

# Maritime Transport

## Education & Competence Development in a Maritime EU





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## EXECUTIVE SUMMARY

This fiche is produced as part of the Press4Transport (P4T) project of the 7<sup>th</sup> Framework Programme in the priority area of Research and Technological Development.

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The role of P4T is to support national and regional projects in the transport area, by providing a communication service at a European level to the general public. This is accomplished through an efficient and professional service for disseminating research results.

This thematic fiche focuses on **maritime education and competence development** which is part and parcel of a company's Human Resource Management Strategy and an area that is in great need of attention, in order to retain and develop **competences in a**

**maritime EU** and maintain a competitive position in the global market.

The fiche highlights the importance of fostering the following **key factors**: **maritime education, competence development, trans-national collaboration, a borderless maritime industry and standardisation.**

Research programmes issued at a European level have sought to address the challenges that the industry faces, supporting the development of trans-national efforts to enhance competence development in a maritime EU. The European Commission has supported the maritime transport sector through research programmes with both a general perspective and a more specific maritime perspective. In this fiche, three projects have been



selected that focus on enhancing the EU agenda. Although they are very different in scope, promoting maritime education and competence development from different perspectives, they see the maritime sector as a global industry that is in great need for *educational and competence harmonisation and standardisation*.

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Based on low levels of Research and Development intensity within the EU in comparison to international competitors such as Japan, South Korea and the United States, The EU is committed to 'lift the bar' on these levels in order to achieve the objective of **The Lisbon Strategy and The Bologna Process**. Member states and industry are called upon through **The European Maritime Transport Strategy (2008-2018)** to accompany EU efforts, and this fiche advocates that maritime research and innovative clusters also rises to

the challenge involved in becoming **“World leader in maritime research and innovation”**.

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### PRESS4TRANSPORT details:

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# MARITIME EDUCATION and COMPETENCE DEVELOPMENT

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The importance of ensuring a sustainable development of the EU is at the very heart of the EU agenda. This involves the challenge to ensure **economic growth, social welfare and environmental protection** in order to enhance **EU competitiveness** on whole, but also within the individual industrial sectors. Maritime transport is an industrial sector that is global in every aspect of its core competence, such as economy, transport of cargo, insourcing of services and human resource management. This demands a dedicated responsibility by EU

policymakers, national and industry efforts to ensure that **education and competence development** is globally oriented and based on a **high level of excellence**, in order to maintain industrial competitiveness and address the further globalization that lies ahead due to the economic growth in developing countries. Due to a general concern about the development of a variety of **quality in global education and training**, the International Maritime Organisation has used efforts in attempting to create a global standard through the



STCW 95 Convention<sup>1</sup> and the following amendments. However, this fiche does not intend to evaluate **maritime education and competence development** in accordance to STCW/95, but to the education and competence development that takes place beyond this.

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### The scope of the Topic

In the wake of a global shortage of officers in the industry, recruitment programs and research projects have been launched at both EU and national levels, and 'fast tracking' of maritime education training programmes has been observed<sup>2</sup>

as a way of coping with the shortage. However, as research shows, the problem is not the lack of seafarers, but the **quality** of their training<sup>3</sup>. This is concurrent with a report that was conducted within the Interreg IVB funded NMU project<sup>4</sup>, where it is stated that the level of competence in the European Maritime Industry is declining, and this is the case at sea and ashore. The grave prospect of a workforce shortage has important issues attached. One important issue is the fact that this lack of workforce seen together with the level of outsourcing that has taken place over the years in the industry

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<sup>1</sup> The STCW 95 has recently been revised, and a STCW 2011 version is downloadable at [IMO.org](http://IMO.org).

<sup>2</sup> M. A. Wagtmann and R. T. Poulsen (2009) Recent Developments and Probable Future Scenarios Concerning Seafarer Labour Markets. At: MET Trends in the XXI Century: Shipping Industry and Training Institutions in the global environment - area of mutual interests and cooperation. International Organisation of Maritime Universities, 2009. p. 306-23.

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<sup>3</sup> Li, K. X. & Wonham, J. (1999) 'A method for estimating world maritime employment'. *Transportation research Part E* 35: 183 – 189.

Leggate, H. (2004) 'The Future Shortage of Seafarers: Will it become a Reality?'. *Maritime Policy and Management* 31(1): 3-13.

<sup>4</sup> Interreg IVB North Sea Region Programme; The Northern Maritime University (NMU) project: Deliverable WP6; MIEP report 2010.



opens the lid on another threatening issue, namely the threat of losing the critical mass of **competencies in a maritime EU**.

This has also been pointed out in the SKEMA project<sup>5</sup>, where it has been claimed that the lack of efforts in the maritime industry in developing human resource management have resulted in a lack of knowledge about career path mobility within the industry. This problem contributes to the workforce shortage problem. The SKEMA project also advocates for the necessity to **expand on existing maritime education and competence development** in order to attract new upcoming generations and potential work forces. This has been addressed at national levels and in the European Maritime Transport

Strategy (2008-2018), where it is sought to promote **trans-national collaborations** between European Maritime Academies and Training institutions and partnerships that work to establish 'maritime certificates of excellence'.

### Future needs for maritime competences

A survey of education and recruitment needs in the Baltic Sea Area was attempted by the Svenska Sjöfartsverket (SMA) in 2010, in order to compare the maritime education offered in the Baltic Sea region with the **future need for competences**. Unfortunately, the response rate was not high enough to form a base for any conclusions. However, a report based on Maritime expert panel discussions<sup>6</sup> conducted in the

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<sup>5</sup> SKEMA –Consolidation study: SE 2.3. Human Resources – education and training. A project supported by the European Commission. Directorate-General for Energy and Transport.

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<sup>6</sup> Interreg IVB North Sea Region Programme; The Northern Maritime University (NMU) project: Deliverable WP6; MIEP report 2010.



Interreg NMU project revealed that the maritime industry is interested in a **variety of competence development offerings** such as e-learning, face2face, short courses that can either be stand-alone courses or be combined with several courses to obtain a competence bulk in a range of areas that are relevant to the organisation or company. The report<sup>7</sup> was based on panel discussions with maritime experts in the UK, Denmark and Germany and all respondents agreed that the level of competence is declining in the European Maritime Industry, and this is noticed both at sea and ashore. The report exerts that it is vital that maritime education matches existing knowledge needs and prepare for the future, by addressing the need for a broader scope of competencies

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<sup>7</sup> Interreg IVB North Sea Region Programme; The Northern Maritime University (NMU) project: Deliverable WP6; MIEP report 2010.

than traditional maritime themes.

The core competence of the maritime industry has evolved, from a need of competences in navigational and technical knowledge, to the needs of a global and complex business segment, calling for a range of different competencies such as logistics, economy and management<sup>8</sup>. Expanding trade in ports around the world calls for **standardised training and new competences** in order to manage global technologies and logistics systems<sup>9</sup>. However, despite a need for education and competence development in the industry, Research and Development intensity<sup>10</sup> in general is still below the 3%

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<sup>8</sup> E. C. Leong, Y. D. Wong and C. Williams (2009) WMU Journal of Maritime Affairs. Vol. 8, No 1, pp 47-60.

<sup>9</sup> M. C. Ircha (2006) WMU Journal of Maritime Affairs. Vol. 5, No. 1, pp 37-59.

<sup>10</sup> R&D expenditure as a percentage of GDP



target set for 2010 by the Lisbon Strategy, as can be seen in the

table below.

**Table 1.0: R&D Intensity in % for EU-15, EU-27, Japan, South Korea, China and United States, 2007-2008<sup>11</sup>**

	R&D intensity in % 2007	R&D intensity in % 2008
Japan	3.44	-
South Korea	3.21	-
EU-goal 2020	3.0	3.0
United States	-	2.76
EU-15	-	1.99
EU-27	1.85	1.90
China	1.44	-

*Note: Research and Development Intensity entails R&D expenditure as a percentage of a country's GDP.*

*EU-15 encompasses the EU consisting of only 15 Member State members. EU-27 encompasses the EU with 27 Member State members.*

*Not all R&D Intensity levels were available from United States and EU-15 in 2007 or Japan, South Korea and China 2008, and are therefore marked, - .*

*Source: Eurostat*

**Table 1.0** shows that the EU is slow to achieve the goal of 2020, which is 3% of GDP, and is overtaken by The United States, Japan and South Korea. This development must change and this can only be accomplished if even more efforts are put into allocating resources to research and development. However, the EU policies presented in this fiche address these low levels of R&D intensity, which shows that

<sup>11</sup> Eurostata data (online data code: [rd\\_e\\_gerdtot](#)).



the EU has acted on the findings in the data.

The next **Table 1.1** shows, among EU State Members, Sweden and Finland do rise above the EU goal of achieving a R&D intensity level of 3% of GDP. The three EU Member States Denmark, Austria and Germany also come close to the EU goal and the percentage accomplished by the United States, outperforming China's R&D intensity level. Although the data is four years old and represents a percentage of GDP, it can seem surprising that China's R&D intensity levels are so low considering the current discussions about China's competitive global position.

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**Table 1.1: R&D Intensity in % for EU and non-EU Member States in 2007<sup>12</sup>**

R&D intensity in % in EU Member States		R&D intensity in % in non-EU Member States	
<b>Sweden</b>	3.75	<b>Japan</b>	3.44
<b>Finland</b>	3.73	<b>South Korea</b>	3.21
<b>EU goal</b>	3.00	<b>EU goal</b>	3.0
<b>Denmark</b>	2.72	<b>United States</b>	2.76
<b>Austria</b>	2.67	<b>China</b>	1.44
<b>Germany</b>	2.63		

<sup>12</sup> Eurostata data (online data code: rd\_e\_gerdtot).



Note: Research and Development Intensity entails R&D expenditure as a percentage of a country's GDP.

EU-15 encompasses the EU consisting of only 15 Member State members. EU-27

Although these tables (**Table 1.0** and **1.1**) provide data that is expenditure in Research and Development in general, they can be used to show which countries overall allocate funds to these activities. The tables also underline the importance that EU still lacks serious actions towards enhancing research and development in order to ascertain a position in relation to the countries that comprise international competition.

### Maritime know-how

The maritime industry consists of a broad palette of professionals, ranging from ship-owners, technical superintendents and forwarders to seafarers, both ratings and officers. There is a vast knowledge base about

encompasses the EU with 27 Member State members.

Source: Eurostat

maritime transport in the EU due to many years of history and tradition. This includes knowledge of the sea, extensive experience, **know-how** and an ability to seize new challenges. Practical knowledge has been a valued and vital part of maritime transport and cannot merely be substituted by higher education and competence development. It is important to build on existing knowledge.

Maritime competence development has profited greatly from various regional, national and European so-called "maritime clusters", which have also been enhanced by national political policies that promote "national maritime clusters"<sup>13</sup>. These

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13 M. Porter (1990) *The Competitive Advantage of Nations*. The Free Press.



maritime clusters have contributed to increasing maritime activities, productivity and innovation and this competence development should continue to be supported. The Community Innovation Survey (CIS) which is a survey that is designed to monitor innovation activity in Europe conducted a survey in 2008, which showed that the highest proportion of innovation cooperation can be located in Denmark (56.8%), Cyprus (51.4%), Belgium (48.8) and Estonia (48.6). However, Finland, Sweden, Belgium and Luxembourg are recorded to have the highest share of innovation collaboration with US partners, and Sweden, Finland and Belgium are reported to have the highest share of innovation collaboration with India or China. This data shows that Belgium has both a **European and an international outlook on developing innovative collaborations**, and

it is such an outlook that EU needs to amplify in order to maintain a leading role in global economy. This outlook in a maritime EU perspective will contribute to the **development of competences** needed in Europe in order to compete on the international scene. As Cullinane and Wilmsmeier<sup>14</sup> have argued, it is essential to battle the challenge from new and emergent markets and growing knowledge specialisation outside of Europe that threaten EU's domination in the maritime industry.

It can be relevant here to investigate how **the high levels of innovation activity** measured in Denmark, Cyprus, Belgium and Estonia are represented in the maritime industry, and if possible enhance these activities, be they in the form of diverse innovation

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14 K. Cullinane, K. and G. Wilsmeier (2009) Beyond policy and process. Public Service Review: Science and Technology 3. Pp. 181-182.



environments or specific competences in maritime clusters. A maritime study<sup>15</sup> conducted outside the EU, investigating competencies for port and logistics personnel used the identification and development of such **cluster competences** as mentioned above. This was done in order to map out an educational program and a regional human resource management policy. This policy was used as a strategic plan for enhancing growth in an emerging industry. Such a study shows how maritime competence development can and must be built on **existing knowledge** pools, and how such knowledge can be harnessed. Given the correct support, this can grow into a knowledge-based education development that is anchored in the industry. Accomplishing such an effort in a specified regional

area, is a clever way of building education on emerging and existing industrial needs. This idea can be replicated and used in other regional areas, focusing on emerging industries that are relevant for that respective region. However, it should be supported alongside efforts to standardise and **enhance maritime education and competence development** in general.

Maritime education and competence development are part and parcel of any strategic Human Resource Management plan in an organisation. This can take place at both company and industry levels as well. It is precisely the elements of such a plan that could **enhance competitiveness** and the ability to meet market challenges by addressing the positive value of the human capital.

The Maritime industry has a multilayered education system and the availability of corporate

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15 Y. Ahn and G. N. McLean (2008) Asia Pacific Education Review. Vol 9, No. 4, pp 542-551.









1. Adoption of a system of **easily readable and comparable degrees**
2. Adoption of a system essentially based on two main cycles, namely undergraduate and graduate. Access to the second cycle shall require successful completion of first cycle studies, lasting a minimum of three years
3. Establishment of a system of credits - such as in the ECTS system
4. Promotion of **mobility**
5. Promotion of **European co-operation in quality assurance** with a view to developing comparable criteria and methodologies.
6. Promotion of the **necessary European dimensions in higher**

**education**, particularly with regards to curricular development

In Leuven 2009, the Bologna policy Forum was extended and a worldwide cooperation commenced with participation of 46 European countries and nations from all continents, in order to obtain global knowledge sharing and cooperation, and mobility and recognition of qualifications. Although the objectives for the next decade were chosen in Leuven 2009, it was agreed that the objectives from the Bologna declaration in 1999 were still relevant, and the following 4 subjects were nominated as being of special importance:

1. Mobility
2. Access to higher education
3. Life-long-learning



#### 4. The link between education and employment

The partial aim in 2010 was the launch of the **European Higher Education Area (EHEA)** which was presented in Budapest and Vienna in March, 2010. The Bologna Declaration was signed

by the Ministers of Education of 30 countries and was marked as the beginning of a work process that was intended to be completed by 2020. The Ministers of Education meet every second year to discuss progress and decide on focal points for the continued work in aligning national policies to meet common goals agreed upon at the biannual meetings.

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### The LISBON Strategy

The LISBON STRATEGY, also known as The LISBON AGENDA or The LISBON PROCESS, is an action and development plan for the EU, with the objective to improve the quality of national and European reforms. It was originally drawn up in 2000 by the Lisbon European Council, where a new strategic goal for the EU was given voice; "...to become the most competitive and dynamic knowledge-based economy in the world capable of

sustainable economic growth with more and better jobs and greater social cohesion". The strategy addresses the decreasing production levels and stagnation in Europe, by creating policy initiatives to be attained by all EU state members by 2010.

Behind this new strategic goal, was an acknowledgement of the fact that the EU must increase its productivity and competitiveness



in order to address the aggressive pace of globalization, technological change and an increasingly ageing population. Furthermore, the policies involving achieving higher productivity and competitiveness called for a close collaboration between the EU and the Member States, due to the fact that the Member States' economies are closely tied together.

The strategy was re-launched in 2005 in a document entitled: Growth and jobs; Working together for Europe's future. This document contained an emphasis on Research and Innovation, investment in people and the modernization of labor markets, unlocking business potential, in particular that of SMEs, and finally, energy and climate issues. This was implemented through **National Reform Programmes (NRP)**. The reason for this re-launch was that the original strategy had evolved into a wide range of

inter-related goals and tasks, and it was difficult to obtain an overview of whether responsibilities of these goals and tasks belonged to either the EU or the Member States. During 2005-2006, all 25 member states prepared their individual NRP's, and the EU Commission was able to present the first annual progress report in 2006. Following this, The LISBON STRATEGY has been confirmed in several social policies, such as The European Social Policy Agenda 2006-2010. The LISBON STRATEGY has had an impact on targeting funds (228 million Euros for 2007-2013) to investments that enhance growth such as innovation, research and development and business support. These funds have contributed to making the Lisbon Strategy more tangible to local and regional authorities.

The LISBON STRATEGY has contributed to building a general



consensus on what kind of reforms the EU is in need of and has been sufficiently flexible strategy that has proved to be adjustable to new changes, such as the increase in Member States from 15-27, and the development of the Euro. However, the economic crisis has with its devastating impact on European economy prevented the strategy from achieving optimal goals within the areas of Growth and Jobs.

### **Enhancing research, development and innovation**

The LISBON STRATEGY to become a knowledgeable society encompassed an ambitious research and innovation agenda. In earmarking 3% of the EU GDP to research and development, the EU flagged a new incentive to promote the importance of research and development (R&D) policies, and the investments in R&D in 20 member states has

increased. However, the lack of investment in R&D in other Member States, contributes to only a small EU performance overall, from 1.85% of GDP to 1.9% of GDP.

## **The EUROPEAN MARITIME Strategy 2008-2018**

The EUROPEAN MARITIME STRATEGY (EMTS) includes many of the issues addressed in the Bologna Declaration such as international corporation, mobility, life-long-learning and research.

The aim of the EMTS Strategy is to strengthen the maritime industry's competitiveness and enhance environmental performance, and has two main issues:

1. To enhance the maritime transport sector's ability to



provide cost-efficient maritime transport services adapted to EU and world economy.

2. To ensure a long-term competitiveness of the EU shipping sector by enhancing the ability to generate value and employment within EU (both direct and indirect) through the cluster of maritime industries.

The EMTS Strategy addresses six main themes, such as European Shipping; challenges & opportunities, trends and business conditions and Quality shipping. Specifically relevant for this thematic fiche are the themes 3) Human Resource and 6) Research and Innovation, which will be explained in the following.

### Theme 3) Human Resources, Seamanship and maritime knowhow

This theme attends to the growing shortage of qualified maritime professionals that can fill the knowledge-intensive and high-quality jobs that are available in the shipping sector, which poses a great threat to the industry of losing the critical mass of human resources that can contribute to the development of maritime competencies in the EU. With this theme, the EU calls for efforts from the Commission, Member States and the industry itself to:

- *Intensify consideration to developing advanced skills and qualifications of EU officers to enhance their **employment possibilities**.*
- *Facilitate **life-long career paths** in maritime clusters.*



- *Improve labor mobility*
- *Maintain high training standards and competence development of crews*
- *Provide an appropriate framework for education offerings*
- *Promote collaboration between maritime training institutions*
- *Create maritime certificates of excellence*
- *Promote student mobility*

As noted previously, the EMTS Strategy addresses many of the issues that are focused on in the Bologna Declaration and they are all relevant to the overall focus of this fiche. The efforts above call for a standardization of maritime education and competence development offerings in the EU, which involve collaboration between institutions and mobility for

researchers, teachers and students.

## Theme 6) Research and Innovation

The EU admits in this theme that maritime transport is greatly dependent on research and innovation efforts, and these efforts must be enhanced in order to accomplish the title of 'World leader in maritime research and innovation'.

The EU calls upon the maritime industries to utilize the vast amount of knowledge that has and is being generated in EU Research Framework programmes and activities, especially within the areas of:

- *New ship design,*
- *advanced logistics conceptions,*
- *e-maritime services,*
- *remote control of engine performance and*



- the enhancement of vessel operation by tele-communication systems.

The enhancement of the above mentioned areas promotes technological innovation and advancement, which will ensure performance and competitiveness in a maritime EU. Finally, the EU acknowledges both previous and ongoing foci in the industry on a 'greener' and sustainable shipping sector, and it is becoming more noticeable that these elements are increasingly enhancing competitive advantages. With the concept of adopting e-maritime services by year 2013,

the EU Commission proposes to create a maritime transport sector without barriers and extend this facilitation to all vessels involved in intra-Community trade and sailing between European ports. This was also partly introduced in the 2004 initiative by the EU commission: "Authorised Regular Shipping Service" in order to ease the transfer of community goods between two Member States and reduce the number of formalities. More about this initiative can be read in the Thematic fiche "Strengthening the potential of the Maritime transport", PRESS4TRANSPORT, 2011.

#### For further information:

##### **The BOLOGNA PROCESS**

[http://ec.europa.eu/education/higher-education/doc1290\\_en.htm](http://ec.europa.eu/education/higher-education/doc1290_en.htm)

##### **The LISBON STRATEGY**

[http://ec.europa.eu/archives/growthandjobs\\_2009/#](http://ec.europa.eu/archives/growthandjobs_2009/#)

##### **The EUROPEAN MARITIME STRATEGY (EMTS)**

[http://ec.europa.eu/maritimeaffairs/index\\_en.html](http://ec.europa.eu/maritimeaffairs/index_en.html)

# RESEARCH PROGRAMMES

## Key research areas at EU levels

Based on policy and recommendations mentioned in the previous sections the European Commission has initiated a number of

programmes with focus on both research and practical implementation.

Some of the programmes are specifically oriented towards the maritime industry, whereas others are more generic in character but have a maritime dimension.

## Framework Programs (FP)

EU has traditionally bundled research related initiatives and activities into Framework Programmes. The current **Seventh Framework Programme** (FP7) plays a crucial role in reaching the EU goals of growth, competitiveness and employment.

The broad objectives of FP7 are grouped into four categories:

- **Cooperation.** The programme supports all types of research activities carried out by different research bodies in trans-national cooperation and aims to gain or consolidate leadership in key scientific and technology areas. One of the theme areas under this category is transport. The central objective of this theme is to develop safer, greener and smarter transport systems for



Europe that will benefit citizens, respect the environment, and increase the competitiveness of European industries in the global market. This objective has led to identification of a number of activities where the most relevant for maritime transport is the development of clean and efficient engines and power trains, reducing the impact of transport on climate change and inter-modal regional and national transport.

- **Ideas.** The objective is to reinforce excellence,

dynamism and creativity in European research and improve the attractiveness of Europe for the best researchers from both European and third countries.

- **People.** This category aims at attracting and retaining highly trained and qualified researchers.
- **Capacities.** This programme focuses on Research infrastructure.

### The Interreg programmes

Interreg programmes are established to promote regional cooperation. The programmes are divided into three levels A, B og C:

- **A - Programmes:**  
Cross boarder collaboration between regions e.g. the Øresund region, Southern Denmark – Schleswig – KERN and the Southern Baltic region



- **B – Programmes:**

trans-national corporation between Member States in larger regions such as the North Sea Region, the Baltic Sea or North-West Europe

- **C – Programmes:**

Interregional programmes, Every European region may participate as well as Norway and Switzerland.

### **The North Sea Region Programme**

The North Sea Region Programme 2007-2013 works with cutting edge policy areas in regional development through trans-national projects.

A principal aim of the Programme is to expand the scope of territorial cooperation and focus on high quality projects in innovation, the environment, accessibility, and sustainable and competitive communities.

Keywords of the North Sea Region Program: Innovation, Environment, Accessibility and Sustainable Communities. An example of an interreg B programme is the North Sea Region Programme.

### **The Baltic Sea Region Programme**

The EU's Baltic Sea programme 2007-2013 promotes regional development through trans-national cooperation. Eleven



countries around the Baltic Sea area all work together to find joint solutions to common problems.

The strategic objective of the programme is to ensure that the Baltic Sea Region is an attractive place to invest, work and live in. The objective aims at coordinating actions by Member States, regions, the EU, pan-Baltic organisations, financing institutions and non-governmental bodies to promote a more balanced development of the Region. The four cornerstones of the Strategy are to make this part of Europe more:

1. *Environmentally sustainable* (e.g. *reducing pollution in the sea*);
2. *Prosperous* (e.g. *promoting innovation in small and medium enterprises*);

3. *Accessible and attractive* (e.g. *better transport links*);
4. *Safe and secure* (e.g. *improving accident response*).

The programme has flagship projects that have a distinct relation to the EU Strategy for the Baltic Sea Region and co-finances projects in the fields of:

- Fostering innovations
- Internal and external accessibility
- Baltic Sea as a common resource
- Attractive and competitive cities and regions.

## EU lifelong Learning Programme

In 2009 the strategic framework for European cooperation in



education and training (ET 2020) was launched to strengthen cooperation between EU member states and support their work towards the common aims:

- Making **lifelong learning and mobility** a reality;
- **Improving the quality and efficiency of education** and training;
- Promoting equity, social cohesion and active citizenship;
- **Enhancing creativity and innovation**, including entrepreneurship, at all levels of education and training.

These objectives are sought fulfilled through the Lifelong Learning Programme, which supports a variety of education and training projects. The programme is divided into four

sub-programmes funding different levels of education and four transversal programmes with a broader aim. The four sub-programmes are:

- Comenius for schools
- Leonardo da Vinci for vocational education and training
- Erasmus for higher education
- Grundtvig for adult education

The transversal programmes aim to promote cooperation covering two or more of the sub-programmes and promoting the quality and transparency of Member States' education and training systems which focus on four key-activities:

- Policy cooperation and innovation
- Languages





# RESEARCH RESULTS

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In this section the fiche presents the benefits from three individual EU funded research projects that focus on battling challenges within Maritime education and competence development. One project is anchored in the Interreg North Sea programme, one is anchored in the Interreg Baltic Sea Region programme and the third project is anchored in the Leonardo Lifelong Learning programme.

The projects were selected according to the theme of this fiche, namely maritime education and competence development. As previously pointed out, there are two different drivers of maritime education and competence development projects:

- They may address deficiencies or gaps in maritime education and training
- They may address technological advancement in recognition of the fact that new technology is developed in order to fulfil EU policies.

Although there were projects that could have been more relevant to include in the fiche than the projects that have been selected, however, due to great variation in description of individual projects, accessibility to knowledge about the projects and their results, some projects have been discarded.





# The EfficienSEA

project

To promote an efficient,  
safe and sustainable

TRAFFIC at sea

## Brief description and objectives

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The EfficienSea project's overall aim is to promote a safe, sustainable and efficient traffic at sea through concise and coordinate actions.

The four issues chosen by the partners are:

- E-navigation
- Vessel Traffic Data & Maritime Planning
- Dynamic Risk Management
- Recruitment & Competences

E-navigation is a concept covering an integrated system where information and data available to the navigator is organised and presented in a well arranged and clear way in order to minimise the complexity of information flow and support decision making on the bridge.

The IMO Maritime Safety Committee (MSC) has declared this development as a high priority item<sup>20</sup>. The EfficienSea project aims to provide the EU

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<http://www.imo.org/Search/Results.aspx?k=e-navigation>



with a best practice demonstration of the e-navigation concept in a trial zone where products and services can be demonstrated, tested and evaluated.

The second scope of the project is maritime planning.

The project partners' work on the development of a maritime dynamic sensitivity map that can be used to give a concise picture of the vulnerability of a region, often referring to what happens in case of a maritime accident, for example oil spill.

The dynamic sensitivity map will support efficient vessel traffic management and planning in a coastal zone as well as in open waters, as it is working on both grounding models and collision models. Furthermore vessel traffic data is being collected to identify potential risks.

The aim is to improve maritime traffic control by using efficient technologies and to develop and

demonstrate different approaches of dynamic risk management, in order to optimize the investments for a safe and clean Baltic Sea.

Finally the EfficienSea project focuses on the need of attracting students to the maritime business. In the context of this fiche, the need for recruitment and competence development is of special interest, in that the implementation of integrated maritime information systems causes a need for **new competences**. The project also seeks to raise awareness and enhance attractiveness among young people about maritime careers, which should result in **more applicants to maritime education and jobs**.

### Impacts and benefits

The analysis of maritime traffic, accidents and **environmental sensitivity** made through this project can provide maritime



authorities with the knowledge needed as a basis for decisions on investments and regulation. This information is also important in the development of e-navigation products and services, which should be delivered by maritime authorities.

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The project partners are working on technical solutions which aim at integrating existing navigational equipment and developing new tools. The system should be implemented by the project Member States in the Baltic Sea but with the potential of global coverage.

In the field of education several initiatives have already been taken to raise awareness of the opportunities of a maritime career. First, the launch of a Facebook group promoting maritime careers and a second, a trainee programme for students at BA level, where 4 universities

form a partnership and accept student mobility in existing programmes and courses<sup>21</sup>.

In early 2009 EfficienSea started to map the range of **higher education in the maritime sector** and to complete the picture. EfficienSea partners have also mapped recent maritime marketing and recruitment campaigns in the region.

#### Potential application

The sensitivity mapping is developed as a tool for decision makers in coastal regions supplying information necessary for maritime safety such as data on maritime traffic, accidents and track patterns as well as data on the environmental state of the Baltic Sea. Mapping the sensitivity and the maritime

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<sup>21</sup> [efficiensea.org](http://efficiensea.org)



traffic makes it possible to enhance coastal zone management and the exploitation of the economic potential in a safe and sustainable manner. **Research and development of new technology** are the key issues in the EfficienSea project.

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The e-navigation system, which may be implemented on a larger scale, is challenged by other systems for example e-maritime which also aims at interoperability and consistency between Member States and transport operators. This calls for efforts to enhance harmonization and regulation of the technology and design, as well as **competence development**.



# The M'AIDER project

## A maritime Aids' development project for Emergency Responses

### Brief description and objectives

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The M'AIDER project is the second phase of the SOS project which was concerned with **harmonisation of education and training** of merchant navy officers. The SOS project identified deficiencies in maritime education and training in regard to the ability to act in emergency situations. The M'AIDER project proposes to exploit the outcome of existing reports through gathering knowledge for creation of simulation based courses.

What is novel in M'AIDER is that students will exercise in both full

mission and e-learning platforms, where the scenarios are entirely developed from the past maritime accident cases<sup>22</sup>.

Three main aims of the project are:

- To improve safety at sea and in ports by identifying emergency situations known so far and creating a knowledge base of scenarios for the training of seafarers at officer level and above
- To develop exercises based on scenarios created for applications in bridge, engine room, propulsion areas as well as in integrated and full mission simulators
- To transfer the knowledge that already exists in the form of a software suite together



with an existing internet e-learning/assessment platform to integrate the scenarios and exercises created based on aims 1 and 2.

### Impacts and benefits

The overall aim is to improve safety at sea and in ports. Human error can be reduced through training and not only training in technical skills but also non-technical skills such as situational awareness, decision making and resource management, all of which are included in the courses. The scenarios enhance the awareness

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The M' AIDER project will gather knowledge on a wide range of accidents and break them down into categories, which will form the base of scenarios to be used for simulator courses for seafarers as well as shore personnel<sup>23</sup>.

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<sup>23</sup> Zaider Ziarati, R., Ziarati, M., & Turan, O., (2010) M'AIDER - Maritime Aids' Development for Emergency Responses International Conference on Human Performance at Sea HPAS 2010, Glasgow, Scotland, UK.



of dangerous situations and lead to identification of the causes of accidents and an understanding of how to avoid accidents.

The project also intends to promote best practice among the partners as the partnership is expected to **standardise** the courses based on the scenarios. This will contribute to the acceptance of certificates and thus to the **mobility and employability of the students**.

#### Potential application

The M'AIDER project addresses several of the EU priorities such as safety, **higher education and competence**

**development, lifelong learning, collaboration of stakeholder, employability and mobility.**

The cooperation between the project partners and the knowledge transferred aligns the education offered by the different METs and through this harmonisation it is made possible for the partners to recognise each other's certificates and this way the students employability is enhanced.



## The NMU Project

The Northern Maritime University project aims to build a strong trans-national network of universities and to integrate relevant

stakeholders from the maritime business sector in order to provide multidisciplinary and internationally oriented qualification offerings for the maritime industry.

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### Brief description and objectives

The central objective of the NMU project is to establish a sustainable collaboration between industry and educational institutions to enhance the innovation capacity of the maritime industry in the North Sea Region through qualification offerings.

The "Northern Maritime University" (NMU) is already well under way in addressing these challenges and has recently received an extension of the project, finally ending in June 2012. The objective of the NMU is to:

- Strengthen the maritime business sector and increase its capacity for innovation within the North Sea Region (as well as in the Baltic Sea Region) by research-based qualification offerings.
- Contribute significantly to **enhance the innovation capacities** of the beneficiaries from SME and maritime industry with the development of the NMU qualification offerings. This will ultimately lead to more effective investments in product and process



innovation by the trained maritime business actors in the North Sea Region.

**mobility.**

### Impact and benefits

In order to ensure future competitiveness and growth, the NMU project will create a common competence development curriculum for the North Sea Region containing maritime business management programmes, including e-learning modules with qualifications at both Bachelor and Master level. The project also works to map out a career development path for employees in the Maritime industry in the EU, ensuring a **life-long education and competence development** that can meet future challenges in the NSR in alignment with The Bologna

- **Establish a European Area of Research and Innovation** for the maritime business sector also reaching beyond the project period.
- **Strengthen the competitiveness of the European education industry in the maritime business sector** in comparison to global competitors and remove obstacles for labour, academic and **student**





Process. In order to accomplish this, a **trans-national network of universities** has been created, in the form of the NMU project, also offering services such as a mentor program. Finally, the project has established and seeks to **ensure a future network of stakeholders in the maritime industry** in the NSR region in order to ground the competence development created within NMU in realistic and existing needs in the industry.

The "Northern Maritime University" addresses many of the future challenges that the Maritime Transport industry faces at present day and increasingly so in the future. In preparing maritime business managers to cope with growing maritime traffic, port development, and rising environmental challenges, by developing multidisciplinary and internationally oriented qualifications at Bachelor and

Master level, NMU is thereby working towards establishing an Area of Research and Innovation for the maritime industry in the North Sea Region. This also contributes to the Lisbon strategy to create a more effective and competitive maritime business sector.

### Potential application

The NMU project has achieved a **trans-national collaboration** and founded a platform for uniform and **highly qualified education offerings** that will be accessible for all EU maritime business managers, and students at Maritime Academies who wish to develop their competencies. This format can be developed further in its current form or be copied and established in other areas of EU, hereby creating a strong maritime knowledge-base in EU. This would contribute to realizing EU as a strong competitor on the global maritime scene in concurrence



with The Lisbon Strategy. In that the NMU has established good relations to stakeholders, which is also still in growth, this can feed potential new collaborations, networks and new projects. This fruitful **trans-national collaboration between science and industry** that has been established in the NMU project is a vital contribution in securing EU as a maritime standard setter. It also addresses the call by EU in The European Maritime Transport Strategy that the industry will participate in activities that enhance the attractiveness of maritime education. For further information contact:

<http://www.nsr.nm-uni.eu/>



## CONCLUSIONS: **key outputs** from the **three projects**

This concludes the presentation of three different projects, two from Interreg B and one from Life Long Learning. The **EfficienSea** project and the **M'AIDER** project both aim to improve safety at sea, where EfficienSea seeks to accomplish this by developing technology. The **M'AIDER** project seeks to better human competencies that will enable maritime officers to tackle crisis situations in a better way, than is offered in maritime education today. Both projects orient towards the very core competence in the ship officer education and to **better competence development in maritime education.**

The **NMU** project on the other hand, aims beyond basic maritime education, by seeking trans-national academic **high-level offerings** at BA and MA levels. EfficienSea has both authority and industry participants in the project, and similarly, **NMU** has succeeded in achieving the participation of **trans-national** industry stakeholders. This is not the case for the **M'AIDER** project, which merely orients towards basic maritime education instructors. EfficienSea and **NMU** are both projects that have a great potential in tangible contributions to all EU policies mentioned in the fiche.



# EUROPEAN POLICY IMPLICATIONS

## Policy Recommendations

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The different approaches to developments in maritime education and competence development that have been presented here call for the necessity that EU Member States discuss how a 'standard of excellence' is achievable in a maritime EU. Such a standard would provide the possibility to attract potential and highly educated workforces from outside the EU, who can help fill the current and future vacancies that are eminent in the maritime industry. The projects presented in the fiche, also point at gaps and deficiencies in maritime education and competence development that need attention. They also point to a need for EU

policymakers to 'lift the bar' and create a standard that lies above the STCW 95 standard and certify accordingly.



This can potentially create higher wages for Europeans in the maritime industry, but what it significantly marks in red, is that EU will not compete on wage expenditure, but on the quality of maritime education and competence development. One way of doing this could be to allow such a process to grow organically, by collecting the knowledge and the collaborations



that are generated in fruitful projects and enhancing these efforts to create similar projects in other areas of the EU. Such efforts would in time create 'rings in the water', which would allow adaptation to take place at an acceptable pace.



# OUTLOOK ON RESEARCH

## What Next?

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The projects that have been briefly presented and analysed in this fiche have contributed to the following suggestions for further research.

It was noted that there are a wide range of projects within the EU programmes that have different participants who all seek to create their own standard for education and competence development in a maritime EU. This can pose a threat that we are left with many different standards which can be difficult to harmonise.

Maritime research and innovation has a vital part to play in harmonising and standardising maritime education and

competence development. This task must not be left to the EU, national and industrial efforts alone.

Research and Development, innovation clusters and knowledge environments can also play an active role. This can be accomplished by ensuring dissemination and exploitation of the findings in the various projects in relevant media outlets, and by using the projects to voice how research can play their part in implementing the EU agenda.

The projects and the policies mentioned in this fiche point to the relevance of establishing a European area of maritime excellence that puts efforts into collecting and coordinating the efforts to harmonise and standardise maritime education and competence development. Such efforts will promote the accomplishment of the goal of “becoming the most competitive and dynamic knowledge-based economy in the world, that is



capable of sustainable economic growth with more and better jobs and greater social cohesion”.

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Interreg programme B

[http://ec.europa.eu/regional\\_policy/cooperation/transnational/index\\_en.htm](http://ec.europa.eu/regional_policy/cooperation/transnational/index_en.htm)

Interreg programme C

<http://www.interreg4c.eu/>

LifeLong learning Programme:

[http://ec.europa.eu/education/lifelong-learning-programme/doc78\\_en.htm](http://ec.europa.eu/education/lifelong-learning-programme/doc78_en.htm)

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[http://www.sjofartsverket.se/upload/Listade-dokument/Rapporter\\_Remisser/SV/2011/Sektorsrapport2011.pdf](http://www.sjofartsverket.se/upload/Listade-dokument/Rapporter_Remisser/SV/2011/Sektorsrapport2011.pdf)

## EU Projects

The **EfficienSea** project

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**M'aider** project:

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**NMU (2010)**; Northern Maritime

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the 1990s, the number of people who have been employed in the public sector has increased in all countries.

There are a number of reasons for the increase in public sector employment. First, the public sector has become an important source of employment for many people, especially in the developing countries. Second, the public sector has become an important source of income for many people, especially in the developing countries. Third, the public sector has become an important source of social services for many people, especially in the developing countries. Fourth, the public sector has become an important source of political power for many people, especially in the developing countries.

The increase in public sector employment has led to a number of problems. First, the public sector has become a major source of corruption. Second, the public sector has become a major source of inefficiency. Third, the public sector has become a major source of waste. Fourth, the public sector has become a major source of unemployment.

The increase in public sector employment has also led to a number of other problems. First, the public sector has become a major source of social inequality. Second, the public sector has become a major source of social injustice. Third, the public sector has become a major source of social conflict. Fourth, the public sector has become a major source of social instability.

The increase in public sector employment has also led to a number of other problems. First, the public sector has become a major source of social stagnation. Second, the public sector has become a major source of social regression. Third, the public sector has become a major source of social decline. Fourth, the public sector has become a major source of social collapse.

The increase in public sector employment has also led to a number of other problems. First, the public sector has become a major source of social despair. Second, the public sector has become a major source of social hopelessness. Third, the public sector has become a major source of social pessimism. Fourth, the public sector has become a major source of social cynicism.

The increase in public sector employment has also led to a number of other problems. First, the public sector has become a major source of social apathy. Second, the public sector has become a major source of social indifference. Third, the public sector has become a major source of social isolation. Fourth, the public sector has become a major source of social alienation.

The increase in public sector employment has also led to a number of other problems. First, the public sector has become a major source of social fragmentation. Second, the public sector has become a major source of social disunity. Third, the public sector has become a major source of social division. Fourth, the public sector has become a major source of social conflict.

The increase in public sector employment has also led to a number of other problems. First, the public sector has become a major source of social chaos. Second, the public sector has become a major source of social disorder. Third, the public sector has become a major source of social anarchy. Fourth, the public sector has become a major source of social collapse.

