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Rethinking Standard Logistics Competencies for Managerial and Operational Positions in Maritime

Franca Cantoni* **- Paolo Gaetano Bisogni****

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Abstract

Compared to the traditional notion of logistics, a much more open and complex concept is rising in theory and practice, especially in the maritime sector. The complexity of the scenario makes us believe that standard skills to operate in logistics are a prerequisite but not sufficient. So, a revision and re-design of the standard competencies for both managerial and operational positions is needed. Aim of this paper is to start analysing logistics maritime competencies. The methodology is based on the comparison between the European Logistics Association (ELA) - one of the world most recognised and accepted standards of competence for logistics professionals - Qualification Framework (QF) and the needs expressed by Executives working for one of the top tier companies in the maritime shipping industry and three ports Authorities (two located in Italy and one in Spain).through interviews. Our conclusions show that most skills remain unaffected while some addition or cancellation changes should be made to the ELAQF in order to align it to the needs of the sector

Key words: supply chain design; logistics competencies; maritime logistics

* **Franca Cantoni**, Associate Professor, Department of Economics and Social Sciences, Università Cattolica del Sacro Cuore, Italy – Email franca.cantoni@unicatt.it.
** **Paolo Gaetano Bisogni**, President of the European Logistics Association (ELA) and Italian Logistics Association and Lecturer at Università Cattolica del Sacro Cuore, Italy – Email paolo.bisogni@elalog.org.

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1. Introduction

Recent and authoritative analysis of trends, strategies and challenges *(Handfield et al., 2017; Mendes et al., 2016)* show that priorities for Supply Chain professionals are concentrated on two unavoidable goals: accomplishment of customer requirements (often identified with reliable/on-schedule delivery) and logistics costs reduction *(Partida, 2017).* It is therefore possible to recognize in an external focus (customers) and an internal focus (the efficiency of business processes) a mainstay of logistics management *(Sabet et al., 2017; Bozarth & Handfield, 2016; Kernsten et al., 2017; Galbraith, 2015).*

The digital transformation - currently underway - pushes towards the identification of a new balance between the internal and external needs (*Burson, 2017; Michel, 2017).* Hence the need to find a sustainable trade-off between the two perspectives (*company-centric* and *customer-centric*) that emerge as conflicting but need to be managed as not opposing. This results by offering the customer a positive and ever more personalized purchasing experience and leveraging at the same time on typical logistics parameters, like product availability and short delivery time *(Zhu et al., 2017; Krajewski et al., 2016).* This strategy implemented on a global scale by the major players has led to the current situation in which consumers are highly informed and expect - even by minor players of the market - very high logistics service levels in terms of both product availability and short delivery times. In other words, standards imposed by the majors need to be guaranteed also by the minors if they want to survive on a very competitive arena.

Traditional linear supply chains suffer from latency and visibility gaps between each stage of the process and become less and less adequate *(Lee et al, 2016).*

In this scenario of overall change, it is obvious that the skills required by the logistics industry, in our case maritime, should be reviewed, rethought and re-designed. The impact of this scenario in terms of skills and competencies required to manage logistic flows is evident: a broader and more sophisticated skillset is needed in order to meet the consumer's expectations and at the same time ensure efficiency to the system *(Hoberg, 2014; Lambert et al., 2008; McKinnon et al, 2017; Niine & Koppel, 2014, 2015).*

The paper is structured in 6 paragraphs. After this introduction, Par. 2 presents the aim of the research. The subsequent Par. 3 is entirely devoted to the explanation of the standards currently recognized, that is to the description of the competence models for logistics and SCM professionals. In Par. 4 four case studies are "used as representative and functional" to describe the main activities carried out by one of the top global players in the shipping and logistics sectors and three ports. It is from the activities carried out and listed that the Authors will check whether the standard skills to operate in logistics are sufficient or need to be adapted to the specificities emerged by the case. In Par. 5 items of the ELA QF are aligned to maritime needs and Par. 6 is dedicated to the preliminary discussion of the findings.

2. Logistics and Maritime logistics: aim of the research

Compared to the traditional notion of logistics - as pertaining to auxiliary functions within the enterprise - a much more open and complex concept is rising in theory and practice *(Sabet et al., 2017; Krajewski et al., 2016)*. Indeed, modern logistics is understood both:

- as a system/network that manages physical, informational and financial flows linking a plurality of enterprises participating in a single supply chain *(Burson, 2017);*
- as a "*process of strategically managing the procurement, movement and storage of materials, parts and finished inventory (and the related information flows) through the organization and its marketing channels in such a way that current and future profitability are maximized through the cost effective fulfillment of orders*" *(Christopher, 2005; pag. 4).*

So conceived, it plays a significant role in coordination between different nodes and functions: in this respect, the ability to integrate logistics with other business functions *(Bozarth & Handfield , 2016)* is one of the qualities that a good logistics manager must possess *(Lambert et al., 2008)* in addition to knowing how to interact with different companies operating in the same supply chain (suppliers, customers, logistics operators, etc.).

In brief, the changing role and structure of logistics, the growing awareness of the customer, and the digitalization in progress [5] necessarily imply changes in demands in terms of professionalism.

Inevitably, the change in the SC architecture poses the need for qualified competences and skills. Aim of this paper is to analyse the gaps between an existing global standard of competences for logistics (the ELA Qualification Framework) and the skills required by the maritime logistics industry.

To summarize, as competitive advantage is unquestionably connected to the skills, knowledge and abilities of the professionals operating within the company (in all functions, but in this case essentially in logistics and SCM) this research aims to map the technical competencies professional figures operating in maritime logistics and SCM must possess.

3. Competence models for logistics and SCM professionals

The studies that have been conducted revealed the presence of four different standards of competence recognized by logistics professionals. This reconnaissance highlighted the presence of the following competence models for logistics and SCM professionals:

- The European Logistics Association Qualification Framework (ELAQF) structured in three levels, limiting its scope to levels 4, 6 and 7 of the more general European Qualifications Framework (EQF). The ELA identifies the Operational/Supervisory Management level (EQF level 4), the Senior

Management level (EQF level 6) and the Strategic Management or Masters' level (EQF level 7). Both levels 4 and 6 are structured into three competence areas: Supply Chain Design, Supply Chain Planning and Supply Chain Execution, the latter of which is further divided into Transport Management, Warehousing, Sourcing and Customer Service. An important trait of the ELAQF is that the standards are regularly updated by a panel of logistics and SCM managers and experts.

- The American Production and Inventory Control Society (APICS) framework that identifies two classes of competence: basic and professional. Professional competencies are divided into three knowledge areas (operations management, distribution and logistics) and basic skills are structured around personal traits and attitudes. While competences such as problem solving, continuous learning and integrity are clearly relevant and it is important that managers develop them, they are not directly recognizable in university undergraduate curricula. Because of this, only the professional competences of the APICS model can be considered.
- The International Society of Logistics (SOLE) framework that approaches professional qualifications by placing considerable emphasis on technologies and promoting the merging of managerial and engineering approaches to logistics. The SOLE professional qualification system is articulated in five levels: Demonstrated Logistician (DL), Demonstrated Senior Logistician (DSL), Demonstrated Master Logistician (DML), Certified Master Logistician (CML) and Certified Professional Logistician (CPL). Step-by-step career progression implies performance evaluation, compliance with well-defined educational requirements, as well as mastering an additional set of functional and enabling skills. Professional experience, diplomas and educational prerequisites to access qualification levels are flexible and interrelated. According to the SOLE qualification scheme, those who hold a Master's degree can directly access the CML level. It is interesting to note that SOLE advises a model of typical university courses considered appropriate for the education of logistics professionals. This model is built on four pillars: systems management; system design; purchasing and maintenance; distribution and customer service.
- The Chartered Institute of Logistics and Transport (CILT) framework that describes three levels of qualification [7]: International Certificate in Logistics and Transport (level 3 in the EQF), International Diploma in Logistics and Transport (level 5 in the EQF) and International Advanced Diploma in Logistics and Transport (level 6 in the EQF, a level usually requiring a university degree). These three qualifications are issued following the attendance of a training programme delivered by CILT and consisting of different modules (12–20, according to the level), accounting for a substantial course workload of 240–360 hours spread over a period of 12–18 months. According to CILT, "the Certificate operates at Level 3 (A level/post-18 school/college leaver standard), while the Diploma is aimed at those already working in the industry/sector at a middle management level and who wish

> to develop a strategic view of logistics and transport operations. The Advanced Diploma operates at level 6 of the EQF and its focus is on strategic logistics and transportation management".

As the scope of our research spans Europe, it has been considered as to be more appropriate to focus on the two models frequently chosen: APICS and ELAQF. Between these two, only ELA has mapped its competence levels according to the EQF. Because of this, it was decided to adopt the ELAQF as a reference standard.

Par. 4 illustrates four case studies which will help us understand which activities are carried out by a shipping company and the three ports.

4. Empirical evidences

Our research adopts a qualitative method of investigation, in particular, case studies. They concern one of the top global players in the shipping and logistics sectors (MSC) and three ports (Trieste, La Spezia and Algeciras).

With reference to the collection of information, the authors decided to refer to four different cases to collect a multiplicity of perspectives.

The case study methodology has been chosen basically for two reasons: the first aspect is that such practice will progress the knowledge and understanding of specific situations; secondly, because of its duality of being both situationally grounded and generalizable. Moreover, the case study method facilitates the collection of more extensive amounts of information than other methodologies: this provides for more comprehensive data and a greater understanding of the phenomenon. The Authors gathered information through recorded interviews to top executives in the maritime sector.

The variability of professional positions has made it possible to broaden the perspective on different aspects: from the dynamics of a logistical-maritime process to the key factors of competitiveness and their translation into skills. The managers interviewed occupy the following positions:

- Logistics and Operations Executive Manager of MSC;
- Project Manager of Port Network Authority of Estern Adriatic Sea – Port of Trieste
- Head of Studies, Special Projects and Innovation - Eastern Ligurian Sea Port Authority;
- Head of Business Development Division – Port of Algeciras.

The value of interviewing is explained by Seidman (2006): "interviewing provides access to the context of people's behavior and thereby provides a way for researchers to understand the meaning of the behavior" (p. 4). Due to the nature of the investigation, most of the questions were open questions.

4.1 Container liner shipping: the MSC case

Liner shipping is the activity of transporting goods by means of high-capacity, ocean-going ships that travel regular routes between specified ports on fixed schedules. Liner vessels, mostly containerships and roll-on/roll-off ships, carry about 60 percent of the goods by value moved internationally by sea each year. Container liner shipping is one of the most efficient mode of transporting goods. ULCS, short for Ultra Large Container Ships, have a nominal container capacity of over 10,000 TEUs (Twentyfoot Equivalent Units) and over in one year, a single Ultra Large containership could carry over 200,000 container loads of cargo.

MSC Mediterranean Shipping Company S.A. is one of the top global players in the shipping and logistics sectors. MSC is the world's second-largest shipping line in terms of container vessel capacity. As of May 2019, MSC was operating 510 vessels with an intake capacity of 3,378,000 twenty-foot equivalent units (TEUs). The MSC fleet is the one which deploys the largest number of ULCS (90) and at the same time has the largest ULCS on order (11x 23,350 TEU). In comparison, Maersk Line, who is responsible for introducing and developing the ULCS concept with the launch of the 15,500 TEU Emma Maersk in August 2006, todays comes second with 86 existing vessels. Through its controlled company TIL (Terminal Investment Limited), MSC manages 54 terminals handling over 29 million moves (45 million TEUs) per year, being present in 7 of the world's 25 busiest ports by volume: Antwerp, Singapore, Long Beach, Ningbo, Newark, Bremerhaven and Rotterdam.

MSC's ranking and organizational features contribute at making the Company one of the best representatives of its industry; therefore we decided to organize a number of meetings with top MSC executives of the Logistics functional area and to interview them to collect information about the Company's needs in terms of skills and competences. In order to avoid bias, no detailed information was provided about the ELA Qualification Framework during the meetings. The authors analysed and cleansed the raw feedback collected and compared the output against the content of the ELAQF.

Main operational activities performed by MSC staff include, first of all, the management of inward and outward freight. The inward and outward freight department takes care of everything that concerns the shipment of containers. The organization of work is by lines or routes, and the objective of the "liner" is to manage the full cost by line or route. Managing the outward freight, entails drawing up the necessary cargo documents (e.g. the manifests, the bills of lading), and making the transport capacity available to the Agencies through the bookings. As for the inward freight it is necessary to collect all of the bills of lading and other required documents and handling the cargo.

Further logistics activities performed by MSC include:

- Chartering, or renting ships in order to flexibly increase shipping capacity of extra tonnage during periods of increasing amounts of cargo, or to allow decommissioning of older, owned ships from the line, or for chartering of ships on the tramping market in times of insufficient cargo offer, thereby

reducing the capital required to invest in the purchasing of additional physical assets (the ships).
- Bunkering, or procuring the necessary fuel for the fleet. Bunkering consists in drawing up the contracts with the oil companies and purchasing fuel at the most advantageous conditions
- Cargo handling and stevedoring includes the reception of the containers at the terminals, their handling and stowage on board

Stowage Planning is the act of allocating space to containers on board of a container ship in the order of the discharge ports. Tools needed for stowage planning include:

- The scheduled list of ports that the ship will be calling at, in the order of rotation
- A summary of the number of containers – size/type/weight of containers per port that are planned to be loaded on the ship
- A summary of the number of hazardous, reefer and OOG containers per port that are planned to be loaded on the ship
- List and summary of containers that are on board after discharge of the containers at your port.

Criteria for stowage planning resemble Storage and Retrieval Rules (SRR) in Warehousing: the list of containers that are to be loaded on board are segregated by destination. Space is allocated to each of the containers firstly in the order of destination – the farthest destination at the bottom and the next port of call right on top, secondly in the order of weight – the heaviest boxes at the bottom and lightest at the top.

MSC owns and runs a global network of 480 Agencies located in 155 Countries. MSC Maritime Agencies play a twofold role, a commercial one, selling the transport capacity allocated by MSC, and second, a "servant" role in organizing and delivering support activities in ports where MSC ships are transiting.

In details, commercial and customs activities consist in:

- Offering transport capacity to Customers, both corporate and Freight Forwarders, according to the allocation set by MSC
- Collecting freights
- Drawing up the documents for the customs and harbour services

While operational activities consist in:

- Ensuring a berth for the ships calling at the port
- Arranging for the pilot and the tugs if necessary
- Arranging for the necessary ship fresh water and food
- Arranging for the necessary healthcare assistance for the crew
- Arranging for storage bunkers at the port if these are needed
- Arranging for necessary repairs
- Conveying instructions to and from the ship owner
- Organizing the transport and the handling of the containers to the port terminal
- Organizing the necessary contacts with the stevedores

- Contacting shippers and the receivers of the goods

This case helps us to list the main activities carried out by a container shipping company. Given the typical characteristics of the maritime sector we will compare them with the standard ELA QF for logistics with the goal to understand if they are sufficient, must be reviewed, integrated or deleted

4.2 Creating a system in the Supply Chain perspective: the port in Trieste

Located in the heart of Europe, the port is the meeting point between the shipping routes and the European, Adriatic-Baltic and Mediterranean corridors. It is considered an international hub for ground-sea interchange flows affecting the dynamic market of Central and Eastern Europe. The centrality of the port is based on two distinct logistic chains: long-range intercontinental maritime connections and intra-Mediterranean short-medium range relations. The depths up to 18 meters deep, the excellent nautical accessibility, the excellent rail and road connections and the proximity to the outlet markets make the port of Trieste an efficient and competitive one.

A fundamental role in the logistics chain of this port is played by railway connections and services. There are over 200 trains that weekly connect Trieste with the production and industrial areas of the Italian North-East and Central Europe, with different destinations such as Slovenia, Croatia, Germany, Austria, Luxembourg, Slovakia, Hungary, Belgium and the Czech Republic, serving a growing economic hinterland development and extremely articulated. The internal railway network available to the port of Trieste includes 70 km of tracks and is integrated with the national and international network. Its structure, which makes Trieste the most important port in Southern Europe, allows all platforms to be served by tracks with the possibility of sorting and / or composing trains directly in the various terminals. As for the road network, however, it is possible to confirm that efficiency is guaranteed thanks to a direct link and an elevated road that enter the external road system, in connection with the motorway network. In light of these aspects, the port of Trieste therefore proposes itself as the preferential access door of Europe to the markets of the Far East.

The terminals of the port of Trieste are managed by private operators (Trieste Marine Terminal S.p.a., directly controlled by MSC) pursuant to Law no. 84/94 and are located on the docks of the port area. They present modern handling, transport and storage technologies in order to serve all types of traffic: containerized goods, fruit and vegetables, coffee, cereals, metals, engines, steel and chemical products, timber, solid and liquid bulk, crude oil and derived products. TMT is investing heavily in the aspects that a container terminal must be able to guarantee to customers and operators, including: efficiency, operational flexibility and a wide range of competitive intermodal services. TMT also provides all the main services of a modern container terminal.

It is not so much the port of Trieste that is competitive with respect to ports such as Venice or Koper, as the whole supply chain, that is the whole process of handling

the goods until the moment it arrives at its destination. In this regard, Legislative Decree 169/16 was issued through which we began to speak of "Port System Authority" rather than "Port Authority". This change may seem a trifle but, in reality, it has brought about a great change that has led to the introduction of the supply chain approach. The President of the Port System Authorities has the task of creating synergies with the dry ports and entities behind the port. It is an element of novelty because it goes towards the relationship between the port and the dry ports. The aim is to create a system by joining the Port Authority with the terminal operators and customs, the port container terminal, the dry ports or even with foreign terminals.

In terms of specific applications and application areas, the approach implemented in the port of Trieste involves not purchasing solutions already in use, but developing them. The purchase of a solution to be customized includes costs related to the license; the development, instead, of proprietary software implies lower costs, from the moment in which the hours of work of the developers are considered and above all the source code originates from them. The goal is to work with other actors, terminal operators and railway companies by creating interoperability between the systems. Remaining on the theme of digitization and other application areas such as, for example, sensors and the Internet of Things, works are in progress both in the port and the railway part. The port of Trieste, in fact, is the first port in Italy for the number of trains and for this reason it is of fundamental importance to invest in digitization.

Despite these innovative aspects, a low degree of efficiency has emerged regarding the current issue of the Internet of Things (IoT): they are not yet equipped with devices, specialized equipment, location devices and, consequently, specialized personnel. It is a critical issue on which the port is working, aware that an expansion from an IT point of view would make it progressively more vulnerable. A consequence deriving from the progressive growth of digitalization is that related to security: the more you digitize, the more you become interoperable and the more vulnerable you are to hacker attacks.

Considering the peculiarities of the port of Trieste, workers are asked for the ability to communicate with different actors and create a competitive logistics chain: it is not enough to be a competitive container terminal in terms of containers handled per hour, but it becomes essential to have relational skills to build a port supply chain, liaise with the Port Authority, with customs and with all the actors involved.

The development of ICT skills for the exchange of data, through IT platforms, becomes fundamental. The more you increase the data, the more you need to understand it. Skills in the use and understanding of big data to carry out analyse and to manage security are essential.

4.3 Integrating the logistics chain and the offer of transversal solutions: the port in La Spezia

The Port of La Spezia is the second container port in our country for direct access to the production and consumption markets of northern Italy, with weekly

connections to all continents: Asia, North and South America, Europe, Africa and the Middle East. It has over 3.5 km of internal roads and 17 km of tracks which guarantee an efficient connection with the national road and rail networks, facilitating the transfer of goods from the ship to the quay and to the final markets.

In the analysis of the port of La Spezia, it is important to mention the "La Spezia Container Terminal" (LSCT) terminal of the Contship Italia Group. It is one of the most cutting-edge container terminals in Europe. LSCT manages the handling of containers to and from container ships efficiently, provides a wide range of integrated logistics services and an effective network of intermodal connections directly connected to the docks, which connect it to the major industrialized areas of northern Italy and the north Europe.

Structurally, road and rail connections are fundamental; functionally the innovative approach is important. The key to operating with a view to innovation, introducing new ICT systems and speeding up the procedures for transferring goods between port and final destination, is to have systems in use that are fully integrated and in dialogue with the systems of the other actors involved, such as: platforms customs offices, platforms of control bodies and systems in use by intermodal operators. The realization of an operational dialogue assumes strategic importance, allowing the achievement of higher efficiency levels and greater speed in the information exchange of data. This setting allows to anticipate and plan certain operations related to the transfer of goods on time.

In recent years, the theme of digitization has been central as it has contributed to making the port of La Spezia at the forefront in many aspects, both operational and documentary. Performance was obtained which placed it at the top of the national and European system for productivity. This path was made possible thanks to the development of a Port Community System (PCS), formulated thanks to the participation of shippers and managed by the Port System Authority through an outsourcing contract with an important IT operator. An IT platform was created that brought together the actors of the La Spezia logistics system, starting from terminals, agencies and shipping companies to get to shippers, carriers and control bodies. The platform has therefore allowed the development of an IT dialogue between the port and the back port involving all subjects operating in the chain of transfer of the goods and always taking into consideration the specificities of the port (spaces, product types and operating methods).

In light of the above observations, the following skills emerge as fundamental:

- managerial skills (general management, or responsibility for one or more activities);
- ICT skills and innovative approach;
- interpersonal skills towards all the actors involved in the logistics chain;
- organization skills;
- ability in investment operations;
- knowledge of customs dynamics;
- knowledge of the port logistics process.

4.4 The evolution of the technology in strategy formulation: the port in Algeciras

The port of Algeciras is the main economic resource of the area located in the far south of the Iberian Peninsula, on the Strait of Gibraltar. The port of Algeciras is the main Spanish port in terms of volumes of freight and passenger traffic.

The strategic importance of the factors determining the competitiveness of a port has been confirmed, namely:

- the geographical position of the port;
- the port infrastructure;
- the capacity of a port;
- the efficiency in terms of load handling and speed in carrying out customs clearance operations;
- the preparation in terms of hard and soft skills of operators and logistic managers and, above all, the ability to create relationships and operate from an integrated system perspective.

Secondly, the technological factor was discussed with particular emphasis. The innovations at the heart of the transformation of ports into "smart ports" are IoT, cloud computing and network connectivity. New technologies are therefore fundamental to achieve and maintain a high competitive level. The added value comes from the ability to remotely check the status of the containers, receive real-time data on shipments, develop solutions to reduce pollution and improve efficiency, through the optimization of truck routes and the reduction of congestion from and towards the terminals.

For the purposes of port competitiveness, it is therefore important to define which technologies to incorporate in the digital strategy of the port. Each port presents unique challenges and different stakeholders interested in different services and infrastructures. Given the presence of international trade, the existence of a system capable of guaranteeing a better sharing of data between the different subjects involved in a port logistics process is fundamental. Considering this assumption, it is possible to understand the essentiality of the interoperability of existing platforms and the development of new applications along the entire supply chain.

Studies on the use of IoT demonstrate the advantages achievable by the correct exploitation of technologies. Ports are able to share maritime information and create perfect connectivity both at sea and in land transport: technologies can significantly improve the efficiency of ports through the automated processing of data connected to the movement of containers.

In light of these statements it is clear that technological evolution is essential for the competitiveness of a port, allowing the following objectives to be achieved:

- optimization of goods handling processes;
- greater automation of loading and unloading operations;
- reduction of costs, waiting times and delays;
- increase in efficiency, productivity and dynamism;

- better traceability of incoming goods and during customs procedures;
- greater security.

From the information collected during the interview, the skills falling within the scope of general management have greater strategic importance. Fundamental is also to operate in an international perspective. Managers today carry out activities totally related to international trade; hence the importance of creating a network with the actors involved.

To explore the topic of skills, the BLV model was taken into consideration, and the most important skills were identified for managers and / or logistics operators. It was decided to submit a short questionnaire to Nicolas Martinez with the aim of understanding the importance of the skills listed for the two types of professional figures.

Below is the list of skills analysed:

- Agility: adaptability and flexibility in carrying out the activities;
- Positive handling of mistakes: ability to deal with unexpected events in a positive way;
- Willingness to experiment and innovate: risk appetite, experimentation, innovation and implementation of new solutions;
- Intuitive use of Information Technology: good intuition and good ability to use IT;
- Interdisciplinary mindset: interdisciplinarity
- Ability to analyse large sets of data: ability to analyse large quantities of data and information;
- Extensive programming knowledge / skills: Programming skills
- Use of new digital, interactive communication media: ability to use and implement new digital means of communication in processes.

The first four items were important for both professional levels (manager and skilled workers); the fifth item (interdisciplinary mindset) was more relevant for managerial figures required to operate with an interdisciplinary mentality and with a global vision; the ability to analyse large quantities of data was important for both levels but, above all, for the managerial level since a good interpretation of the data can allow you to make correct decisions; programming skills were important for managers and, finally, the ability to know how to use new digital tools is required at all levels.

5. ELA standards applied to maritime

In this paragraph, the standards ELA QF are applied to the maritime sector and some proposals are put forward: standards to be maintained unaltered (No Change – NC), to be cancelled (C) or rewritten (RW).

As said before, the ELA Qualification Framework (ELAQF) is structured in three levels: Operational/Supervisory Management level (EQF level 4), the Senior Management level (EQF level 6) and the Strategic Management or Master's level (EQF

level 7). Both levels 4 and 6 are structured into three competence areas: Supply Chain Design, Supply Chain Planning and Supply Chain Execution, the latter of which is further divided into Transport Management, Warehousing, Sourcing and Customer Service.

In the three paragraphs we will investigate the three different levels.

5.1 EQF Level 4

Table n. 1 - Business Principles

Cod.	Competence (Ela std)	NC
4.1.01.01	Understands the elements of a Profit and Loss (P&L) statement and balance sheet	x
4.1.01.02	Understands the meaning of financial terminology	x
4.1.01.03	Calculates the costs of inventory holding	x
4.1.01.04	Monitors supplier and customer payment terms	x
4.1.01.05	Understands the importance of benchmarking in performance management	x
4.1.01.06	Understands the link between shareholder value and supply chain improvements	x
4.1.01.07	Describes the use of 4Ps in a marketing plan	x
ADDED 4.1.01.08	Is able to edit a bill of lading properly	

Source: authors' own elaboration

Table n. 2 - Core Management Skills

Cod.	Competence (Ela std)	NC
4.1.02.01	Plans own and team professional development	x
4.1.02.02	Understands the principles of change management	x
4.1.02.03	Participates in cross functional teams	x
4.1.02.04	Has good oral and written communication skills	x
4.1.02.05	Demonstrates decision making ability	x
4.1.02.06	Chairs meetings	x
4.1.02.07	Manages a team	x

Source: authors' own elaboration

Table n. 3 - Process Management

Cod.	Competence (Ela std)	NC	RW
4.2.03.01	Understands the trade-offs within the supply chain	x	
4.2.03.02	Describes a value chain		Describe the maritime supply chain
4.2.03.03	Understands the effect of demand variability on the supply chain	x	
4.2.03.04	Understands the basic concept of lean	x	
4.2.03.05	Understands how to calculate total supply chain costs	x	
4.2.03.06	Understands the use of a Quality Management Systems (QMS)	x	
4.2.03.07	Uses business test scenario's	x	
4.2.03.08	Understands the different types of data used in organisations	x	
4.2.03.09	Understands process reference models	x	

Source: authors' own elaboration

Table n.4 - Change and Project Management

Cod.	Competence (Ela std)	NC
4.2.04.01	Mantains project documentation	x
4.2.04.02	Understand PM tools	x

Source: authors' own elaboration

Table n.5 - Demand, production and distribution requirements planning

Cod.	Competence (Ela std)	NC	C	RW
4.3.05.01	Calculates total supply chain/logistics lead time	x		
4.3.05.02	Uses inventory replenishment models		x	
4.3.05.03	Establishes and maintains Bill of Materials (BOM) and Bill of Labour (BOL)		x	
4.3.05.04	Calculates stocks turns or weeks cover and reports it		x	
4.3.05.05	Understands stock ageing report		x	
4.3.05.06	Allocates available products to orders			Allocates available slots to cargos

4.3.05.07	Uses ABC analysis to differentiate inventory management	x		
4.3.05.08	Uses forecasting methods to create a demand forecast		x	
4.3.05.09	Understand the concept of Available to Promise (ATP)			Utilizes stowage planning techniques
4.3.05.10	Understands different planning techniques	x		
4.3.05.11	Understands different inventory management optimisation tactics			Understand ship routing techniques
4.3.05.12	Understands the functionality of planning systems	x		

Source: authors' own elaboration

Table n.6 - Warehousing

Cod.	Competence (Ela std)	NC	C	RW
4.4.06.01	Understands the key challenges in warehouse management	x		
4.4.06.02	Has a detailed understanding of the warehousing processes	x		
4.4.06.03	Understands different order picking strategies		x	
4.4.06.04	Understands different order picking methods		x	
4.4.06.05	Deploys appropriate warehouse handling equipment			Deploys appropriate material handling equipment
4.4.06.06	Understands how to design a warehouse layout			Understands how to design a dock yard layout
4.4.06.07	Organises stock taking		x	
4.4.06.08	Optimises packing of goods prior to dispatch		x	
4.4.06.09	Understands the implications of storing hazardous goods	x		
4.4.06.10	Understands the role of logistics service providers			Understands the role of logistics service providers, terminal operators, freight forwarders and maritime agencies

4.4.06.11	Implements warehouse safety procedures			Implements IMO (International Maritime Organization) safety procedures
4.4.06.12	Understands the functionalities of Warehouse Management Systems (WMS)			Understands the functionalities of IT technologies applied to the maritime industries

Source: authors' own elaboration

Table n. 7 - Transportation

Cod.	Competence (Ela std)	NC	C
4.4.07.01	Describes the shipment process)	x	
4.4.07.02	Manages transport routing and scheduling	x	
4.4.07.03	Describes the transport procurement process	x	
4.4.07.04	Manages day to day shipment operations	x	
4.4.07.05	Understands key elements of transport cost	x	
4.4.07.06	Understands the European transport policies, legislation and procedures		x
4.4.07.07	Understands the implications of shipping hazardous goods	x	
4.4.07.08	Understands the functionalities of Transport Management Systems	x	

Source: authors' own elaboration

Table n. 8 - Sourcing

Cod.	Competence (Ela std)	NC
4.4.08.01	Describes the procedures covering the procurement process cycle	x
4.4.08.02	Supports supply market analysis	x
4.4.08.03	Describes the different purchasing approaches	x
4.4.08.04	Understands supplier evaluation and selection process	x
4.4.08.05	Understands the negotiation process	x
4.4.08.06	Uses Key Performance Indicators (KPIs) to measure supplier performance	x
4.4.08.07	Describes the goal of a supplier certification and the process steps	x
4.4.08.08	Understands functionalities of Electronic (e)-Procurement Information Technology (IT) tools	x

Table n. 9 - Customer Service

Cod.	Competence (Ela std)	NC
4.4.09.01	Understands customer service procedures	x
4.4.09.02	Uses Key Performance Indicators (KPIs) for measuring customer service	x
4.4.09.03	Understands multi channel customer communication	x
4.4.09.04	Understands the key functionalities of Customer Relationship Management (CRM) Systems	x

Source: authors' own elaboration

5.2 EQF Level 6

Table n. 10 - Business Principles

Cod.	Competence (Ela std)	NC	C	RW
6.1.01.01	Understands the financial impact of holding inventory	x		
6.1.01.02	Understands cash to cash (C2C) cycle	x		
6.1.01.03	Is able to calculate Net Present Value (NPV)			Is able to properly process the bill of lading
6.1.01.04	Monitors actual costs versus budgeted costs	x		
6.1.01.05	Prepares a business plan	x		
6.1.01.06	Understands how a pricing strategy is defined	x		
6.1.01.07	Assesses business performance	x		
6.1.01.08	Makes outsourcing decisions	x		
6.1.01.09	Defines and implements a performance scorecard	x		
6.1.01.10	Designs an appropriate organisation structure	x		

Source: authors' own elaboration

Table n. 11 - Core Management Skills

Cod.	Competence (Ela std)	NC
6.1.02.01	Demonstrates excellent communication skills	x
6.1.02.02	Influences and coaches others to achieve superior performance	x
6.1.02.03	Demonstrates strategic thinking	x
6.1.02.04	Facilitates change	x
6.1.02.05	Understands the principles of situational leadership	x
6.1.02.06	Understands the principles of Management By Objectives (MBO) and performance evaluation	x

Source: authors' own elaboration

SC and Logistics Design Level 6

Table n. 12 - Process Management

Cod.	Competence (Ela std)	NC	C	RW
6.2.03.01	Analyses the supply chain by using value stream mapping			Analyses the supply chain by using different modeling tools
6.2.03.02	Understands what is required to implement a lean & agile supply chain		x	
6.2.03.03	Applies problem solving techniques	x		
6.2.03.04	Implements reverse logistics	x		
6.2.03.05	Understands the elements of a Cost-to-Serve model	x		
6.2.03.06	Identifies and implements supply chain Key Performance Indicators (KPIs)	x		
6.2.03.07	Applies lean techniques to identify process improvement opportunities			Identify process improvement opportunities
6.2.03.08	Uses modelling to explore the impact of options on the supply chain	x		
6.2.03.09	Performs software functionality tests	x		

Source: authors' own elaboration

Table n. 13 - Change and Project Management

Cod.	Competence (Ela std)	NC
6.2.04.01	Defines and manages the scope of a project	x
6.2.04.02	Establishes project governance structure	x
6.2.04.03	Understands the concept of project management life cycle	
6.2.04.04	Applies phase gate process to a project	x
6.2.04.05	Coaches projects managers	x
6.2.04.06	Applies a project methodology whilst managing a project	x
6.2.04.07	Manages the costs of project	x
6.2.04.08	Understands project quality management	x
6.2.04.09	Implements a continuous improvement programme	x

Source: authors' own elaboration

SC and Logistics Planning Level 6

Table n. 14 - Demand, Production and Distribution Requirements Planning

Cod.	Competence (Ela std)	NC	C	RW
6.3.05.01	Improves the demand management process		x	
6.3.05.02	Implements collaborative forecasting		x	
6.3.05.03	Understands push/pull planning		x	
6.3.05.04	Optimises planning parameters to fine tune inventory holding		x	
6.3.05.05	Establishes safety stock		x	
6.3.05.06	Optimise Distribution Requirements Planning (DRP)			Optimise ship routing schedules
6.3.05.07	Understands how to adapt inventory holding taking into account product cycle		x	
6.3.05.08	Identifies causes for stock obsolescence and redundancy and propose ways for minimising this		x	
6.3.05.09	Runs the demand management, supply management and the scenario analysis of the Sales and Operations Planning (S&OP) process		x	

6.3.05.10	Understands functionalities of inventory optimisation tools		x	
6.3.05.11	Implements Vendor Management Inventory (VMI) process		x	
6.3.05.12	Develops Key Performance Indicators (KPIs) relative to inventory management	x		
6.3.05.13	Selects and implements appropriate Information Technology Systems (ITS) such as Advanced Planning Systems (APS)	x		

Source: authors' own elaboration

SC and Logistics Execution Level 6

Table n. 15 - Warehousing

Cod.	Competence (Ela std)	NC	C
6.4.06.01	Optimises warehouse costs	x	
6.4.06.02	Implements a health and safety programme	x	
6.4.06.03	Improves receipt of goods from suppliers		x
6.4.06.04	Selects appropriate storage systems		x
6.4.06.05	Implements a 5S programme in warehouse environment		x
6.4.06.06	Performs warehouse risk management assessments	x	
6.4.06.07	Defines and implements Key Performance Indicators (KPIs) to improve warehouse operations	x	
6.4.06.08	Understands and implements appropriate technology in warehousing	x	
6.4.06.09	Selects and implements appropriate IT systems such as a warehouse management system (WMS)	x	

Source: authors' own elaboration

Table n. 16 - Transportation

Cod.	Competence (Ela std)	NC	C	RW
6.4.07.01	Optimises transport mode selection	x		
6.4.07.02	Evaluates freight market and selects appropriate carriers	x		

6.4.07.03	Implements transport supplier agreements	x		
6.4.07.04	Optimises transport scheduling	x		
6.4.07.05	Selects logistics service providers		x	
6.4.07.06	Designs a distribution network			Designs and implements inland transport networks and agreements
6.4.07.07	Defines and implements Key Performance Indicators (KPIs) to improve transportation	x		
6.4.07.08	Selects and Implements appropriate Information Technology (IT) systems such as a transport management systems (TMS)	x		

Source: authors' own elaboration

Table n. 17 - Sourcing

Cod.	Competence (Ela std)	NC
6.4.08.01	Prepares sourcing plans	x
6.4.08.02	Establishes supplier agreements	x
6.4.08.03	Creates and manages collaborative supplier relationships	x
6.4.08.04	Optimises negotiation strategies with all involved stakeholders	x
6.4.08.05	Standardises and optimises operational purchasing processes	x
6.4.08.06	Selects and implements electronic (e)-Procurement tools	x

Source: authors' own elaboration

Table n. 18 - Customer Service

Cod.	Competence (Ela std)	NC
6.4.09.01	Implements a customer service policy	x
6.4.09.02	Establishes a customer service organisation	x
6.4.09.03	Defines and implements Key Performance Indicators (KPIs) to improve customer service	x
6.4.09.04	Selects and implements appropriate Information Technology Systems (ITS) such as Customer Relationship Management (CRM) systems	x

Source: authors' own elaboration

5.3 EQF Level 7

Table n. 19 - Business Principles

Cod.	Competence (Ela std)	NC
7.1.01.01	Understands the impact of supply chain design on company taxation	x
7.1.01.02	Identifies and manages enterprise risk	x
7.1.01.03	Evaluates the impact of government and politics on business strategy	x
7.1.01.04	Understands the implications of contract law	x
7.1.01.05	Develops appropriate Key Performance Indicators (KPIs) and Service Level Agreements (SLAs) for inclusion in contracts	x
7.1.01.06	Manages contracts life cycle with third party service providers and suppliers	x

Source: authors' own elaboration

Table n. 20 - Core Management Skills

Cod.	Competence (Ela std)	NC
7.1.02.01	Demonstrates excellent communication skills	x
7.1.02.02	Influences and coaches others to achieve superior performance	x
7.1.02.03	Demonstrates strategic thinking	x
7.1.02.04	Facilitates change	x

Source: authors' own elaboration

Supply chain and Logistics Design Level 7

Table n. 21 - Process Management

Cod.	Competence (Ela std)	NC	RW
7.2.03.01	Understands the drivers to supply chain transformation	x	
7.2.03.02	Understands leading and lagging Key Performance Indicators (KPIs)	x	
7.2.03.03	Derives an appropriate supply chain strategy from the business strategy	x	
7.2.03.04	Understands how sustainability might impact on the supply chain	x	

7.2.03.05	Understands the impact of technological innovation on supply chain design	x	
7.2.03.06	Manages lean projects to identify and reduce waste		Manages lean projects to identify and improves sustainability
7.2.03.07	Improves synchronisation along the supply chain	x	
7.2.03.08	Understands and implements lean flow principles	x	

Source: authors' own elaboration

Table n. 22 - Change and Project Management

Cod.	Competence (Ela std)	NC
7.2.04.01	Acts as an expert in phase gate models in projects	x
7.2.04.02	Applies principles of change management	x
7.2.04.03	Coaches managers to manage change	x
7.2.04.04	Initiates change management programmes	x
7.2.04.05	Completes project risk assessment	x
7.2.04.06	Makes the business case for supply chain automation and systems	x

Source: authors' own elaboration

Supply chain and Logistics Planning Level 7

Table n. 23 - Demand, Production and Distribution Requirements Planning

Cod.	Competence (Ela std)	NC	C
7.3.05.01	Improve forecasting process		x
7.3.05.02	Implements Sales and Operations Planning (S&OP) process		
7.3.05.03	Implements push/pull planning systems		x
7.3.05.04	Optimises inventory within a multi echelon inventory management systems		x
7.3.05.05	Understands relationship between New Product Development (NPD) and Supply Chain Management (SCM)	x	
7.3.05.06	Assesses supply chain risks	x	
7.3.05.07	Manages the Material Review Board (MRB)		x
7.3.05.08	Implements process to achieve end-to-end supply chain visibility	x	

7.3.05.09	Deploys a multi criteria inventory categorisation model		x

Source: authors' own elaboration

Supply chain and Logistics Execution Level 7

Table n. 24 - Warehousing

Cod.	Competence (Ela std)	NC	C	RW
7.4.06.01	Determines whether to outsource warehouse operations	x		
7.4.06.02	Implements sustainable warehouse policies and practices	x		
7.4.06.03	Implements lean warehouse policies		x	Works on resilience
7.4.06.04	Implements collaborative agreements with service providers	x		

Source: authors' own elaboration

Table n. 25 - Transportation

Cod.	Competence (Ela std)	NC	RW
7.4.07.01	Seeks collaboration to improve load utilisation		Seeks collaboration
7.4.07.02	Implements freight optimisation strategies	x	
7.4.07.03	Implements sustainable transportation management programmes	x	
7.4.07.04	Links transportation costs with business strategy	x	

Source: authors' own elaboration

Table n. 26 - Sourcing

Cod.	Competence (Ela std)	NC
7.4.08.01	Establishes a strategic procurement programme	x
7.4.08.02	Manages outsourcing projects	x
7.4.08.03	Manages Total Costs of Ownership (TCO) of sourced services and goods	x
7.4.08.04	Implements Supplier Relationship Management (SRM)	x
7.4.08.05	Implements a category management approach	x

Source: authors' own elaboration

Table n. 27 - Customer Service

Cod.	Competence (Ela std)	NC
7.4.09.01	Understands use of social media in customer service processes	x
7.4.09.02	Implements Voice of the Customer (VOC) programmes	x
7.4.09.03	Implements effective Service Level Agreements (SLA)	x
7.4.09.04	Implements preventive complaint handling process	x

Source: authors' own elaboration

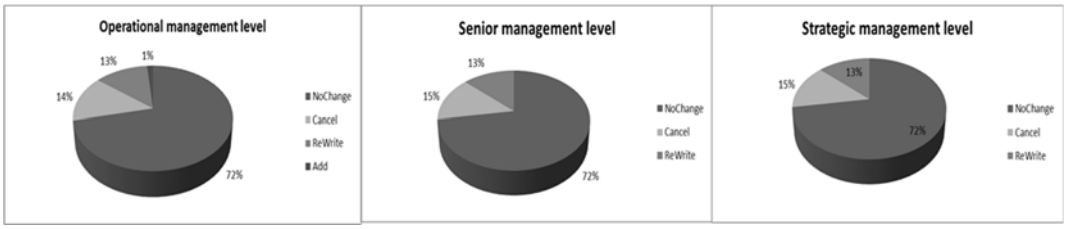
6. Conclusions

Summarizing the work done so far, some preliminary conclusions can be drawn.

Though maritime logistics shows typical peculiarities in terms of the size of investment required, type of assets deployed, transport modes, technical setup and planning objects, skills and competences needed by managers to operate in this industry still fit within a general framework designed to describe the skills of supply chain management professionals. Most skills remain unaffected while some addition or cancellation changes must be made.

Specifically, for the Operational Level (EQF4) 72% of the 69 skills described in the ELA Standards require no change, 14% should be cancelled and 13% should be rewritten to align the standards to the needs of the maritime shipping sector. Similarly, at Senior Management Level 73%of the 74 skills require no change, 22% should be cancelled and 5 % rewritten. In strategic management level the ELA Standards include 50 detailed skills: 82% need no change, 12% should be cancelled and 6% should be rewritten. The results are synthetized in Figure n. 1

Figure n. 1 – Synthesis of the main results



Source: authors' own elaboration

Most managers underlined the relevance of typical managerial skills like leadership, the ability to work in a systemic way collaborating with different external partners, the ability to apply innovation, especially digitalization, to actual business scenarios. These suggestions have to be carefully taken into consideration by people responsible to develop training and assessment programmes in Higher Education and other organizations.

In the full knowledge that a single case study cannot be representative of a research reality as complex as that of maritime operators, the Authors conducted this preliminary analysis which revealed interesting results

At operational level (level 4 of the European Qualification Framework and the ELAQF) the main changes will affect the Planning area (demand, production and distribution requirements planning module in the ELAQF) and warehousing. As for SC and Logistics Planning at EQFLevel 6 lots of changes will occur in demand, production and distribution requirements planning. Level 7 undergoes very marginal changes. This last finding is not surprising, as the skillset of people at VP or C-level are often only marginally linked to technical skill of the professional area.

It should also be specified that the ELA standards currently do not directly address important issues such as resilience, sustainability and digitization whose growing importance does not allow to neglect them.

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