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Concetta Fonzo, Laura Evangelista

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3. REGULATORY FRAGMENTATION AND QUALITY IN TRAINING: THE CASE OF THE MEDITERRANEAN YACHTING SECTOR

by Fabio Croci*

Abstract: Il cluster mediterraneo dello yachting di lusso rappresenta un'eccellenza europea, oggi chiamata a fronteggiare sfide sistemiche legate alla frammentazione normativa e a una crescente carenza di capitale umano specializzato. L'analisi del settore segnala criticità strutturali legate all'invecchiamento della forza lavoro, alla carenza di competenze digitali e green e alla difficoltà di attrarre nuovi talenti. Tali criticità risultano accentuate da un "mosaico regolatorio" che limita la mobilità transnazionale e il riconoscimento delle competenze, ostacolando la creazione di un mercato del lavoro realmente integrato e dinamico. Si evidenzia in tal senso l'urgenza di un'integrazione sistematica delle politiche regionali e nazionali con strumenti europei quali EQF, ESCO ed EQAVET per garantire standard di qualità uniformi e trasparenti. L'obiettivo è delineare modelli di *governance* capaci di valorizzare l'apprendimento permanente, garantendo la competitività e la sostenibilità sociale.

Parole chiave: qualità, settore nautico, formazione, quadro normativo.

Abstract: The Mediterranean luxury yachting cluster represents a European excellence that is currently called upon to address systemic challenges linked to regulatory fragmentation and a growing shortage of

* Esperto in politiche pubbliche formazione e lavoro. Valutatore indipendente di programmi cofinanziati dal Fondo Sociale Europeo, Consulente senior in europrogettazione e gestione di interventi complessi (Interreg, Erasmus+, PNRR), Esperto valutatore per le Agenzie Nazionali Erasmus+ (INAPP e INDIRE) e consulente del Ministero dell'Istruzione e del Merito. fabio@prospecto.net.

specialised human capital. The sectoral analysis points to structural criticalities related to workforce ageing, shortages of digital and green skills, and difficulties in attracting new talent. These challenges are further exacerbated by a "regulatory mosaic" that limits transnational mobility and the recognition of competences, hindering the development of a truly integrated and dynamic labour market. In this context, the urgency of systematically integrating regional and national policies with European instruments such as the EQF, ESCO and EQAVET is highlighted to ensure uniform and transparent quality standards. The objective is to outline governance models capable of enhancing lifelong learning while ensuring competitiveness and social sustainability.

Keywords: quality, yachting sector, training, regulatory framework.

1. The Shipbuilding and Maritime Technology Sector in Europe

According to OECD, Europe is currently the largest global producer and supplier of advanced maritime equipment, systems, and climate-friendly technologies (OECD, 2023). This is likely due to the sector's continuous investments in highly skilled workforce as well as in research, development, and innovation. In addition, the OECD notes:

«*As technologies are developing with increasing speed and interdependencies, the linkages between marine technological systems and skilled labour are becoming more complex and impose demands on the skills of workers designing, manufacturing and operating marine equipment products. Measures to train a skilled-labour force and develop human and institutional capacities [...] must coincide with digitalisation and decarbonisation efforts, to maximise the benefits from new digital technologies, find workable solutions and achieve a just and people-centred transition*» (OECD, 2023:34).

The Shipbuilding and Maritime Technology Sector is strategically important to meeting the goals of the EU Green Deal and the Smart and Sustainable Mobility Strategy but also to ensure Europe's maritime and coastal safety and security and the sustainable development of the Blue Economy. To tackle the green and digital transition companies are undergoing intensive upskilling and reskilling plans. However, the skills agenda is very complex and too extensive for individual companies to cope with it on their own. Various threats and critical issues are characterising the sector:

- the need to adapt skills to the Shipyard and Industry 4.0 and to the progressive digitalisation of the industry;
- the EU Green Deal and especially the industry's goal and responsibility to deliver the first zero emission ships and technologies by 2030;
- an ageing workforce: 40% of the current workers are expected to retire within the next 10 years (SEA Europe, 2021);
- the high intra-EU mobility of workers and the need for a highly skilled workforce across the entire EU-wide supply chain;
- the scarcity of sectoral training offerings and the difficulty in adapting them to the fast-changing needs of the industry;
- the difficulty in attracting talent to the sector and to find people with sectoral skills. Women account for only 20% of the workforce and there is a need to also attract more women and to promote career opportunities in the sector (SEA Europe, 2021);
- the high added costs for companies to overcome the shortage of training and skills by creating their own schools and delivering training.

According to the *Shipbuilding Pact for Skills: upskilling shipbuilding and maritime technology workers in Europe*[1]:

[1] The Pact has been signed by the European sectoral social partners, SEA Europe and IndustriAll Europe, together with main industry leaders, education providers,

«*Maintaining talent in the sector at this crisis moment is key to preserve Europe's competitiveness and leadership in innovative maritime technology markets and to achieve the goals of the EU Industry Strategy and the Smart and Sustainable Mobility Strategy by 2030. In order to tackle the challenges while the market is at such low levels it is necessary to take collective and urgent hands-on actions with the involvement of industry, workers, education providers and public authorities.*»

The EBI - European Boating Industry association has recently highlighted the potential offered by the recreational boating industry in addressing several challenges:

«*The recreational boating industry is a key economic sector within the blue economy and tourism sector, contributing to Europe's industrial success through manufacturing #MadeInEurope. The industry is a frontrunner on sustainability, innovation and new technology and its products are recognised worldwide, putting Europe as a synonym for quality. It is also a hugely important element of Europe's leisure and touristic offer, offering an antidote to mass tourism and providing access to the sea for all citizens building environmental awareness and ocean literacy*[2].»

According to a survey[3] carried out by the social partners of the EU project "Upskilling Shipbuilding Workforce in Europe", by 2030 the industry will still need professionals with specific sectoral skills, blue-collar workers such as welders and solderers, shipyard mechanics, naval painters, electricians, assembly-supervisors,

national and regional sectoral stakeholders. More information: https://pact-for-skills.ec.europa.eu/about/industrial-ecosystems-and-partnerships/mobility-transport-automotive-ecosystem_en (last seen on 31 March 2026).

[2] From EBI Manifesto: Navigating Tomorrow: A vision for a sustainable boating industry #MadeInEurope. EBI Calls for the period 2024-2029. https://www.europeanboatingindustry.eu/ (last seen on 31 March 2026).

[3] Results of USWE's Survey on Skills, Education and 4.0 technologies in Shipbuilding, 2020. https://www.usweproject.eu/images/D23_Results_of_USWE_Skills_Survey.pdf (last seen 31 March 2026).

shipwrights, pipe fitters, mechanic turners, integrators and 3D designers, or electronics technicians. However, these profiles will need to be revised to include Industry 4.0 competences, digital, green and specific soft skills. On the other hand, the demand increases in the coming years for professionals in new technologies, such as data scientists, 3D printing technicians, system architects, or cybersecurity experts. Industrial, mechanical, electrical engineers and naval architects are also highly sought-after professionals in the sector.

The yachting sector, in particular, is now at a crucial moment to ensure its competitiveness, given the strong market recovery that has taken place since 2022. Among the most significant clusters, the Italian yachting sector reached a total production value of €3.6 billion in new boats (+34% compared to 2020), contributing 2.9% to national GDP. Italy is the leading country in the global superyacht orderbook, with a 49% share, and also leads in terms of historical growth. Overall, Italy is the second-largest country in the world in terms of production, with a market share of 12%, following the USA at 40%. The nautical industry has fully overcome the difficulties of previous years. Italian companies are experiencing a period of strong dynamism and are world leaders in the production of superyachts. Among maritime economies, the nautical industry was the fastest-growing sector in 2021, recording the highest-ever increase in turnover, a record level of exports, and a 10% rise in direct employment. The newbuilding market is mainly represented by motorboats (around 90%) and, geographically, by North America and Europe (around 70%). Today, 70% of the world's megayachts are sailing in the Mediterranean year-round, as the trend of seasonal transfers between the Mediterranean and the Caribbean has diminished.

Thus, the real global centre of luxury yacht production is the European continent. Outside the EU, Turkey and the UK stand

out for their strength and reputation. Within Europe's borders, however, there are two dominant poles: the Northern European one (led by the Netherlands and Germany), and the Mediterranean one, where Italy stands out as the world's main hub for luxury yacht building, drawing in the districts of France, Spain, Greece, and Malta for the refitting industry, on-board professions, and the entire boating tourism economy, including port accommodation services.

2. The Mediterranean luxury yachting supply chain

The impact of the yacht sector on the European labour market is highly significant, although not always visible or properly valued, partly due to the difficulties in delineating its boundaries. In fact, numerous professions and markets revolve around yachting. Broadly speaking, we can identify four main sub-sectors: yacht building, refitting, port-related professions, and on-board professions.

Regarding luxury yachts, the very identification of the sub-sector has some peculiarities. Traditionally, all market analyses are based on classifications according to vessel length, with the inevitable tendency for continuous evolution and overlap. Here, however, it is important to emphasise that the focus is based not so much on length as on the nature of the luxury yacht as a product. In Europe there are two distinct poles in this regard: the Italian and the Dutch. The former, with a natural inclination toward sailing on the Mediterranean, is characterised by growing partnerships with France, Spain, Greece and Malta. The latter, with a strong presence in Atlantic sailing, has over time developed partnerships and collaborations with the German industry over time, creating an Atlantic cluster. Together these two clusters constitute the world's largest luxury yacht manufacturing cluster, with the Dutch one

more focused on longer lengths of yachts. The Mediterranean cluster, on the other hand, is characterised by a very strong coexistence of manufacturers and leisure destinations, making the Mediterranean context highly suited to a multidimensional offering that must cover all stages from design to refitting, from port accommodation to on-board professions. According to the report from the CPMR Intermediterranean Commission and MedWaves (CPMR, 2022):

«*50% of the global fleet of large yachts – also called superyachts – spends eight months out of twelve in Mediterranean waters. In terms of charter destination, 70% of large yacht charter contracts worldwide are for the Mediterranean (56% for the Western Mediterranean). The Superyacht Migration Report gives a 3.5% average annual growth in large yacht presence within the Mediterranean Sea, with 37% of them below 40m, 47.5% from 40-60m, 13% from 60-90m, and 2.5% of vessels more than 90m*» (CPMR, 2022:83).

This leads us to a second important consideration: yacht building also entails additional activities essential for the proper development of its market: refitting (as yachts require continuous maintenance), the availability of specialised crews for luxury yachts, and, finally, optimal marina management. This supply chain has demonstrated over time that complete and efficient control in a single location is unfeasible. Ships, by definition, tend to move constantly, and harmonisation of international policies and strategies is still urgently needed today. The entire value chain – from production, refitting and navigation to port reception – requires international partnerships capable of responding to global challenges, including sustainability and innovation.

When we talk about recreational boating, we refer to an economic sector that is not easily delineated. Within the NACE classification of economic activities, only three categories are

directly attributable to the boating sector. These are the activities corresponding to the following codes:

- 30.11 building of ships and floating structures;
- 30.12 building of pleasure and sporting boats;
- 33.15 repair and maintenance of ships and boats.

In this classification of boating, the yachting and recreational segment—understood as all activities relating to the construction, maintenance, and repair of boats for private use—cannot be clearly delineated. In fact, when we speak of pleasure craft, the NACE classification allows us to unambiguously isolate only the production activity carried out within shipyards, which, identified by code 30.12, differs from nautical production for purposes other than leisure (boats and other floating structures), which instead falls under NACE code 30.11 and mainly concerns commercial boating. The activities identified by code 33.15, on the other hand, refer to the repair and maintenance of both recreational boats (code 30.12) and commercial vessels (code 30.11).

Thus, while it is evident that the nautical sector, as identified by the NACE classification and defined by the sum of the three categories listed above, does not refer exclusively to recreational boating, it is equally clear that it cannot encompass the full range of activities carried out by companies that are complementary to boating but located in other production domains and operating outside shipyards.

These include all enterprises that work in collaboration with shipyards, mainly under subcontracting arrangements, and produce components to be assembled on vessels—such as sails and ropes (textile sector), interior furnishings and wooden elements (furniture and wood sector), systems and machinery (plant manufacturing and installation), propellers, anchors, and other metal parts (metal products), engines (mechanical sector), and navigation instruments (compasses, radar, GPS, and other software

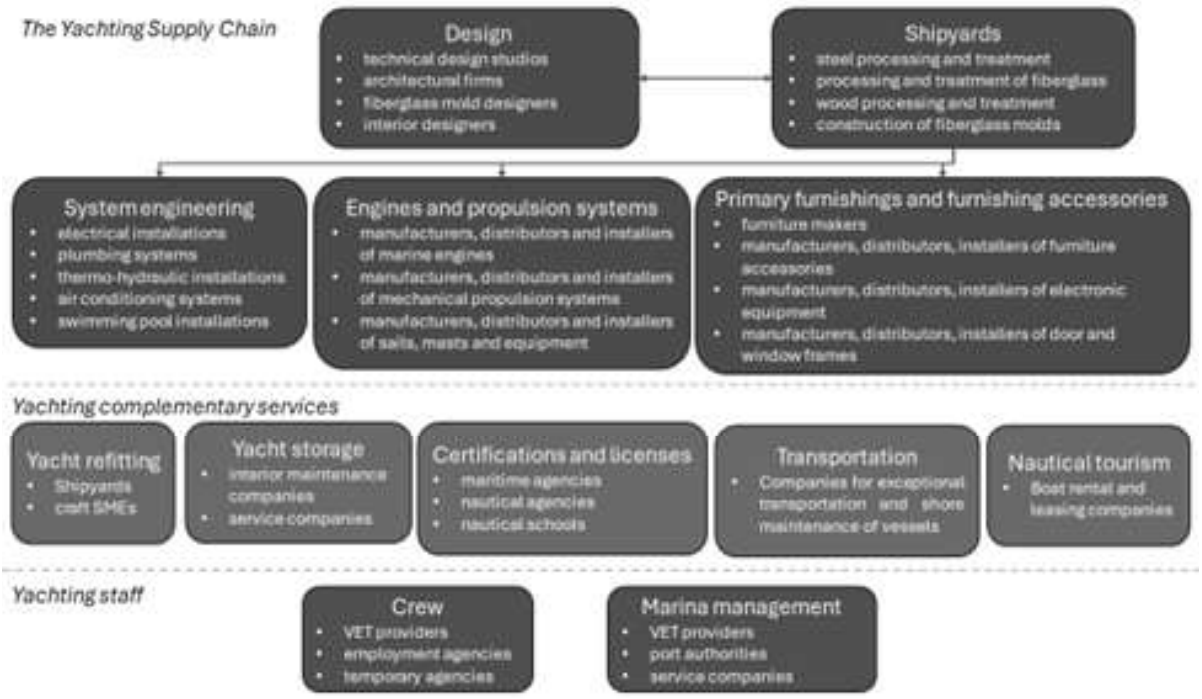
produced by the electronics and precision instruments sector).

These enterprises are not directly classified within the boating sector because their production is not exclusively aimed at the nautical market and is distinct in terms of product typology.

In addition to production-related activities, there is also a range of service-related activities associated with boating, including design, port services, exceptional transport, chartering, boat sales, and tourism.

It is thus clear that the yacht building and refitting sectors encompass a wide range of specialised industries and services dedicated to the construction, renovation, and maintenance of yachts and other luxury vessels. Below is an overview of some key sectors within the yacht building and refitting industry that make up the Mediterranean cluster.

Figure 1: The Yachting supply chain



Source: Author's elaboration

Ultimately, therefore, the nautical sector represents only the central part of a broad and articulated supply chain, comprising production activities and services carried out across multiple sectors. According to an Italian estimate, the inclusion of all these activities—which are not directly and/or exclusively attributable to boating but are related to it—would expand the sector's production categories from 3 to as many as 286.

3. Systematic skills gaps

The EU specialises in high-tech, high-value-added segments of shipbuilding. The EU is also a world leader in the production of advanced, high-tech marine equipment and systems, ranging from propulsion systems to large diesel engines, environmental and safety systems, and electronics. This specialisation and leadership position is a direct result of the sector's continuous investments in research and innovation as well as in a highly skilled workforce (European Commission, 2022). The Commission has long promoted blue skills and careers. The challenges posed by the dual transition of the European economy – and therefore the blue economy – also represent a unique opportunity to strengthen skills in the sector. Digital skills, in particular, are becoming critical to support growth in the industry (Marsch, 2018). An increasing number of skilled workers will be needed to work on innovative, technology-based projects in many blue sectors, while at the same time these skills will be essential for attracting investment. Reducing skill gaps will also be essential in the future. According to a recent field research (Napolitano and Pedrazzoli, 2019) conducted through surveys to a panel of experts and professionals in the maritime sector, the perception of Industry 4.0 technologies is that there is currently a delay in their implementation within the maritime field. Even though

the industry is actively seeking ways to implement digital technologies, it perceives itself as unprepared to face the digitalisation era. According to the Inmarsat report (Inmarsat, 2018), which specifically refers to IoT technology, based on a survey of 750 maritime industry stakeholders, the sector perceives itself as lagging behind in the adoption of IoT, particularly in relation to the skills currently possessed by companies to adopt this technology. Respondents identified a growing gap between technological advances and the skills available to manage them, particularly in terms of cybersecurity and data management.

Of course, technological progress can offer companies new ways to promote value creation, but the real benefits of the digital age can only be achieved when organisations also integrate the right skills and knowledge to enable the effective use of new technologies. Technologies cannot stand alone within a company; they must be supported by a coherent strategy of skills development. Moreover, the maritime industry can be described as a traditional manufacturing sector that relies largely on a synthetic knowledge base (Radosevic, 2017). Another typical aspect of the maritime industry is the strong emphasis placed on workers' expertise. In the design environment, for instance, ship designers usually rely on their personal experience to support their design work. However, relying exclusively on traditional experience can lead to a decline in overall design quality, reducing the robustness of projects (Cui, *et al.*, 2012). In other words, the workforce possesses a high level of experience-based and tacit knowledge, especially in the field of engineering. To embrace new technologies, maritime companies must not only introduce new skills but also successfully share and integrate them across the workforce. In the context of Industry 4.0, shipyards need skilled engineers and specialists not only in technical sciences, but also in IT and data management (Stanic *et al.*, 2018).

This is also clearly reflected in the concerns highlighted by the Global Maritime Issues Monitor (The Global Maritime Issues Monitor, 2022). In the last years, both the expected impact and likelihood of workforce and skill shortages have increased. At the same time, the level of preparedness has decreased. Workforce and skill shortages have seen a significant rise in expected impact, ranking as the fourth most impactful issue in 2022, compared to eleventh the previous year. Meanwhile, the industry feels less prepared to manage the problem. Issues such as the crew change crisis, lack of diversity, and the growing demand for digital skills are among the core concerns. While the need for workforce, skills, and talent is widely recognised, the issue continues to grow in urgency.

This current skills gap represents a real constraint for the maritime industry, preventing it from fully exploiting the advantages offered by new technologies. Despite the clear demand for digital skills, the current industrial revolution also requires complementary capabilities. The maritime workers of the future must be characterised by diversity, personal achievements, social values, and readiness to face future challenges.

This is particularly relevant considering that the boating industry—specifically the recreational boating sector—is composed predominantly of small and medium-sized enterprises (97% of businesses are SMEs). In the European context, the boatbuilding sector consists of approximately 3,600 companies employing over 82,000 people[4]. Only through consolidated cross-border cooperation will it be possible to effectively address the challenges posed by skills gaps.

[4] "European boating industry," 2019. [Online]. Available: https://www.europeanboatingindustry.eu/facts-and-figures (last seen 31 March 2026).

4. Yachting sector skills foresight at EU level

According to the European Blue Economy Observatory, in 2019 a total of 2.409.000 persons were employed in Coastal tourism, Ports activities and Shipbuilding and repair sectors. Among the top 5 European countries in terms of the number of people employed, 4 of them are part of the Mediterranean area: Italy, France, Spain, Greece. These 4 countries alone make up 49,2 % of European employees in the above sectors[5].

Despite the general awareness of the urgent need to invest in skills in the nautical sector, there is still little awareness at the micro level of the importance of an ongoing analysis of training needs with respect to emerging technologies and future market trends. According to the survey from the LINCOLN project[6], a very small percentage (5%) of respondents has already performed an evaluation of the needed digital competences, while a quarter (24%) of them say that this will not be done, due to other company priorities, and 40% has planned but not yet done.

Going into the individual Industry 4.0 skills, the survey alarmingly demonstrates the lack of awareness and lack of organisational skills with respect to the main areas of digital innovation. At best, only 16 percent of companies claim to have sufficient in-house skills to implement new technologies in their production processes. This problem characterises not only the production processes in ship design and construction, but also increasingly the professions on board. The non-technical skills of seafarers are overlooked by recruitment departments, even though digitalisation and automation on board ships are creating a demand

[5] More details on: https://blue-economy-observatory.ec.europa.eu/depth-analytical-tool_en (last seen on 31 March 2026).

[6] LINCOLN is a Horizon 2020 project, ended in 2019. For more information: http://www.lincolnproject.eu/ (last seen on 31 March 2026).

for seafarers with skills that go beyond what machines are capable of and are therefore a key part of promoting a dynamic workforce. With the rise of digital navigation infrastructure and semi-autonomous naval systems taking on an increasingly wide range of operational functions, the traditional configuration of maritime employment is undergoing profound changes. This transition requires a substantial reconfiguration of training pathways and competency frameworks to ensure that professionals remain capable of operating in increasingly technological environments. In particular, three interconnected dimensions deserve attention:

- technological transformation and automation. The increasing integration of automated systems is redefining responsibilities on board, changing workflows and redistributing tasks that were previously performed manually. Rather than simply replacing labour, automation is changing the skill set required of shipboard personnel, demanding greater system oversight, problem-solving abilities and hybrid technical skills;
- corporate and environmental responsibility. Shipboard and port personnel are increasingly required to align themselves with broader sustainability goals. This involves not only compliance with environmental regulations, but also the development of ethical awareness, sensitivity to diversity and human rights, and an understanding of the social and ecological impact of the industry, beyond financial results;
- non-technical skills. The progressive digitisation of on-board operations accentuates the importance of interpersonal, communication and organisational skills. With the automation of routine functions, human value shifts towards coordination, leadership, adaptability and decision-making in conditions of uncertainty: skills that machines cannot replicate and that are essential for maintaining productivity and safety.

In the luxury yachting industry, crew members are a key

component of both operational performance and the long-term sustainability of the entire sector. Faced with rapid innovations in design and manufacturing technologies, onboard instrumentation and comfort standards, as boats become more sophisticated and service-oriented, customer expectations also rise accordingly.

Today's passengers seek ever-higher levels of hospitality, personalisation and technical reliability, thereby increasing the demand for highly skilled crew members. In particular, the role of a yacht captain goes far beyond navigation and technical command.

On smaller or multi-purpose vessels, responsibilities often include logistical coordination, supervision of hospitality services and overall management of the onboard experience. Captains and crew members must combine navigational skills and in-depth knowledge of cruising areas with other cross-functional skills such as organisation and situational awareness to ensure efficient itinerary planning and a high-quality experience for guests. Passenger satisfaction depends not only on the condition and performance of the vessel, but also on the professionalism, communication skills and responsiveness of the crew. Professional training is therefore a decisive factor, as it must combine technical skills with a culture of service, ethical responsibility and a culture of safety. Given that yachts operate in different maritime jurisdictions and often sail in international waters, the competence of seafarers directly affects compliance with international standards and the broader issue of maritime safety. While shipyards continue to invest in advanced safety devices and preventive design measures, improving the skills of operators remains a key lever for reducing accidents and strengthening the credibility of the industry.

5. Urgent need for transnational recognition

As might be expected given the situation described above, numerous transnational European projects have addressed the issue of training needs in the sector. This is the case with the EJOB[7] project and its successor I-YEP (Improving Yacht Excellence Profiles)[8], both part of Interreg Maritime, and the recent Erasmus+ Superyacht Qualification Framework[9] project. The assessment of regional training needs indicates that the evolution of the nautical market has been accompanied by a growing demand for professionally trained cabin crew. Their expertise is not limited to providing high-quality on-board services, but also contributes directly to operational standards and safety procedures. For this reason, cabin crew are a strategic element for the long-term stability and resilience of the sector. However, unlike other maritime professions regulated by internationally harmonised regulatory frameworks, significant discrepancies remain between countries in terms of training pathways, licence categories and certification requirements. The absence of a globally shared reference system leads to uneven qualification standards and limits the portability of credentials (AAVV, 2022). Modernisation and harmonisation of the maritime education and training (MET) curriculums with the STCW Convention[10] and Manila amendments 2010 is still a challenge for maritime educational institutes around the globe. Adopted in 1978, the International Convention on Standards of Training, Certification

[7] More details on: https://interreg-maritime.eu/web/ejob (last seen on 31 March 2026).
[8] More details on: https://interreg-marittimo.eu/web/i-yep (last seen on 31 March 2026).
[9] More details on: https://maritimemt.edu.mt/erasmus-syqf/ (last seen on 31 March 2026).
[10] International Convention on Standards of Training, Certification and Watchkeeping for Seafarers (STCW). Adoption: 7 July 1978; Entry into force: 28 April 1984; Major revisions in 1995 and 2010.

and Watchkeeping for Seafarers (STCW) marked a turning point in the regulation of maritime professions by introducing, for the first time, globally agreed minimum standards for education, certification and watchkeeping duties. Before its entry into force, the preparation and qualification of officers and ratings were regulated exclusively at national level, according to domestic legal frameworks that rarely reflected a shared international benchmark. However, training for the Small Commercial Vessel (SCV) is not covered by this convention, and each country is allowed to implement its system. As a result, standards and procedures varied widely, even though shipping is the most international of all industries. As a result of this fragmented regulatory landscape, national systems vary considerably in terms of both training pathways and licensing regimes. Access to yachting qualifications varies greatly: in some jurisdictions, completion of structured courses is mandatory, while elsewhere candidates can obtain certification primarily by passing an examination. Additional criteria are often imposed, such as documented sailing time or possession of complementary certificates. The scope, duration and curriculum content of programmes also differ substantially from country to country. A further source of inconsistency concerns the categorisation of licences for yacht skippers and officers. Some legal systems distinguish credentials based on vessel tonnage, while others rely on length-based thresholds. The number of licence categories is not uniform across jurisdictions, and the professional responsibilities associated with each qualification are defined differently. Alongside nationally regulated credentials, private and transnational training bodies-such as International Yacht Training Worldwide (IYT) and the Royal Yachting Association (RYA)-offer certification schemes operating in multiple countries. Although their qualifications are recognised by various maritime authorities, this coexistence of public and private systems contributes to a complex and only

partially harmonised certification environment.[11] These regulatory divergences inevitably limit cross-border recognition of qualifications. As a result, credentials issued in one jurisdiction are not automatically accepted in another. This situation particularly affects professionals operating in the SCV segment, who may find themselves unable to serve on vessels registered under a different flag despite possessing substantial experience and formal certification. Such constraints generate inefficiencies in labour allocation and contribute to the under-utilisation of available human capital. The absence of common training benchmarks further exacerbates the problem. Unlike commercial shipping, where internationally harmonised standards have established clearer equivalence mechanisms, the yachting domain lacks a consolidated framework capable of ensuring uniform qualification levels. Developing comparative references for yacht master training schemes and identifying areas of overlap across national systems therefore becomes a prerequisite for any meaningful harmonisation effort. Yet establishing equivalence between credentials remains highly complex, given the heterogeneity of curricular structures, competency definitions and assessment criteria, compounded by the scarcity of comprehensive comparative data. Consequently, notwithstanding the principles underpinning the European internal market and the simplified mobility rights granted to EU citizens, several professional licences in the yachting field continue to encounter obstacles to formal recognition within Member States. This is the case for skippers of small commercial vessels. Education and training in maritime transport, is characterised by national differences and specificities, most notably in methods for the development of competences and delivery of certificates which are often recognised only at the national level. While the STCW

[11] IYT Worldwide Government Approvals. Available online: https://www.iytworld.com/about-us/government-approvals/ (last seen on 31 March 2026).

Convention sets standards of certifications for certain aspects of work in maritime transport, it does not encompass many qualifications that companies require from prospective employees.

For example, despite the importance of electronics on modern vessels, the STCW does not envisage any certificate on electronics and despite the importance of using correct language and terminology, there is no common standard on teaching of maritime English. Furthermore, whilst higher education degrees are standardised and recognised through the Bologna process within the EU, this is not true for education and training in non-EU countries and for vocational education and training and practical training in seagoing which represents the most important component of maritime professionals' training. In past years, an EU-funded project called TCC-SCV (TRECVET Core Curriculum for Skippers of Small Commercial Vessels) was initiated. A comparison tool for the syllabus of a similar skipper qualification of three countries (The United Kingdom-Yachtmaster Offshore Commercial, Spain-Patrón Profesional de Embarcación de Recreo-PPER, and Germany-SportSeeSchifferschein-SSS) was developed as the project output.

Later, TCC-SCV project analysed professional SCV skipper qualifications (up to 24m) from seven EU Member States (the United Kingdom, France, Spain, Germany, Slovenia, Czech Republic, and Croatia), comparing their commonalities and differences to finally propose a solution tool. However, the equivalence of qualifications between different countries is indeed a confusing problem. It is especially important to identify similarities for the sake of harmonisation and standardisation efforts[12].

The most recent attempt at harmonisation at European level

[12] On this matter, please refer to the European Boating Association Position paper, 2022.

was adopted with Directive 2022/993[13], in which the EU updated the vocabulary and minimum training levels with respect to the STCW Convention. The Directive is an essential step to ensure that seafarers holding certificates issued by third countries and serving on board Union ships have a level of competence equivalent to that required by the STCW Convention, and had become particularly urgent in the wake of Brexit. Hence, the Directive lay down procedures and common criteria for the recognition by the Member States of seafarers' certificates issued by third countries, stating that Member States should recognise qualifications proving the required level of training complying with STCW standards. In addition, it states that "every Member State shall accept certificates of proficiency and documentary evidence issued by another Member State, or under its authority, in hard copy or in digital format, for the purpose of allowing seafarers to serve on ships flying its flag". The directive also calls for the adoption of the EQAVET framework in the maritime sector. Finally, the Directive foresees a centralised system for the recognition of seafarers' certificates globally issued, whose implementation is still ongoing.

The problem of standardisation and transnational recognition of skills does not only concern on-board professions, but characterises the entire yachting sector in general, also due to a lack of standardisation of certification systems, as summarised in the table below containing the main regulations governing the sector.

[13] Directive (EU) 2022/993 Of the European Parliament and of the Council of 8 June 2022 on the minimum level of training of seafarers (codification).

Table 1: Certification system – main regulation governing the yachting sector

Level	Instrument	What it regulates
International	STCW 78, as amended	Education, training, assessment and certification of seafarers
	MLC, 2006 as amended	Seafarers' living and working conditions
	ISM Code, as amended	Following the Herald of Free Enterprise accident, several IMO resolutions were adopted which resulted in an amendment to the SOLAS Convention, introducing a new Chapter IX, making it mandatory to establish a Safety Management System in the companies and on board.
EU	Directive 2008/106/EC	Transposes the STCW Convention (education, training and certification of seafarers).
	Regulation 391/2009	Common rules and standards for ship inspection and survey organisations
	Regulation (EC) No 336/2006	On the implementation of the ISM Code within the EU.
	Directive 2009/13/EC	Implementing the Agreement concluded by the European Community Shipowners' Associations (ECSA) and the European Transport Workers' Federation (ETF) on the Maritime Labour Convention, 2006, and amending Directive 1999/63/EC.
	Directive 2022/993	Minimum level of training of seafarers (Brexit)

Source: author's elaboration

This fragmentation tends to have repercussions on multiple levels: for example, as stated by the Shipyards' and Maritime Equipment Association of Europe:

«*Europe's maritime equipment industry invests significantly in the certification and approval of its equipment, systems and technologies by Classification Societies. Typically, one maritime equipment company needs a certificate from 7 to 8 different classification societies before it can bring its*

product to the market and install it onboard ships. Although Article 10 (1) of Regulation 391/2009 was adopted to reduce this very expensive administrative burden, by means of a mutual recognition of classification certificates and an harmonisation of classification rules, SEA Europe regrets to note that 10 years after this adoption, no meaningful progress has been made since classification societies remain unwilling to move forward.»[14]

In spite of important work already done within the European ESCO framework, there is still a long way to go not only in mapping and designing the sector's specific skills, but above all in disseminating standards that are too often hindered by the barriers of a market that is not yet free and able to guarantee equal opportunities and free movement of skills and workers. Furthermore, there is not a complete overview of what exists in the yachting sector in terms of education and training programmes in Europe, with the consequent loss and under-exploitation of results in terms of programmes as well as best practices developed at different geographical levels. This partial isolation and lack of complete information have prevented the maximisation of results/ collaborations across Europe and produced different quality of education.

In addition to the issue of mutual recognition of qualifications, a more structural challenge concerns the architecture of quality assurance for training provision in the sector. Although European transparency and quality tools, such as the European Qualifications Framework (EQF), the ESCO classification and the EQAVET framework, provide a common reference for learning outcomes, skills mapping and continuous improvement cycles in vocational education and training (VET), their actual penetration into the recreational boating ecosystem remains

[14] More details on: https://www.seaeurope.eu/wp-content/uploads/2025/08/2022.04.27_Industrial-Transition-Pathways_EU-Consultation_SEA-Europe-response_Final-1.pdf (last seen on 31 March 2026).

uneven. In many Member States, maritime education and training (MET) systems are still predominantly organised according to national regulatory traditions, with limited systematic alignment to learning outcome-based standards and cross-border benchmarking procedures. As a result, training programmes can differ significantly in terms of duration, content, assessment methodologies and validation of non-formal and informal learning. This heterogeneity affects not only the transparency of qualifications, but also trust between employers and mobility authorities. Strengthening the integration of EQAVET quality cycles (planning, implementation, evaluation and review) into sector-specific training pathways and systematically linking professional profiles to ESCO descriptors would improve comparability, foster mutual trust and support the emergence of a truly European skills area for the luxury recreational boating sector.

From a theoretical perspective, the regulatory fragmentation observed in the European nautical sector can be interpreted as a manifestation of multi-level *governance* asymmetries within the EU maritime sector. Fragmentation does not simply refer to the coexistence of different legal instruments, but rather to the stratification of regulatory levels operating at international (STCW, IMO instruments), European (Directives, Regulations, EQAVET/ ESCO frameworks), national and even private (classification societies, international training bodies such as RYA and IYT) levels. This generates what can be described as “certification pluralism”, whereby public and private authorities simultaneously exercise regulatory functions without an effective coordination mechanism. In practice, this results in inconsistencies in standards, duplication of certification procedures and limited cross-border portability of qualifications. The paradox is particularly evident within the EU Single Market: while the free movement of workers is formally guaranteed, the lack of harmonised professional standards for

various yacht-related professions, particularly in the SCV segment and in refitting activities, creates de facto barriers to mobility.

From a theoretical perspective, the regulatory fragmentation observed in this fragmentation also affects the quality of training, as training providers operate within national regulatory frameworks that are only partially aligned with European transparency tools such as ESCO and EQF. Consequently, regulatory fragmentation is not only a legal issue, but also a structural constraint to the development of a coherent European skills ecosystem in the luxury recreational boating supply chain.

Conclusions

The analysis conducted highlights how the luxury yachting sector in Europe represents global excellence undergoing profound structural change. While the industrial leadership of the Mediterranean districts remains undisputed, systemic fragilities linked to human capital management and regulatory fragmentation threaten the long-term competitiveness of the entire European supply chain.

In summary, the main arguments discussed in this article that support this vision include:

- strategic relevance of the Mediterranean Cluster: the central role of Europe, with a specific focus on the Mediterranean districts, which lead the world market in superyacht construction and refitting;
- the critical situation in the labour market: the challenge posed by a rapidly ageing workforce, combined with the sector's low attractiveness for younger generations and women;
- the twin transition (green and digital): the impact of Industry 4.0 and the EU Green Deal objectives, which demand new

competencies in digitalisation, decarbonisation, and technological leadership;
- the regulatory mosaic and the small commercial vessel (SCV) gap: the critical coexistence of international frameworks (STCW) and European standards that creates barriers to mobility and uncertainty in the recognition of qualifications, particularly for non-standardised on-board and refitting professions;
- the need for quality governance: the urgency of adopting Quality Assurance models (such as EQAVET) and competence tracking systems to valorise formal, non-formal, and informal learning across the entire value chain.

The numerous issues identified in this article regarding the European luxury yacht sector and the critical issues relating to skills requirements are effectively summarised in the latest position paper by Sea Europe:

«*There is a need for mutual recognition of skills and certifications to ensure a flexible workforce across the EU and a highly skilled EU-wide supply chain. […] To address these challenges and safeguard the future of the European maritime manufacturing industry, we propose […] to implement a mutual recognition system for certifications across the EU, allowing for greater mobility of workers within the sector. This would enable a more flexible workforce and alleviate regional skill shortages.*»[15]

At the same time, the issue of recognition cannot be separated from the question of quality. The uneven integration of European transparency tools such as EQF, ESCO and the EQAVET framework prevents the consolidation of a coherent European skills ecosystem in the sector. Without systematic alignment with standards based on learning outcomes, cross-border benchmarking

[15] More details on: https://www.seaeurope.eu/wp-content/uploads/2025/08/2025.02.24_Union-of-Skills_SEA-Europe-position-paper.pdf (last seen on 31 March 2026).

and quality assurance cycles, differences in curricula, assessment methods and the validation of non-formal and informal learning continue to undermine mutual trust between Member States and employers. Quality governance therefore emerges as a prerequisite for genuine mutual recognition. Only through a coherent transnational governance model will it be possible to transform the current fragmentation into a driver of innovation and safeguard the long-term sustainability of the European luxury yachting supply chain.

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