Marine Technologies

The ***Marine technologies*** macro sector includes the protection of the marine environment, all activities relating to the ship itself (shipbuilding, *services, refitting*), to the port (logistics, security, controls) and to services with high added benefits (integrated logistics).

The topic of economy and technologies of the sea plays an extremely important role in Liguria from an industrial point of view, services and technological development and represents a competitive cluster for the territory to be preserved and strengthened.

The strategic role of Liguria in maritime activities is stated in the X Report on the Economy of the Sea, drawn up by Unioncamere and the Tagliacarne Institute. The report shows how, looking at how much the sea economy contributes to the added benefits in the regions, the first place goes to Liguria, where the *Blue Economy* accounts for 14.5% of the total regional added value (year 2020).

It is particularly important the presence of large industrial groups in the shipbuilding and ship repair sectors, which promoted the development of highly specialized and competitive supply chains with the presence of numerous SMEs, which have always continued to invest in product and process innovation. Following the economic crisis of the first decade, the sector underwent a profound transformation. Nevertheless, it has maintained project skills and abilities able of competing at an international level, which must be preserved and supported through innovation processes strongly oriented towards sustainable products and that respond to the challenge of the efficiency and sustainability of maritime transport.

SYNTHESIS FRAMEWORK

MARINE TECHNOLOGIES

R&D system specialisation level	High
Strengths and competitiveness of the territory	• Presence of the major Italian port system • Tourist vocation • Specialisation in shipbuilding, logistics, manufacture of means of transport. • Strong tradition and history in manufacturing (Institutions and companies) • High competitiveness both on the national and international market with avant-garde solutions and products • Good availability of technological skills • Collaboration and synergies among subjects • Good competitive positioning both at national and international level in research activities
Impact	The impact of technological and industrial solutions connected to the area of specialisation is extremely broad and affects the following sectors: • Tourism • Building systems and furnishing components • Domotics • Industrial Design • Eco-sustainability and protection of the marine environment

Territorial pervasiveness	Whole region
Sub-sectors	**Maritime Technologies** • Energy efficiency of naval and nautical means • New eco-sustainable processes and technologies for shipbuilding (with attention to the entire ship's life cycle) and ship repair • Reduction of the environmental impact of naval and nautical vehicles, including acoustic pollution • Safety, Cyber security and ships and port infrastructures' automation: new technologies for command and control in maritime scenarios with the possibility of unexpected or anomalous events, aiming the goal of autonomous ship, with decision support. • Advanced maritime infrastructure, including e-Maritime solutions. • Innovative solutions for the design, validation and creation of new materials and components resistant in the marine environment and development of environmentally friendly technologies for the protection of materials in the marine environment • Domotics, Digitalisation, IoT and Smart Ship • Development of innovative services (after sales) and related enabling technologies • Systems for predictive maintenance of on-board equipment and systems (*Life Cycle Cost Analysis and Condition Based Maintenance*) • Robotic systems and instruments and their subsystems in the underwater environment to operate in the depths, particularly in coastal areas, ports and *offshore* infrastructure. • Innovative design for the nautical industry and *refitting* • Development and application of enabling technologies of Industry 4.0 to shipbuilding (robotics, *digital twin*, AI and *Big Data*)

	Protection and enhancement of the marine-coastal environment • Development and application of environmental and marine monitoring systems, including AI-based systems and *marine litter* systems. • Weather-marine modelling, measurement and modelling of wave motion and currents and sea level • Green ports, *cold ironing*, ships electrification, green *propulsion* and circular economy models • Development and use of technologies and biotechnologies for the management of environmental emergencies and of restoration interventions extended also to the interaction coast/rivers. **Logistics, security and automation in port areas** • ICT for the management of port logistic process • *Safety, Security, Cybersecurity and Biosecurity* in ports and interports • Systems and technologies for the management and automation of port activities and port access gates • Ship-terminal freight traffic planning and management • Integration between port logistics systems and port and maritime navigation monitoring systems • Maritime and port traffic control systems • Study of innovative technologies and strategies for the management of the coastal area and marine anthropic impacts, particularly in the port area (port/city/highway/railway interaction, dredging, *marine litter, oil spill*).