnational coordination among countries in the development and implementation of integrated passenger transport system and intermodality, reducing existing disparities and creating the opportunity to implement smart solutions to the identified challenges in the field of tourist transport. The project will produce 3 concrete outputs:</p> <ol style="list-style-type: none"> 1) Cooperation networks on intermodal and multimodal connectivity between ports and airport located in Adriatic-Ionian Region. The network will be the place where partners and other stakeholders will exchange knowledge on innovative solutions (techniques, methods, operating codes etc.) that could be easily and successfully adapted in Adriatic-Ionian context. 2) Action plan for each territory which will define solutions to be tested and implemented in involved cities. The testing of 4 identified solutions to be implemented in Dubrovnik, Pula, Bari and Corfu during the summer 2018 with the objective to concretely speed up the tourist processing between ports and airport. 3) Elaboration of a joint Integrated Strategic Plan for multimodal passenger transportation between ports and airport to be shared with other ports, airports, and authorities located in Adriatic-Ionian Region. The project will be implemented by a consortium composed by 8 project partners and 1 associated partner: 3 Airports (Dubrovnik, Pula, Airports of Apulia), 4 Port Authorities (Dubrovnik, Pula, Southern Adriatic, Corfu) and 1 scientific partner(Technological Institute of Epirus). 	<p>036 Multimodal transport</p>
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<p>MultiAPPRO</p>	<p>Multidisciplinary approach and solutions to development of intermodal transport in region</p>	<p>The European Commission has launched a Freight Transport Logistic Action Plan (COM(2007) 607) that is proposing a series of measures to promote the freight transport logistics, make intermodal transportation more competitive, create a framework which will allow European ports to attract investment for their modernization, put maritime freight transport on an equal footing with other transport modes and review progress made in development of sustainable mobility. Based on that plan, project MultiAPPRO combines different approaches to reach most of the goals highlighted by the EC. Therefore, overall objective of the project is development of intermodal transport in Adriatic-Ionian region. The first approach is focused on systematic collection and providing solutions to all bottlenecks, both on national or regional level. Since White Paper (COM(2011) 144 final) of EC identifies promotion as one of the priority activities in transport development, the next approach innovatively and systematically performs promotion of the intermodal transport in the region and also creates a network of promotional centers. Furthermore, to assure high quality service, project will design specific port quality measures indicators. Investments in the transport infrastructure require exceptional financial means. These are capital projects, in which cost rationalisation is the key for the future competitiveness of that direction. MultiAPPRO project will thus create a model, that will be able to measure the effect of each new investment, in relation to the existing situation, in a simple and logical way. Hence, it will be possible to bring objective and rational decisions about future investments in intermodal infrastructure, in the area of the entire Adriatic-Ionian region. Given the above, project outputs include development of two supported transnational cooperation networks: 1) Intermodal Transport Network and 2) Promotion network as well as a SSS and MoS promotion action plan and a Transport Performance Strategy. Intermodal Transport Network will be composed of partner representatives, national authorities and experts working on activities to improve regional intermodal transport while Promotion network will encourage establishment of new Promotion Centres into coordinated work of already existing Centres within European Shortsea Network. Furthermore, SSS and MoS promotion action plan will serve as a strategic document for performing common promotion campaign and finally, Transport Performance Strategy will enable actors to define the effect of any investment by defining the strategy and action plan for future investments in the region.</p>	<p>036 Multimodal transport</p>
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<p>SMILE</p>	<p>FirSt and last Mile Inter-modal mobiLity in congested urban arEas of Adrion Region</p>	<p>SMILE is focused on first and last mile of mobility in some variegated and paradigmatic urban areas of Adrion Region, embracing coastal, inland and bordering cities of different size (capital, middle, little). Urban areas are place where every day residents, commuters and tourists face consequences of unsustainable mobility models and lack of effective multimodal solutions: air pollution, aggravated in many urban areas involved in SMILE by circulation of obsolete diesel vehicles, congestion and related waste of time, CO2 emission, noise, accidents, too public spaces occupied by cars. SMILE will address these issues through a logical sequence of actions and related outputs: depiction and comparison of mobility scenarios to enable policy makers and key stakeholders to better understand consequences of inaction/action; elaboration of a transnational SUMP-Sustainable Urban Mobility Plan as common cognitive umbrella under which to elaborate (or reinforce, where already initiated) local SUMPs mirroring local specific situations; to test by residents, commuters, tourists, freight and bus tourism operators someIT-Information Technology solutions (APPs/Platforms) aimed at reducing/curbing congestion, promote intermodal solutions and make more efficient traffic flows. The expected change of SMILE is multilevel: firstly, to strengthen knowledge and operational capacity about mobility of local/regional authorities; secondly, to test quick-win solutions based on IT, and hence not requiring large infrastructural investments, to promote intermodal transport. The transnational approach is needed because it allows a comparison, exchange and share of experiences. The novelty and originality of SMILE resides in the elaboration of mobility scenarios and SUMP scheme within a transnational context and in the mix of IT solutions that will be tested. SMILE will strongly contribute to achievement of EUSAIR strategy (Pillars 2 &3: "Connecting the Region"; Sustainable Tourism").</p>	<p>036 Multimodal transport</p>
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<p>SUPAIR</p>	<p>Sustainable Ports in the Adriatic-Ionian Region</p>	<p>Ports are core nodes for multimodal transport in the Adriatic-Ionian basin and strategic key drivers for economic growth: reducing negative environmental impacts is essential for a sustainable development of the area. SUPAIR responds to a major challenge (EUSAIR strategy, pillar 2, topic 1), in that it tackles reduction of emissions from shipping and on-shore port operations with an integrated approach, enhancing port authorities' capacity to plan and implement low-carbon and multimodal transport and mobility solutions and further empowering the main political, technical, trade stakeholders and partners in related decision-making. SUPAIR firstly establishes a TRANSNATIONAL NETWORK of port authorities, technical organizations, relevant actors to jointly elaborate the project's durable and transferable methodology; then develops operational ACTION PLANS complete with technical and feasibility studies in the 7 partner ports; ultimately implements dedicated actions and produces a TRANSNATIONAL STRATEGY for port-based low-carbon transport systems to increase the network, disseminate, enhance and widen scope, methodology and results. The transnational development and implementation (3 EU and 2 IPA countries) of methodology and actions insisting on a broad range of fields, with an innovative territory-based approach, involving port authorities, technical partners, stakeholders and institutional actors guarantee quality, durability and transferability. SUPAIR's impacts are short-term (7 operational plans developed) and mid- to long-term plans implemented and financed, new actions undertaken following the established methodology by an enhanced and widened network of ports. Benefits for the involved territories embrace enhanced technical capacity for ports, increased empowerment of relevant local organizations and institutions, improved environmental quality and attractiveness, increased investments in low-carbon and environment-friendly port transport and mobility solutions.</p>	<p>44 Intelligent transport systems (including the introduction of demand management, tolling systems, IT monitoring control and information systems)</p>
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<p>Inter-Connect</p>	<p>Intermodality Promotion and Rail Renaissance in Adriatic - Ionian Region</p>	<p>Improving Region's accessibility as indicated in EUSAIR strategy can be a decisive drive towards this objective. What is mainly missing, as proven by the failure past stories, is the capacity of key players & different decision making levels (local, national, transnational) to establish strong cooperation schemes able to enable the desired growth in a territory consisting of countries presenting great differentiations.</p> <p>Based on the principles of smart specialization, that is built on regional strengths, competitive advantages and cooperation, and following a well-defined forward-looking agenda towards passengers' intermodality promotion and rail revitalization, transportation negative effects can be handled and environmental performance in the Region can be improved. ADRION should invest on passengers' intermodality to revitalise itself; the unrelenting strong competition from the road sector should be balanced by the respective promotion of combined sea - rail alternatives. Building on the knowledge of previous projects, especially in RAIL4SEE, while drawing inspiration from ongoing innovative initiatives. Inter-Connect project seeks new solutions tailored to ADRION's specificities for the promotion of intermodal transport and guides the respective actors on how to turn connectivity plans into reality. Hubs clustering, identification of current and future trip generating poles, user surveys for mobility needs and expectations understanding, mapping of drivers, cooperation schemes establishment, soft mobility measures (e.g. integrated ticketing, harmonized timetables&procedures)&funding opportunities examination, roadmap formulation constitute Inter-Connect approach. Summing up, Inter-Connect project is estimated to boost intermodal PuT based (rail-sea) passenger transport in ADRION through; The identification of key players in mobility planning and the creation of a cooperation environment (Inter-Connect Transnational cooperation network) where experience and knowledge exchange will take place. The development of common understanding of area's needs, challenges, opportunities and treats and the reaching of an agreement among stakeholders for the direction towards which mobility planning should focus (Action Plan on ADRION intermodality arising from real needs understanding and flows analysis, Detailed Action Plan based on Inter-Connect cases examination outputs) The formulation of a strategic framework for enhancing intermodality in the area and the respective authorities training on how to implement and finance measures able to add on</p>	<p>036 Multimodal transport</p>
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		ADRION sustainability (Inter-Connect Strategy-Roadmap with measures in a hierarchical order)	
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Other research projects at the European Level

An analysis carried out by Capone (2014) on FP6 and FP7 projects related on the Technological clusters and innovation trajectories in shipbuilding in Europe shows high level of collaboration at the international (EU) level.

In particular there are some research institutions that are dominant in the EU context. Nevertheless, multiple clusters of technological collaboration emerge (as shown in Figure 23), with large participation of clusters in FP6 and FP7 related to the North Sea. However, at least 3 clusters are identified aiming at supporting technological advancement in the Italian and Croatian contexts.

Figure 23: Innovative shipbuilding clusters in Europe (first 100 per participation rate)



Source: Capone (2014)

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Annex A

Italian Shipbuilding GVC sectors: type of activity,
number of firms and employees in the Veneto and
Friuli Venezia Giulia (FVG) Regions

Box	GVC sector	ATECO code	Type of activity	Veneto		FVG		Total	
				Firms	Empl.	Firms	Empl.	Firms	Empl.
1	Materials	24.10	Manufacture of basic iron and steel and ferro-alloys	795	18771	96	3366	891	22137
		24.20	Manufacture of tubes, pipes, hollow profiles and related fittings, of steel						
		24.41	Precious metal production (plates, profiles, fittings)						
		25.90	Manufacture of other fabricated metal products (screws, nuts, bolts, welding material)						
		28.12	Manufacture of fluid power equipment (pumps and compressors) (valves and fittings)						
		28.13	Manufacture of other (non-hydraulic equipment) pumps and compressors						
		28.14	Manufacture of other taps and valves						
2	KIBS	62.02	Computer programming consultancy and related activities including consultancy activities	5907	15355	1227	3010	7134	18365
		70.22	Business and other management consultancy activities						
		71.12	Engineering activities and related technical consultancy						
		71.20	Technical testing and analysis						
		72.19	Other research and experimental development on natural sciences and engineering						
		74.10	Specilized design activities						
3	Propulsion	25.30	Manufacture of steam generators, except central heating hot water boilers	414	10901	68	2278	482	13179
		27.11	Manufacture of electric motors, generators and transformers						

Box	GVC sector	ATECO code	Type of activity	Veneto		FVG		Total	
				Firms	Empl.	Firms	Empl.	Firms	Empl.
		27.20	Manufacture of batteries and accumulators						
		28.11.11	Manufacture of internal combustion engines (excluding engines for road transport equipment and aircraft)						
		28.11.12	Manufacture of pistons, piston rings, carburettors and similar parts of internal combustion engines						
		28.11.2	Manufacture of turbines and turbo-alternators (including parts and accessories)						
		28.12	Manufacture of fluid power equipment						
		28.13	Manufacture of other (non-hydraulic equipment)						
4	Automation, Navigation	26.20	Manufacture of computers and peripheral equipment	1222	17577	233	4706	1455	22283
		26.30.2	Manufacture of electrical and electronic equipment for telecommunications						
		26.51	Manufacture of instruments and appliances for measuring, testing and navigation						
		26.70.1	Manufacture of optical elements and optical instruments for measuring, checking and precision						
		27.31	Manufacture of fibre optic cables						
		27.32	Manufacture of other electronic and electric wires and cables						
		27.33	Manufacture of electricity distribution and control apparatus						
		28.15	Manufacturers of bearings, gears, gearing and driving elements						

Box	GVC sector	ATECO code	Type of activity	Veneto		FVG		Total	
				Firms	Empl.	Firms	Empl.	Firms	Empl.
		28.29.9	Manufacture of general purpose machinery and other mechanical equipment nca						
		32.50.11	Manufacture of medical, surgical and veterinary materials (medical thermometers)						
		32.50.12	Manufacture of dental appliances and instruments and of medical diagnostic apparatus (including detached components and accessories)						
		62.09	Other information technology and computer service activities						
5	Mechanical components	25.93	Manufacture of wire products, chain and springs	728	16589	69	1467	797	18056
		25.99	Manufacture of other fabricated metal products (i.e. propeller, anchor, rudder blades, etc.)						
		28.15	Manufacturers of bearings, gears, gearing and driving elements						
6	Other equipment	20.30	Manufacture of paints, vernishes and similar coatings, printing ink and mastics	410	10349	77	2550	487	12899
		23.99	Manufacture of other non-metallic mineral products (insulation materials)						
		24.50	Casting of metals						
		32.30	Manufacture of sports goods (aquatic sports, surf, etc.)						
7	Outfitting	13.90	Manufacture of other textile	5490	98300	870	28511	6360	126811
		22.00	Manufacture of rubber and plastic products						
		23.00	Manufacture of other non-metallic mineral products (glass and ceramics)						

Box	GVC sector	ATECO code	Type of activity	Veneto		FVG		Total	
				Firms	Empl.	Firms	Empl.	Firms	Empl.
		23.12	Shaping processes of flat glass						
		23.42	Manufacture of ceramic sanitary fixtures						
		24.33	Cold forming and folding						
		25.12	Manufacture of doors and windows of metal						
		25.99	Manufacturer of other fabricated metal products n.e.c. (stairs, ladders etc.)						
		26.11	Manufacture of electronic components						
		27.12	Manufacture of electricity distribution and control apparatus						
		27.33	Manufacture of wiring device						
		27.4	Manufacture of electric lighting equipment						
		27.51	Manufacture of electric domestic appliances						
		27.9	manufacture of other electrical equipment						
		28.25	Manufacture of non-domestic cooling and ventilation equipment						
		31.09	Manufacture of other furniture						
		43.32	Joinery installation						
8 9 10	Leisure-Commercials-Other boat equipment	25.11	Manufacture of metal structures and parts of structures (frames, walls and staircases)	3620	52931	648	15136	4268	68067
		25.99	Manufacture of other fabricated metal products (locking devices, platforms, fish crates, tanks)						
		26.11	Manufacture of electronic components						
		26.20	Manufacture of computers and peripheral equipment						
		26.30.1	Manufacture of radio and television broadcast apparatus (including television cameras)						

Box	GVC sector	ATECO code	Type of activity	Veneto		FVG		Total	
				Firms	Empl.	Firms	Empl.	Firms	Empl.
		26.40	Manufacture of consumer electronics						
		26.70.2	Manufacture of photographic and cinematographic equipment						
		28.22	Manufacture of lifting and handling equipment						
		28.23	Manufacture of office machinery equipment (except computers and peripheral equipment)						
		28.25	Manufacture of non-domestic cooling and ventilation equipment (for liquid Cargo)						
		28.93	Manufacture of machinery for food, beverage and tobacco processing (fish processing, raw material processing)						
		43.29	Other construction installation (escalators)						
		43.32	Joinery installation						
11	Other auxiliary products/equipment	13.92	Manufacture of sails	1602	24322	225	4475	1827	28797
		13.94	Manufacture of cordage, rope twine and (fishing) netting						
		25.29	Manufacture of other tanks, reservoirs and containers of metal						
		25.40	Manufacture of weapons and ammunition (distress signaling equipment)						
		25.94	Manufacture of fasteners and screw machine products						
		25.99	Manufacture of other fabricated metal products (locking devices, platforms, fish crates, tanks)						
		28.22	Manufacture of lifting and handling equipment						

Box	GVC sector	ATECO code	Type of activity	Veneto		FVG		Total	
				Firms	Empl.	Firms	Empl.	Firms	Empl.
		28.29.91	Manufacture of apparatus for purifying and filtering liquids and gases for non-domestic use (Tank cleaning hatches, Deck washing, Swimming pool technology) (Filters, cleaners) (Oil skimmers, booms, transfer hoses, etc.)						
		28.29.99	Manufacture of other mechanical equipment and other general-purpose machinery nca						
		32.99.1	Manufacture of life-saving equipment						
		33.20	Installation of industrial machinery equipment (offshore and underwater equipment)						
12	Boat and Shipyard	30.1	Boat and Ship building (cruise, cargo, diporto, etc.)	911	11274	621	17504	1532	28778
		30.11	Manufacture of ships and floating structures						
		30.12	Building of pleasure and sporting boats						
13	Maintenance and repairing	33.11	Repair for fabricated metal products	464	2667	112	684	576	3351
		33.12.1	Repair and maintenance of general purpose machinery						
		33.12.4	Repair and maintenance of non-domestic cooling and ventilation equipment						
		33.12.51	Repair and maintenance of office machinery and equipment (excluding computers, peripherals and fax machines)						
		33.12.55	Repair and maintenance of fire extinguishers (including charging)						
		33.12.59	Repair and maintenance of other general-purpose machinery nca						

Box	GVC sector	ATECO code	Type of activity	Veneto		FVG		Total	
				Firms	Empl.	Firms	Empl.	Firms	Empl.
		33.12.9	Repair and maintenance of other special purpose machinery (including machine tools)						
		33.13.01	Repair and maintenance of optical and photographic equipment (excluding cameras and video camera recorders)						
		33.13.02	Repair and maintenance of electrical equipment						
		33.13.03	Repair and maintenance of medical diagnostic equipment, medical surgical and veterinary equipment, dental instruments and instruments (thermometers)						
		33.13.09	Repair and maintenance of other electronic equipment (excluding telecommunications and computers)						
		33.14	Repair of electrical equipment						
		33.15	Repair and maintenance of ships and boats						
		33.19	Repairing of fishing nets						
14	Mobility services	50.00	Sea transport (passengers and goods)	715	12019	157	1923	872	13942
		52.22	Maritime and water transport service activities						
		52.24.2	Movement of goods by sea and inland waterway						
		52.29.22	Logistics services related to freight distribution						
		77.34	Hire of means of sea and inland waterway transport						
15	Tourism services	26.20	Manufacture of computers and peripheral equipment (Hotel management)	12277	44370	2506	10577	14783	54947
		41.20	Construction of residential and non-residential buildings						

Box	GVC sector	ATECO code	Type of activity	Veneto		FVG		Total	
				Firms	Empl.	Firms	Empl.	Firms	Empl.
		55.00	Accommodations						
		56.10.5	Catering on trains and ships						
		62.09	Other information technology and computer service activities						
		79.11	Activities of travel agents						
		79.12	Activities of tour operators						
		79.90	Other reservation services and tourist assistance activities not provided by travel agencies						
16	Port authorities	84.10	Administration of the State and the economic and social policy of the community	1	4220	1		2	4220
17	Commercial brokers & other services	46.14.05	Agents and representatives of ships, aircraft and other vehicles (excluding motor vehicles, motorcycles, mopeds and bicycles)	786	2488	211	672	997	3160
		46.14.06	Business hunters for machinery, industrial plants, ships and aircraft, agricultural machinery, office machinery and computers						
		46.14.07	Mediators in machinery, industrial plants, ships and aircraft, agricultural machinery, office machinery and computers						
		46.69.99	Wholesale of other machinery and equipment for use in industry, trade and navigation nca						
		47.64.2	Boats and accessories retailing						
18	Other services of Blue Economy	38.31.2	Shipbreaking yards	179	1648	34	1052	213	2700
		43.34	Painting and glazing						
		52.24.2	Movement of goods by sea and inland waterway						

Box	GVC sector	ATECO code	Type of activity	Veneto		FVG		Total	
				Firms	Empl.	Firms	Empl.	Firms	Empl.
		64.90	Other financial services activities, except insurance and pension funding						
		80.20	Security systems service activities						
		81.22	Other building and industrial cleaning activities						
		84.13.5	Regulation of affairs and services relating to the construction of inland waterway and maritime transport infrastructure						
		85.32.01	Sailing and sailing schools issuing patents or commercial licences						
		94.11	Activities of business employers and professional organizations						
		95.24	Repairing of furniture and home furnishings						



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