Interreg ADRION ADRIATIC-IONIAN

EUROPEAN UNION

European Regional Development Fund - Instrument for Pre-Accession II Fund

FUTURE 4.0

Validation of the Smart Learning Model

DELIVERABLE D.T3.2.2

WP4 T3, ACTIVITY A.T3.2

Final Version

December/2020

Project number and acronym	294 – FUTURE 4.0
Lead partner	Veneto Region
Prepared by	PP2 - Confindustria Veneto SIAV S.p.A. Stefano Miotto, Gabriella Bettiol, Chiara Cortese
Address	Via Torino 151C, Venice, Italy
Email	area.progetti@siav.net
Date, Venue	December 2020, Venice
Delivery Date	04/12/2020

CONFINDUSTRIA Veneto SIAV S.p.A.

DOCUMENT CONTROL SHEET

Work package Number	WP4 T3
Work package Title	Local Pilot Action Design and Implementation
Activity Number	T3.2
Activity Title	Validation of the Smart Learning Model
Deliverable Number	T3.2.2
Deliverable Title	Validation of the Smart Learning Model
Dissemination level	~~Public~~ / Restricted / ~~Confidential~~
Main author	PP2, Confindustria Veneto SIAV S.p.A.
Contributors	Future 4.0 Partners
Quality Assurance	LP, SIAV

TABLE OF CONTENT

1. Peer Review: Criteria, Experts and Feedbacks 4
1.1. Validation Criteria 4
1.2 Experts 4
1.3 Feedbacks for the improvement of the Smart Learning Model 5

2. Smart Learning Model Validation 6
2.1 Validation from Veneto region – Expert: Prof. Alberto Vergani 6
2.2 Validation from Apulia region – Expert: Prof. Paolo Ferrari 9
2.3 Validation from Dytiki Ellada– Expert: Harrys Bikas, Research Engineer 11
2.4 Validation from Jadranska Hrvatska – Experts: PhD Sanja Čandrlić, Alen Jakupović and Heri Bezić 13
2.5 Validation from Albania – Expert: PhD Vebina Resuli 17
2.6 Suggestions for the improvement of the Smart Learning Model 19

3. Strategy for the future: EUSAIR industrial Policy perspective 21
3.1 Analysis of the Model according to Adrion and EUSAIR horizontal priorities 21
3.1.1 SWOT ANALYSIS: Impacts on Blue, Sustainable and Smart Growth 23
3.1.2 SWOT ANALYSIS: Impacts on Sea Mobility – Sustainable & Innovative Transport 24
3.1.3 SWOT ANALYSIS: Impacts on Social Inclusion & Innovation 25
3.2 Evidences resulting from the SWOT Analyses 26
3.3 The Albanian contribution: a deep analysis for the alignment with Industry 4.0 innovation paths. 28
3.3.1 SWOT ANALYSIS of Albanian Maritime System in the context of INDUSTRY 4.0 and EUSAIR STRATEGY 28
3.3.2 EUSAIR ACTION PLAN: Trends & Megatrends 32
3.3.3 The Albanian National strategy and possible alignment with INDUSTRY 4.0 innovation paths 38
3.4 Strategy for the future 40

1. Peer Review: Criteria, Experts and Feedbacks

1.1. Validation Criteria

The validation of the FUTURE 4.0 Smart Learning Model developed in the Interreg Adrion FUTURE 4.0 project will be based on the following criteria:

- **Model's clear and understandable design**
- **Internal coherence (of the model)**
- **Model's pilot-implementation soundness**
- **Model's responsiveness to its implementation contexts**
- **Comprehensiveness of theoretical references**

1.2. Experts

For the Validation of the Smart Learning Model has been carried out a transversal peer review of the Model, based on the strategical and theoretical approach, the main evidences and findings resulting from the Local Pilot Actions experimental interventions and the identified Best Practices.

At this purpose, in each of five regions involved, an evaluation and assessment on the Model was realized by one or more of the following profiles:

- Academics and PhDs;
- Innovation Managers;
- External experts with high expertise on 4.0 technologies and their application into business realities;
- External stakeholders: such as members of local or regional public authorities; relevant sectoral agencies; business support organisations; higher education and research institutions.

The partners in each region selected and identified their own expert/s according to their expertise, also in consideration of the target reference sector of the FUTURE 4.0 represented by companies – mainly SMEs – operating and active in the Naval Industry, the Shipbuilding and the related supply chain.

1.3. Feedbacks for the improvement of the Smart Learning Model

The experts' reviews and assessments on the Model, based on the identified criteria, also include feedbacks for the improvement of the Model.

The provided suggestions of experts and stakeholders on the Model and Local Pilot Actions evidences, along with the FUTURE 4.0 Policy Recommendations, have represented an added value in setting up the principles and priorities foreseen in the Strategy for the future within the EUSAIR industrial policy perspective. (See section 3).

2. Smart Learning Model Validation

2.1. Validation from Veneto region – Expert: Prof. Alberto Vergani

a) Model's clear and understandable design: the model's structure is clear and explicitly based on an adaptation of the "knowledge transfer model" elaborated by Liyanage. Only the first three levels of the original model, integrated by preliminary seminars, have been included in the Smart Learning Model (because of the project's timeline and resources' constraints) but this did not result, also considering pilot-actions feedbacks, in a partial or uncomplete design;

b) Model's internal coherence: even if, as here above mentioned, not all the levels of Liyanage's knowledge transfer scheme have been included in the Smart Learning Model (SLM) and its pilot actions, the internal coherence of the model is fully satisfactory. The coherence is to be found in the strong consequential relation which reciprocally links each element of the "awareness-acquisition-transformation" *chain* as it has been implemented in the 5 pilot-actions. An important contribution to internal coherence comes also from the learning support methods used in model implementation. Among these methods, different in their combination depending on the model's level (but largely consisting in *Action Learning for Innovation/ALI* within a blended-learning framework), a specific mention must be made for those tailored on IND4.0 issues (like the *Card Game Analysis* or, matched with ALI, the *FUTURE4.0 platform*);

c) Model's pilot-implementation soundness: feedbacks from Local Pilot Actions monitoring (Validation Report, Del. D.T3.2.2, Oct 2020, chap. 2) give clear evidence of the soundness of their implementation in contexts similar for sectors but different for digital maturity, innovation and project's partnership composition. LPA's implementation robustness mostly comes from 4 elements: the SLM model's design; the coherence between the model's contents and the challenges of the manufacturing sector it has been applied to (naval and shipyard); the model's careful implementation organization and infra-structure; the added-value given by a monitoring action going by each LPA's implementation;

d) Model's responsiveness to its implementation contexts: the SLM model revealed to be able to adapt to the 5 different contexts where the pilot-actions were carried out. In addition, the model was also adaptable to coexisting with COVID19 pandemic which forced the model to be implemented mostly through blended learning sessions. Evidence of such responsiveness comes from both the different micro-structures of the learning paths completed in the 5 Countries (but within the same macro-structure) and the wide range of the methodological approaches which has been used (see also above on this point). An important contribution to model responsiveness came also from the monitoring process which accompanied pilot-actions implementation;

e) Comprehensiveness of theoretical references: the theoretical references the model is based on are clearly made explicit in both the pilot-actions framework (LPA, Del. D.T3.1.1, Jan 2020, chap. 1) and the Validation Report (Del. D.T3.2.2, Oct 2020, chap. 1 as well). These references have been coherently assumed in the Local Pilot Actions' expected structures (LPA, Del. D.T3.1.1, Jan 2020, chap. 4) and can be found as confirmed by the main evidences deriving from Local Actions implementation (see the *Validation of the SML* report, Oct 2020, chap. 2).

Expert profile:

Alberto Vergani *has been Adjunct Professor Policies at the Catholic University of the Sacred Heart, (Milan and Brescia headquarters) and at University of Genova – Faculties of Sociology and Education - in the following fields:*
- Programming and Evaluation of Human Capital, (2009-10);
- Methods and techniques of Training Evaluation, Specialist Degree in Adult Education and Orientation and Development of Training Systems (2008-09);
- Active Labour Policies, Specialist Degree in Applied Social Sciences (2006-09);
- Models, Methods and Tools for the Evaluation of Services and Interventions, Master's Degree in Social and Third Sector Policy Sciences, Service Organisation and Management (2002-06);
- Economic Sociology, Basic Degree Course in Training Processes Expert (2002-04);
- Training and Human Resources Policies, Basic Degree Course in Training Process Expert (2001-05).

Since 2000 he has been a lecturer in Master, advanced and highly specialised courses on the following topics: Methodology of Evaluation of Educational and Training Policies, Services and Interventions; Planning and Evaluation of Training and Labour Policies; Methodology of Evaluation Research; Sociology of Organisation.
He is currently a member of the Faculty of the course "High specialization in Educational and Training Policies" and of the related specialization "The integrated system of Evaluation Processes" at the Catholic University of the

Sacred Heart, Milan and Rome/Brescia.
Furthermore, he has carried out and continues to carry out social research and survey activities and technical-methodological assistance as a freelancer at Universities; Research Bodies and Training Agencies of both public and private nature; Foundations; Public Administrations at provincial, regional and national level

Its main professional specializations include:
- analysis and basic research and evaluation with reference to public and private training, policies for the development of human resources, work and employment, support to entrepreneurship;
- design, construction and application of monitoring and evaluation devices (ex-ante, in-progress, final, ex-post); creation of monitoring and evaluation reports and documents; technical assistance to the design and implementation of monitoring and evaluation devices;
- consultancy and methodological assistance to the design and implementation of monitoring and evaluation devices in the field of policies and personal services;
- direction, coordination, implementation, monitoring and evaluation of projects aimed at the development of public training and employment policies;
- planning and methodological coordination of integrated training interventions within both the public training system and private organisations;
- coordination and conduction of analysis and organisational development activities through the approach of research/intervention oriented to management and process innovation in training structures;
- consultancy for the drafting of texts and articles of law on training and the labour market.

2.2 Validation from Apulia region – Expert: Prof. Paolo Ferrari

a) Model's clear and understandable design: the Smart Learning Model adopted in the project is taken from Liyange's Knowledge Transfer Model. It is interesting to note that, although only three of the five phases of the original model have been considered, its application allows to have useful results for the development of the project. The design of the model and its understanding are therefore clear and in line with the project proposal;

b) Model's internal coherence: the Smart Learning Model applied to the project acquires coherence thanks to the contribution of the Smart Learning Techniques and methods used in model implementation. In particular, the applied Online learning or E-learning method facilitates and foster the communication and the interaction between educators, learners and educational material, offering flexibility and effectiveness, through a Blended Learning scenario;

c) Model's pilot-implementation soundness: the Smart Learning Model, although very positive in its implementation, has shown very different levels among the companies involved in the Local Pilot Action, both in terms of knowledge of digital tools and in terms of innovation and awareness of their possibilities. It can therefore be said that the use of the SML, thanks to its method and techniques, has helped the companies involved in the sector to which it has been applied (naval and shipyard) to understand the usefulness of this tool and the potential for their growth and future development;

d) Model's responsiveness to its implementation contexts: in general, the Smart Learning Model has shown great reactivity in the application and administration phase to the companies involved in the pilot-action, especially in consideration of the different characteristics of each of them. The Card Game Analysis applied in each session with companies proved to be of great use to understand their desirability on the Enabling technologies of industry 4.0. However, there was a widespread lack of knowledge of the possibilities offered by local development tools, that was resulted through the different phases of the SML;

e) Comprehensiveness of theoretical references: the theoretical references on which the Smart Learning Model is based are explained in the project deliverables (in particular in D.T3.1.1, January 2020). From a practical point of view, the transmission of these references was carried out through the main activities implemented during the pilot-action. The companies involved were able to count on a series of seminars focused on technological megatrends and on the advice about needs and competences, conducted by the Polytechnic of Bari from an analytical point of view, being able to satisfy their curiosities and requests for more information, specific to each of them.

Expert profile:

Paolo Ferrari: *Research Fellow at University of Trieste in the field of model optimization and Adjunct Professor at Polytechnic University of Bari, Italy.*

Graduated in Architecture, I obtained the title of PhD in Industrial Design at the Department of Engineering and Architecture of the University of Trieste. Winner of numerous awards in nautical design, I am among the leading experts in the design of accessible sailing and motor boats.

Freelance journalist, he writes for various publishing houses, on technical and naval design issues.

2.3 Validation from Dytiki Ellada– Expert: Harrys Bikas, Research Engineer.

a) Model's clear and understandable design: the design and the structure of the model is quite clear and understandable as it follows a logical sequence: I) attracting the interest of potential learners via the "awareness" seminar that was more informative II) transferring knowledge to one or more industry 4.0 key enabling technologies via the "acquisition" training and III) providing mentoring based on the company's specific industrial needs within the "transformation" level. The integration of the Teaching Factory Concept adds value to the model since it is an educational approach where students, researchers, and manufacturing practitioners can learn through co-creating solutions to real manufacturing challenges;

b) Model's internal coherence: the internal coherence of the model is sufficient since the transition from the level of awareness to the level of acquisition and transformation takes place gradually. For example, by completing the first level, the learners acquire attitude about the Key enabling technologies of Industry 4.0, by completing the second level potential trainees gain knowledge of a specific I4.0 technology and by implementing the transformation level the learners gain skills and competences and they could use the acquired knowledge and apply it in their business. The proposed card game analysis is performed at the first level to better understand the importance of these technologies and the FUTURE 4.0 platform which includes more executive learning content is used in the next levels;

c) Model's pilot-implementation soundness: the information contained in the monitoring tools confirms the correctness of the implementation of local pilot actions. All local pilot activities carried out in each of the 5 different areas according to the methodology of the Smart Learning Model. All the activities, according to monitoring tools, began with an information seminar to inform the potential stakeholders and invite them to the LPAs. Then they continued with awareness seminars/webinars, acquisition trainings and ended with transformation trainings. In addition, more than 100 SMEs from the Maritime Sector and its supply chain successfully participated in these activities, the digital maturity of both the organizers and the participants contributed significantly to the successful implementation of the local pilot actions;

d) Model's responsiveness to its implementation contexts: the Smart learning model is flexible, versatile and easily adaptable to the implementation of each of the 5 LPAs. The smart learning model consists of different types of learning activities: synchronous and asynchronous learning, online, physical and combined learning. Due to the COVID-19 epidemic, and as shown in the monitoring tool, many activities were performed entirely online via Zoom or other web tools and the rest were implemented through combined learning sessions. Therefore, we consider that the model corresponds to its implementation;

e) Comprehensiveness of theoretical references: the theoretical references that the Smart Learning Model is based on are valid, sufficient, and clear.

Expert profile:

Harrys Bikas. *Research Engineer: He has graduated from the Department of Mechanical Engineering and Aeronautics (University of Patras-GREECE). He is a PhD candidate focusing on the Additive Manufacturing area. He has been a Research Engineer at the Laboratory for Manufacturing Systems and Automation at University of Patras since 2011. His research interests and expertise are Additive Manufacturing, laser processing and machining. Mr. Bikas has been directly involved as a Research Engineer in seven (7) EC-funded RTD projects; namely ENEPLAN, white'R, Borealis, 4D Hybrid, AMable, INTEGRADDE and DIMOFAC since 2011.*

2.4 Validation from Jadranska Hrvatska – Experts: PhD Sanja Čandrlić, Alen Jakupović and Heri Bezić

a) Model's clear and understandable design: model's structure is very clear and precise and it is based on transferring knowledge about technologies and enablers of 4th Industrial Revolution. Seminars were divided in two different levels: 1) Introduction to Big data analytics, Cloud computing, Cyber Security, AR, AMS and Additive Manufacturing in the context of Industry 4.0 and 2) Basic knowledge regarding Big data analytics, Cloud computing, Cyber Security, AR, AMS and Additive Manufacturing in the context of Industry 4.0. These technologies are enablers of 4th Industrial Revolution and represent basic of Smart Learning Model;

b) Model's internal coherence: model is strongly coherent since it was divided in two logically connected steps. Participants were from different companies from Primorsko – Goranska county: faculties, shipyards, lawyer firms, IT, consulting. Through both seminars' participants could gain or extend knowledge about 4th Industrial Revolution enablers that represent basics for Smart Learning Model. These knowledges can be adapted in their everyday jobs and improve their effectiveness. Division on two logically interconnected levels enabled higher level of coherence of the model. Completing both levels, participants could gain and extend their knowledges about pillars and enablers of 4th Industrial Revolution and Smart Learning Model;

c) Model's pilot-implementation soundness: since, Covid-19 pandemic changes everything, seminars were organized via Zoom application. Model was very coherent and participants were satisfied with seminars and knowledge transfer. They emphasize importance of choice of participants from different areas and sectors where Smart Learning Model can be implemented. They can successfully apply knowledges in their everyday jobs and create new business model. Managers from different sectors enabled variety of quality solutions and increase level of knowledge that could be gained through seminars;

d) Model's responsiveness to its implementation contexts: Smart Learning Model proved itself as very flexible and adaptable to different contexts where pilot actions were carried out. Smart Learning Model consisted of: online learning, combines learning, synchronous and

asynchronous learning. Due to Covid-19 pandemic majority of activities was organized online via Zoom application. Since, there is positive feedback from participants about successful implementation of knowledges in their everyday jobs, we consider that model correspond to implementation contexts;

e) Comprehensiveness of theoretical references: theoretical references model is based on a comprehensive, explicit, clear and enable higher quality of knowledge transfer to participants. Since they could acquire new and extend previous knowledges, we consider theoretical references valid and comprehensive for this level.

Experts' profile:

1) ***Sanja Čandrlić: PhD, Associate Professor***: *Professor Čandrlić is Associate Professor at Department of Informatics of University of Rijeka with 19 years of relevant academic experiences. Subjects she teaches are:*

- *Team development of business applications*
- *Introductions to program engineering*
- *Program engineering*
- *Software engineering*
- *Strategic planning of information systems*
- *Process modelling/Information system analysis*

She is author or co-author of 63 scientific papers, majority of them with international reviews. Her papers were published in prestige databases like WOS, Scopu. According to Google Scholar her papers are cited 113 times, with h-index 6 and i10 index 2.

She was associate at different projects of Croatian Ministry of Science and Education: Methodology of information systems development and Methodology of modelling and analysis of information systems.

She is associate on EU project Development of International Education Program Veleri OI-IOT School. Objective of this program is creation of new educational program on Croatian and English language that is related to IoT.

She participated on different University projects:

- *Knowledge based system as learning support to students with dyslexia – Project leader*
- *Development of QA system on relation database – Young researchers – Project leader*
- *Development of NOK platform for transformation of sentences from regular language to relation database*
- *Development of educational programs, qualification standards and profession standards for ICT sector that is harmonized with Croatian qualification framework*
- *Information system of Spatial Planning*

She is a member of Croatian Society for Information, Communication and Electronic Technology, Cybernetic society, The Association for Computing Machinery.

2) ***Alen Jakupović, PhD****: is Associate Professor at Polytechnic of Rijeka. Subjects he teaches at different levels of study are:*

- *Information system planning*
- *Modular program engineering*
- *Introduction to programming*
- *Computer networks*
- *Information system development*
- *Algorithms and data structures*
- *Telematic projects*

He is an author or co-author of 43 scientific and research paper that are according to Google scholar cited 222 times, with h-index 7 and i10 index 6.

He is project leader on EU project Development of International Education Program Veleri OI-IOT School. Objective of this program is creation of new educational program on Croatian and English language that is related to IoT. He educated in areas of project creation and implementation, Socially useful learning, E-learning, Software implementation methods, Marketing, Communications.

He was involved in 16 scientific and IT projects. His practical experience is related to the position of sales manager.

His skills are:

- *The implementation of Navision ERP Solutions*
- *Business process, data and software modelling*
- *Programming in Visual Basic, PowerBuilder, VBA, Java, C, PHP, JavaScript, HTML,*
- *CSS.*
- *Working with Scout, Laravel, Bootstrap, AngularJS and Ionic framework.*
- *Working with databases: Oracle, MS SQLServer, PostgreSQL, SQLite, MySQL, MS*
- *Access - SQL query language, making the procedure*

3) ***Heri Bezić, PhD:*** *is Full Professor at Faculty of Economics and Business, University of Rijeka with almost 40 years of relevant academic and business experience. He is course holder*:

- *International business*
- *International trade strategies*
- *Business negotiation*
- *Technological policy and competitiveness*
- *Conquering global markets*
- *Doing business in the conditions of the internal EU market*
- *Negotiation in the EU business environment*

He is an author or co-author of 302 scientific papers, books and research papers. Papers were published in journals indexed in CC, SSCI, WOS or Scopus. According to Google scholar, I am 3rd most quoted author in the field of international business in Croatia, and 720th in the world.

For 2 mandates he was a Dean of the Faculty and contributed to internationalization of the Faculty by signing cooperation agreements with different universities. During his mandates Faculty introduced academic program on English language, course International business. It increased number of foreign students and international presence. He started and implemented distance learning program that successfully works for already 7 years.
He was project leader or associate on different projects and we emphasize:

- *Fourth Industrial Revolution and Export Competitiveness of EU*
- *Fourth Industrial Revolution and Export Competitiveness of Croatia*
- *Fourth Industrial and Foreign Direct Investments*
- *Innovativeness, productivity and export competitiveness of EU enterprises*
- *Determinants of international competitiveness of EU enterprises.*

He is a member of editorial bord in two foreign journals, Program and Organization committee of several international conferences and institutions like AIB - Academy of International Business, Michigan State University and CEDIMES Institute (Centre for Studies in International Development and Social Movement), Paris, Croatian Society for Information, Communication and Electronic Technology.

Except successful academic career, he has successful business career. Currently, he is a President of County Chamber of Economy (part of Croatian Chamber of Economy) in Primorsko-Goranska County. He was was Advisor and consultant at the development agency of the Italian province of Veneto - "Veneto sviluppo", Co-author of "Market strategy of Veneto region companies on the Eastern Europe markets", President of the consulting company "Fortrade Consulting" Inc. New York, USA, CEO of the consulting company "Cofar" Ltd, Rijeka and Head of Supervisory Board at Plodine Ltd, Rijeka.

2.5 Validation from Albania – Expert: PhD Vebina Resuli

a) Model's clear and understandable design: the design of the model is clear and understandable from the potential students and potential instructor. The model is developed in an approach divided into three parts: 1. the individual, social/collective and company perspective 2. it includes a process of knowledge transfer for 4.0 technical competences, the knowledge sharing achievement through a description of the main tools. 3. In the last part on a technical solution which can help companies to implement a knowledge transfer dynamic throw learning and creating new way for solution;

b) Model's internal coherence: the internal coherence of the model is fully satisfactory with the elements in which reciprocally links each element of the "awareness-acquisition-transformation" chain as it has been implemented in all pilot-actions, the "Knowledge Triangle" /quadruple helix logic; Industry behaviours concerning the effects of Industry 4.0 on the organisational structures and Involvement in Technological Road mapping activities of relevant private, public and research stakeholders. Results of 4.0 platform stimulating the design of further initiatives as follow-ups, including also concrete proposals to ensure further implementation. It also contributes to the achievement and increase knowledge;

c) Model's pilot-implementation soundness: all the activities according to monitoring tools from the seminars are focus in 5 different areas according to the methodology of the Smart Learning Model. They start with the information for potential students or potential stakeholders' acquisition of the desired information the SLM model's design; the coherence between the model's contents and the challenges of the manufacturing sector it has been applied the model's careful implementation organization and infra-structure; the added-value given by a monitoring action;

d) Model's responsiveness to its implementation contexts: all local pilot activities carried out in each of the 5 different areas of the methodology of the Smart Learning Model. All the activities, according to monitoring tools, began with an information seminar to inform the potential stakeholders. Then they continued with awareness seminars/webinars, acquisition

trainings and ended with transformation trainings. The Smart learning model implement each of the 5 LPAs of the smart learning model consists of different types of learning activities;

e) Comprehensiveness of theoretical references: the theoretical references that the Smart Learning Model (SLM) uses are clear, sufficient for the pilot action framework.

Expert profile:

***Vebina Resuli**: lecture at Mediterranean University of Albania from 2016 at the Economic Faculty in the following fields: Management, Research Methods in Business, e-Business and Organizational Behavior.*
Vebina Resuli has a diploma in Business Administration from New York University of Tirana (2003-2008) a Master International Business in Marketing (2009-2010) and a Master in Science of Education (2012-2014).
She holds a PhD in Education Management (2015-2019) her research interest are implementation of research methodology in business, education standards implementation, technology of education.

2.6 Suggestions for the improvement of the Smart Learning Model

- **Veneto suggestions – Expert: Prof. Alberto Vergani:**

The Model structured according to the main three phases of AWARENESS, ACQUISITION, TRANSFORMATION of the Liyanage knowledge transfer process has achieved interesting results in terms of introduction of some relevant knowledge on 4.0 technologies, digitalization and acquisition of skills for their proper management.

As many companies expressed the willingness to proceed with the actions and innovation processes activated by FUTURE 4.0 project, it will be advisable and particularly relevant to integrate the Model experimentation with the other two last phases of Liyanage to be tested through further structured in-company experimental interventions in which experimenting once more and in deep the innovative methodologies applied.

- **Apulia suggestions – Expert: Prof. Paolo Ferrari**

The most part of involved companies expressed the willingness to proceed with the actions and innovation processes activated by Interreg Adrion FUTURE 4.0 project. For this reason, it is advisable and particularly relevant for the success of the project to continue the follow-up activity of the companies involved, with additional tools to support the technological development and enabling initiatives, not only in theoretical but also practical form, thus proceeding with the activation of financial channels alongside additional research projects with higher TRLs.

- **Dytiki Ellada suggestions – Expert Harrys Bikas, Research Engineer:**

The Smart Learning model is very well designed. However, it would be appropriate to further promote the concept of the Teaching Factory in the context of the implementation of the Smart Learning Model.

- **Jadranska Hrvatska suggestions – Experts: PhD Sanja Čandrlić, Alen Jakupović and Heri BezićJ**

The Smart Learning Model is very well structured and designed. We consider it very applicable for participants from different sectors. We consider it would be very important to raise awareness of the model and increase number of participants from public and private sector. We suggest to

make brief research about previous knowledge about and expectations from seminars about Smart Learning Model. It would be recommended to create KWL chart for participants. K- What do I know about this topic? W – What do I want to know? L – What did I learn about this topic. It should be given to participants after each lecture. We consider it very important to communicate with participants after seminars, so they can report how did they apply knowledges they got and results of application of these knowledges in their company and did it raise their own productivity. Another thing, it would be important to find out are barriers and obstacles they faced with in implementation of the model. It is very important to promote those models on national levels.

- **Albania suggestions – Expert PhD Vebina Resuli**

The Smart Learning model is very well designed. There are no difficulties in assimilating of the information. The process of transferring or transformation of the knowledge becomes familiar with 4.0 technologies; there are no difficulties to train the skills and to manage them properly.

3. Strategy for the future: EUSAIR industrial Policy perspective

3.1 Analysis of the Model according to Adrion and EUSAIR horizontal priorities

The challenges brought by the fourth industrial revolution and new digital era called Industry 4.0 are witnessing the new significant transformation of manufacturing industry.

EUSAIR area societies and economies are affected as well by shift to Industry 4.0, which as effects also on production, the environment, intercompany relations and human capital development. In this context the shipbuilding industry and its related supply chain in Adriatic-Ionian region (EUSAIR) is facing great challenges and changes, being undeveloped and left behind with the urgent need to new technology brush ups. The solution is to implement new technologies brought by the Industry 4.0 by encouraging sustainable and better management of Blue Economy.

To face these the FUTURE 4.0 project, which has as specific focus the Blue Economy and is included in the Adrion innovative and smart region priority which the specific objective of supporting the development of a regional innovative system for the area, innovated the companies' approach to training Smart Learning Model boosting their competitiveness of the Naval Industry, the shipbuilding and the related supply chain. The Model has been tested experimental knowledge transfers actions foreseen in five Local Pilot Actions which involved about 130 companies, mainly SMEs, operating in the shipyard and nautical logistic supply chain.

The experimental actions, along with the introduction of relevant knowledge on 4.0 technologies and the developments of related skills and competences, produced impact on the following Adrion main horizontal priorities which will drive the EUSAIR post 2020 strategy and policy:

a) Blue, Sustainable and Smart Growth

b) Innovative & Sustainable Sea Transport

c) Social Inclusion & Innovation

The impacts on the FUTURE 4.0 experimental action on these priorities and related variables are examined and explicated through three SWOT analysis. A focus is on the potential benefits,

both at short and long-terms, of the knowledge and know-how provided on 4.0 technologies on the identified priorities.

The evidences resulting from these analyses, along with the Policy Recommendations, Local Pilot Actions findings and revised professional profiles, will be at the heart of the FUTURE 4.0 Smart Learning Strategy.

3.1.1 SWOT ANALYSIS: Impacts on Blue, Sustainable and Smart Growth

Specific priorities considered: a) Sustainable development (environments); b) Air and climate change, c) Use of renewable and non-renewable resources

	Strengths	Weaknesses
Opportunities	- Consolidated experience of the companies involved (mostly SMEs) in waste and natural resources management; - Strategic geographic positions of companies involved, in most cases strongly connected with the port authority; - High sustainable and green potential of the knowledge and know-how provided on 4.0 technologies and new materials: the new technologies allow the save capital; to reduce energy waste and to recover and reuse materials; - Introduction into companies of clean technologies and circular material flows to secure economic and social stability over time; - New innovative methodologies for the proper implementation of 4.0 technologies enabling companies 'competitiveness and the development of circular economies - Integration of energy management technologies in shipyards and port's organisational culture; - Development on new sustainable business models; - Develop a new generation of naval managers and executives; - New skills for the proper management of 4.0 technologies for a naval and maritime quality environment; - The increased awareness of the relevance of sustainability issues on long business activities; - Passion for the sea; - New international investors for the development of ports;	- Resilience to technological changes linked with sustainable development and climate change - Lack of vision and long-term green and sustainable strategy by entrepreneurs - Climate agenda focus on mitigation - Cost of retrofitting - Contexts with different levels of technological progress related to the development of sustainable environments and therefore less prepared to implement circular economies - Basic digitalization is still a priority in many SMEs - High maintenance costs of green technologies - Increasing complexity of decision-making processes - Lack of experience and skills in the specific fields of renewable energies - Uncertainty about short-term benefits and profits from the use of green, clean technologies and eco-materials - Poor attitude towards waste management
Threats	- Assessment of the in-time companies' productions from a green perspective: accurate measurement of energy performance of companies operating in the naval industry, shipyard and the related supply chain thanks to technologies 4.0 - Optimization of the companies' procedures linked to fuel savings and reduction of emissions from waste recovery vehicles - Improvement of companies' efficiency: more efficient, safe and sustainable production processes and structures (Smart Yards) - New university-industry collaborations for the further development of eco-innovations; - Industry 4.0 ad hoc plans for the development of eco-sustainable and energy efficient vessels (Green Ship) and of related supply chain; - Increase of the productive coordination along the Naval industry value chain - Increase of the competitiveness of the manufacturing industry of the shipyard and nautical logistic supply chain - Development of innovative solutions for the growth of the Blue Economy (Smart Infrastructures) - Experimentation of new sustainable and eco-materials and technologies with social positive impacts; - Mobilization the interest and the commitment of local authorities and all relevant stakeholders to the vision of a sustainable Blue Economy and act to turn that vision into reality	- Insufficient long-term financing resources - Lack of long-term planning - Significant initial costs of green technologies development for SMEs may be a barrier - Tight environmental regulations - Excessive bureaucracy - Environmental protection standards - Financial crisis: other priorities - Too many competitors: broad competitive market - Evolving technologies - Climate change sceptics - Strength of maritime heritage

3.1.2 SWOT ANALYSIS: Impacts on Sea Mobility – Sustainable & Innovative Transport

Specific priorities considered: a) Transport demands; b) Energy efficiency c) Water

Strengths

- Good knowledge of the shipbuilding and nautical sector and ecosystem;
- Strategic position in the Mediterranean of the companies involved;
- Destinations with a high level of tourist attractiveness for passenger and cruise traffic in the Adriatic Ionian area;
- Involvement of ship service providers, port and logistics operators and companies operating in touristic and maritime transport sector;
- Involvement of companies specialized in the transport of raw materials and even special waste, as well as in the handling of goods and in the management of waste treatment and shredding plants
- High potential of knowledge provided supporting digitalisation and the introduction of 4.0 technologies which can significantly transform the maritime transport business, improving systems and processes and the efficiency of the whole maritime supply chain
- Sensitivity of shipyards and companies operating in the maritime transport to energy saving, reduction of emissions, proper waste-water treatment and disposal of waste, including special ones
- Companies propension to sustainable innovation
- Implementation of plans by port and logistics operators and tourist companies aimed to introduce new technologies to track goods from origin to delivery
- Implementation of integrated quality and data security management systems through the introduction of 4.0 technologies such as cloud, big data and cybersecurity

Weaknesses

- High cost of ship services
- Ships become even more complex to manage
- Too many different innovations that come together without sufficient integration and a lack of overall coordination
- Non-transparent data communication flows among port and logistics operators for the management of maritime transport
- High maintenance costs of green technologies
- Lack of experience and skills in the management of green technologies
- Hight cost of proper waste management
- Complex integration and coordination of public and private actors operating in the field of maritime transport and related logistic flows
- Difficulties in collaboration between micro enterprises and universities

Opportunities

- Maritime transport of the future: connected and autonomous transport systems
- Digitalisation and continuous progress in data flow management will enable the increasing "intelligent" interaction of ships, ports and infrastructure, greatly improving logistics flows, security and the environmental impact of maritime transport operations
- Efficiency of port services and increased competitiveness of maritime operators
- Elimination of the environmental externalities of maritime transport and achievement of the full decarbonization
- Marine Renewable Energies will play a key role while creating a potential "market" for the production of tidal and wind energy devices and technologies, helping to reduce dependence on fossil fuels.
- Optimisation of maritime traffic in the Mediterranean Sea by reducing inefficiencies and errors
- Automated navigation and cargo tracking systems and digital platforms facilitating operations, trade and data exchange
- Reducing costs facilitating also the interactions between the different actors and generally improving the efficiency of the maritime supply chain
- Increased demand by the maritime touristic sector

Threats

- Complex and extensive bureaucratic procedures
- High environmental protection standards
- Financial crisis: other priorities
- Regulatory changes and the need for common standards
- Tight security regulations and requirements for ships and ports to be respected
- Obsolete maritime infrastructures
- Tight EU privacy regulations
- Tight tax policies
- Insufficient long-term financing resources
- Covid 19: effects on the cruise business

3.1.3 SWOT ANALYSIS: Impacts on Social Inclusion & Innovation

Specific priorities considered: a) Equality between men and women b) Equal opportunities and non-discrimination c) Population and human health

	Strengths	Weaknesses
Opportunities	- FUTURE 4.0 project and experimental actions managed, coordinated and implemented mainly by women at partnership level (female academic, engineer and researchers, project and financial manager) - Despite the few female presence, the women operating within the naval and shipbuilding companies have important and strategic roles - The Model includes and valorizes both male and female external expertise on 4.0 technologies - Equal opportunities and non-discrimination character of the experimental actions on knowledge transfer on 4.0 technologies as were involved different stakeholders and companies' human resource with different profiles and tasks (inclusion and attendance of both top management and simple companies' employees) - The knowledge and know-how delivered on 4.0 technologies through the experimental actions contributed to the rethinking and reorganization of the workplaces and the warehouses of companies operating in the shipbuilding industry and related supply chain, in terms of optimazion and security - The experimental actions involved both junior companies' human resources and seniors' ones	- Maritime and Naval industry's largely male-dominated - Under-representation of women in the maritime and naval industry, as well as in the related supply chain - Digital divide: marked difference in the use of 4.0 technologies by women and men - Few females graduate in STEAM fields - Cultural barriers to the participation of women in the naval and maritime industry - Low levels of security of naval and shipyards workplaces - Strength of maritime heritage - Need to overcome cultural bias
Threats	- Growing numbers of women and young digitally skilled in the naval industry, the shipbuilding and the related supply chain ensure a smart and inclusive growth of the whole sector and naval ecosystem - Innovative and inclusive workplaces more attractive for new generations - Promotion of the access to positions of responsibility for women and young within the Naval industry as skilled on new relevant technologies for the sector - Understanding the role of women in the various value chains within the blue economy sub-sectors, can support the development and implementation of systems and policies that cushion them from exploitation and discrimination.	- Lack of effective inclusion policies - Gender stereotypes - Huge gender pay gap exists

3.2 Evidences resulting from the SWOT Analyses

Referring to the first Swot Analysis related to the ***impacts on Blue, sustainable and smart growth***, among strong points there are some that are very consistent with the Programme priorities and with the overall framework of the European Green Deal. In particular, the high sustainable and green potential of the knowledge and the know-how provided on 4.0 technologies and new materials has been indicated as useful in saving capital, reducing energy waste and recovering and reusing materials. Consequently, another strong point is the development of new sustainable business models which enable companies' competitivity, as the realisation of the Local Action Plan has shown.

On the other hand, among weaknesses the lack of vision and of long-term green and sustainable strategy by entrepreneurs may create uncertainty about benefits and profits from the use of green, clean technologies and eco materials. On the side of opportunities, it was brough out the development of innovative solutions - or smart infrastructures - for the growth of the Blue economy.

This may increase the productive coordination along the naval industry value chain, as requested by companies during the project.

Finally, among threats the problem of financing resources was underlined, with a link to excessive bureaucracy and tight environmental regulations.

With reference to second Swot Analysis related to the ***impacts on sea mobility and sustainable & innovative transport***, among the strong points, the high potential of knowledge provided supporting digitalisation to transform the maritime transport business was seen as a way to improve systems and processes and the efficiency of the whole supply chain. Besides that, this is consistent with INTERREG - ADRION priorities.

Moreover, the Adriatic - Ionian area is considered to have a strategic position, with lots of destinations with a high level of tourist attractiveness for passenger and cruise traffic. On the other hand, weak points are considered the high costs of ship services and the complex integration and coordination of public and private actors operating in the field of maritime logistic. Networking in the supply chain could be a way to overcome this, as pointed out by companies during the project. As for opportunities, the most positive issue is that digitalisation and continuous progress in data flow management will enable the smart interaction of ships, ports

and infrastructure, greatly improving logistic flows, security and the environmental impact of naval transport operations.
Finally, as far as threats are regarded, the complex and extensive bourocratic procedures, along with regulatory changes and the need for common standards are esteemed to slow down the development of the naval industry.

The third and last Swot Analysis is about ***the impacts on social inclusion & innovation***, which are cross-cutting issues for all productive sectors and as well for all EU-funded Programmes. Strong points include the fact that, despite the scarce female presence in the shipbuilding sector, women have important and strategic roles within companies.
Besides that, Future 4.0 experimental actions on knowledge transfer on 4.0 technologies had a character based on equal opportunities and non - discrimination. On the other hand, the maritime and naval industry is still largely male - dominated and women are underrepresented also because of the few female graduates in STEAM fields.
Referring to opportunities, among project's findings, is important the understanding of the role of women in the various value chains within the Blue economy sectors; this can support the development and implementation of systems that avoid exploitation and discrimination.
As for threats, gender stereotypes and huge pay and career gaps are the most relevant negative points for the maritime industry.

3.3 The Albanian contribution: a deep analysis for the alignment with Industry 4.0 innovation paths

3.3.1 SWOT ANALYSIS of Albanian Maritime System in the context of INDUSTRY 4.0 and EUSAIR STRATEGY

In order to have an understanding of problematics of system relating green shipping and marine protection environment a SWOT Analysis is carried out.

In this SWOT analysis the terms green shipping and marine environment protection is seen mainly related to the following issues:

- Intermediaries and Public Authorities relating to maritime sector
- Human capacities of Albanian Maritime SME-s
- Innovation and technological level of Albanian Maritime SME-s
- Financial resource and access to finance of Albanian Maritime SME-s.
- Collaboration of Albanian Maritime SME-s with scientific institution
- Approach of Albanian Maritime SME-s toward the use of renewable energy
- Legislative aspects
- Intellectual properties rights

The main findings carried out through questionnaires, one to one meeting, desktop analysis are presented on Table 1.

Table 1 SWOT ANALYSIS

Note: BE – Business Entity; SI – Supporting Institution; SCI – Scientific Institution; HEI- Higher education Institutions; BG – Blue Growth

STRENGHTS	***WEAKNESSES***
• The favourable geographic position of Albania. • Beginning of showing interest from BEs, for exploiting potentials offered by blue economy. • Accelerations of the developments of maritime tourism sector and the removal from several years of moratorium for the use of the leisure boats.	• Lack of a strong tradition and maritime culture in Albania. • Lack of infrastructure and logistics at the required levels for maritime training and education according to international requirements and trends. • Albanian Maritime Institutions are not yet institutions at the required level of international competitiveness.

• The existence of HEIs, which offers from a long-time education in maritime operations and maritime engineering • The existence of maritime training centers (mainly related to SCTW Standards of Training, Certification and Watch keeping for Seafarers) • HEIs have collaborations with other maritime EU and non-EU HEI.	• Albanian maritime legislation is not at all aspects in coherence with the international *requirements*. • HEIs and SCIs have not the required infrastructure and logistics for innovations and research in maritime field in coherence with international developments and trends. • Unfavourable approach of collaboration between BEs; HEI; SCIs in Albania. • Albanian HEIs and SCIs oriented mostly toward basic research than applied research in maritime sector. • BEs, in Albania, have lack of trust in (national) HEIs and SCIs and perceive cooperation with HEIs and SCIs as complex. • BEs have insufficient capacities (human, technological, financial and infrastructural) favourable toward innovations. • No patent applications from BEs HEIs and SCIs • BE haven't participated in any BG related projects in past 5 years • Inappropriate access to funding resources for research and development from BEs • BEs aren't familiar with legislation and acts related to BG sector. • BEs are not familiar with the use of renewable energy source (advantage, disadvantages and challenges) and their actual trend of use in maritime industry. • BEs are not familiar with intellectual properties rights. • Albanian Intermediaries organizations have not the necessary human capacity to deal with maritime aspects in general and aspects related to green shipping in particular.
• Albanian geographic position favourable toward the development of maritime activities (management, engineering, construction, fishing, maritime logistics, etc.) and BG sector	• The high level of competitiveness of the Maritime Sector which is leaded by international rules and standards. • Institutional bureaucracies • Absence of collaboration between BEs

• Increased regional development of tourism can affect positively all the chain of nautical tourism (boatbuilding, marina, safety, eco-friendly technologies) • General international pressure toward climate change and reduction of CO2 emissions from shipping can affect positively the Albanian national policies, • strategies and funding for innovations and development of maritime activities. • Involvement of Albanian HEIs and SCIs in international research projects (Horizon, etc.), initially as beneficiary, can affect positively the general situation toward innovations and research and transfer technology in BG sector. • The diversity of maritime industry and macro-economic trend can improve the perception of innovation climate and collaboration between actors (BEs; SCIs; SI) in BG sector in Albania.	and HEIs and SCIs in such dynamic and competitiveness sector as maritime sector. • Decrease motivation of HEIs and SCIs for research and innovation due to insufficient financial and infrastructure capacities for research in maritime field in Albania. • Idleness of all actors (BE; HEIs; SCIs; SI) in Albania to be adapted toward new regional and global macro trends and developments in maritime sectors. • The fragility of Albanian Maritime sector can be affected by national, regional, global socio-political and macro-economic developments. • Deficiency of capacities (human, technological, financial) of Albanian BEs is a permanent threat for BG development in general and green shipping in particular in Albania.
OPPORTUNITIES	***THREATS***

From the SWOT analysis of the Albanian Maritime System in the context of green shipping and marine environment protection the following conclusions are developed.

Conclusions 1

Albanian Maritime System has not many strong points, but the system has the ground base for its sustainable development.

Recommendation N 1. A strong collaboration between all actors and stakeholders (national and local authorities, public authorities, intermediaries, business entity, higher education, and scientific institutions, etc.) within the mechanical and naval sector is needed.

Recommendation N 2. National and local public authorities must take their own responsibility of coordination of collaboration between actors to guaranty the synergy of collaboration between all actors.

Recommendation N 3. A national strategy of development of Albanian maritime system taking also in consideration the context of green shipping is needed.

Conclusion N 2. The system presents weakness mainly related to:

1. Infrastructure and logistics
2. legislative aspects within the maritime system
3. insufficient capacities (human, technological, financial and infrastructural) of business entities in order to face international competitiveness and sector developments, especially those related to green shipping developments worldwide.
4. business entities are not familiar with the use of renewable energy source (advantage, disadvantages and challenges) and their actual trend of use in maritime industry.
5. business entities are not familiar with intellectual properties rights.
6. Business entities are not aware of European and Albanian funding opportunities and requirements to apply for funds.

Recommendation N 1. National and Albanian Public authorities must undertake concrete action in order to update Albanian Maritime framework, in coherence with the latest development in general and green shipping in particular. (for example, we must start thinking for the development of new Albanian Maritime Code, or we must start thinking of the latest IMO requirements relating to green shipping specially those related to ANEX 6 of MARPOL)

Recommendation N 2. Improvement of coordination with Albanian national institutions, local and public authorities in charge for creation of business enabling environment of maritime sector, is needed

Recommendation N 3. Albanian Maritime Institution, National and Local Authorities must start thinking to provide the adequate human and institutional infrastructure able to response on needs of private sector

Recommendation N 4. Training of human resources of intermediary organizations in order to be able to address the needs of Albanian Maritime Business entity and to assist them in applying for domestic and EU funds.

Recommendation N 5. Increasing awareness relating entrepreneurship and IP related concepts from early age, by involving these topics in educational programmes.

Recommendation N 6. National and local public authorities in collaboration with intermediary's organisation must promote the best international practices relating green shipping emphasizing both environmental and financial aspects.

Conclusion N3. The system presents some opportunity which can affect positively the development of Albanian maritime system

Recommendation Nr 1. A strategy of development of ALBANIAN MARITIME system is needed in order to predict the scenario of development based on best practice worldwide, impact of scenarios on territory and the probability of occurring.

Recommendation Nr 2. A close collaboration of all actors, intermediaries, SME-s, local and national authorities, higher education institutions.

Recommendation Nr 3. The strategy must include also the approach to finance, innovation, intellectual properties rights and an eco-friendly Albanian Maritime System.

Conclusion N 4. The System represents threats which are conditioned by factors such as high competitiveness of sector, deficiency of resources (human, financial, logistic), insufficient level of collaboration between all actors in territory and institutional bureaucracies.

Recommendation Nr 1. A strong collaboration between all actors and stakeholders (national and local authorities, public authorities, intermediaries, business entity, higher education and scientific institutions, etc.) within the sector is needed, in order to find the right path to increase the resources (human, financial, logistic) to respond the high competitiveness of sector worldwide and decrease institutional bureaucracies.

3.3.2 EUSAIR ACTION PLAN: Trends & Megatrends

The EUSAIR Action Plan is based on the following main pillars.

1. Blue Growth
2. Connecting the Region
3. Environmental Quality
4. Sustainable Tourism

For each pillars a set of sub-pillars are presented in EUSAIR Action Plan.

In Figure 1. is a schematic representation of pillars and sub – pillars as presented in EUSAIR Strategy.

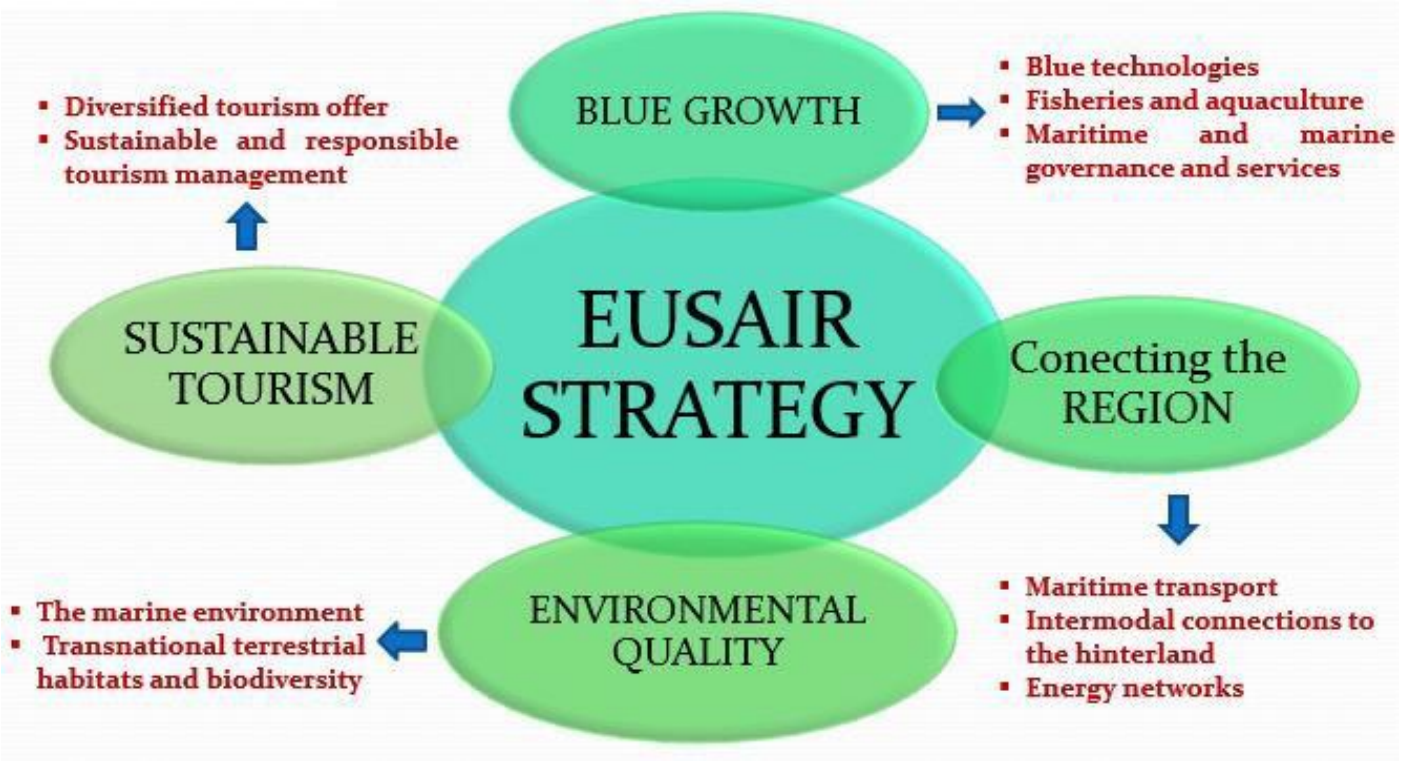

Figure 1. Pillars and sub pillars as presented in EUSAIR ACTION PLAN

Trends megatrends and trends for the green sea mobility sector are identified based on the following sectors and subsectors:

SECTORS	SUB-SECTORS
Energy	• Innovative power storage systems; • Solar energy mobility; • Ships' internal transmission systems; • Reduction of harmful emissions for new and existing ships (according to IMO regulations).

Logistic	• Maritime freights and passengers' transport; • Fluvial freights and passengers' transport • In-land transport networks; • Harbour infrastructures and operations; • Traceability of sailing routes (maritime and fluvial); • Operation of terminal facilities; • Harbour storage facilities.
Safety	• Protection of coastal areas from pollution (on-board • production scraps and fuel spilling); • Harbour security systems; • Salvage activities; • Lighthouse activities.
Environmental- friendly technologies	• Renewable energy storage units; • Construction materials (hull, machinery, equipment); • Design and Construction methods and procedures; • Components' restoration procedures; • Computer hardware or software for on-board diagnosis.

Based on trends and megatrends of INDUSTRY 4.0 in maritime industry some scenarios are proposed.

SCENARIOS			
T1 – Energy	**T2 - Logistics**	**T3- Safety**	**T4- Environmental-friendly technology**
development of eco-friendly energy sources	development of new transport routes	improve maritime security	development and use of eco-friendly energy sources for new technologies
increased energy consumption	coordination of sea traffic with road- and train transport	safe maritime ecosystem	reduction of emissions
sustainable and efficient blue growth		development of digitalized infrastructure	increased attention towards blue growth
			review of energy policies

Among many trends and megatrends and the respective scenarios, scenarios presented in the above table seems to have high certainty of verification and high impact on ADRION Area, so these scenarios must be integrated in Albanian National and Local strategy of Maritime transport sector together with respective legislative reform, approach to finance and training of human capacity of intermediaries' organisation and public national and local administration.

Technology and innovation paths for Blue Growth and the green sea mobility sector has identified the following innovation path in the ADRION area:

1. Shore-side solar power for ships;
2. Offshore wind energy supply to ports;
3. Coordination and optimization of waterborne traffic with train- and road transport;
4. Development of new transport routes;
5. Flood protection due climate change & safety of fresh water sources;
6. ICT development to autonomous ships;
7. Shipbuilding towards a circular economy;
8. Eco-friendly technologies for sea mobility.

In table 1 are presented the 8 ADRION innovation path and the possible match with EUSAIR Action plan.

Table 1. ADRION INOVATION PATH and matching with EUSAIR Action Plan.

	ADRION Innovation Path		POSSIBLE MATCHES WITH EUSAIR	
N.	**PATHS**	**TECHNOLOGIES**	**PILLARS**	**TOPICS**
1	Shore-side solar power for ships	• Electrical infrastructure and sub-structures • Solar energy production and extended lifecycle • Innovative power storage systems	• Connecting region • Blue growth	• Energy networks • Maritime Services and Marine Governance
2	Offshore wind energy supply to ports	• Electrical infrastructure and sub-structures • Wind power plant infrastructure and sub-structures • Turbines (new blade designs, new protection techniques, rotors, power trains, new gearing technology) • Automated assembly and monitoring systems	• Connecting region • Blue growth	• Energy networks • Maritime Services and Marine Governance
3	Coordination and optimization of waterborne traffic with train and road transport	• Traceability of sailing • routes (maritime and fluvial) • Optimization of waterborne transport and coordination with train- and road transport • Development of new transport routes	• Connecting region • Sustainable tourism • Blue growth	• Maritime transport • Intermodal connections to the hinterland • Sustainable and responsible tourism management • Maritime Services and Marine Governance
4	Development of new transport routes	• New sea transport routes • New fluvial transport routes	• Connecting region • Blue growth	• Maritime transport • Intermodal connections to the hinterland • Maritime Services and Marine Governance

5	Flood protection due to climate changes & safety of fresh water sources	• Surveillance systems • Automated security systems to start acting when sea level or flood level raise • Connecting areas and nearby ports to mega-corridor • New materials and new desalination technologies (also part for circular economy – for sea water to fresh water)	• Environmental quality • Blue growth	• Marine environment • Pollution of the sea • Blue technologies • Maritime Services and Marine Governance
6	ICT development to autonomous ships	• Development of digitalized infrastructure and connecting of sea operators to digital mega-corridor	• Blue growth • Connecting region	• Blue technologies • Maritime Services and Marine Governance • Maritime transport
7	Shipbuilding towards circular economy	• Fiberglass recycling	• Blue growth	Blue technologies
8	Eco-friendly technologies for sea mobility	• Maritime biotechnology (medicines, industrial enzymes) • Aquaculture • Renewable energy (wind, waves, tide) • Coastal & maritime tourism • Seabed mining • Plastic and waste collecting floating devices	• Blue growth • Connecting region • Sustainable tourism	• Blue technologies • Energy Networks • Maritime Transports • Sustainable and responsible tourism management

3.3.3 The Albanian National strategy and possible alignment with INDUSTRY 4.0 innovation paths

The Albanian National Sectorial Strategy of transport for 2016-2020 has its main goal to have an efficient transport system, integrated in the region and in the EU network, which promotes economic development and upgrades the citizens' quality of life and the overall objectives of this strategy aims to: further develop Albania's national transport system, and in addition to significantly improve its sustainability, interconnectivity, interoperability and integration with the international and European wider transport system and region.
The action plan of Albanian National Sectorial Strategy of transport for 2016-2020 identifies the following main strategic priorities (SP).

- SP1. Increase the transport sector governance to provide better transport services to citizens and businesses alike;
- SP2. Develop and implement measures to improving the utilisation rate of transport infrastructure by removal of physical and non-physical bottlenecks and unnecessary technical cross border barriers;
- SP3. Ensure harmonisation with the EU transport regulatory framework for creating common market conditions and safety standards at national level and within the neighbouring region;
- SP4. Develop co-modal solutions by optimisation of individual transport modes and focus on energy- efficient and environmentally friendly transport modes;
- SP5. Introduce measures for reducing energy consumption and costs per unit of transport service;
- SP6. Put forward measures to improve the ratio of railway and waterborne transport, foster liberalisation of railway services and open the rail transport market to competition;
- SP7. Enhance aviation transport activities and air traffic cooperation in the region and implement the JSPA initiative to facilitate air transport (strongest air carriers taking advantage of using Tirana airport as a regional hub for air transport in South East Europe); and
- SP8. Increase the use of Intelligent Transport Systems in the transport sector.

Regarding the maritime sector the Albanian National Sectorial Strategy of transport for 2016-2020 identifies the following main strategic objectives:

1. Improvement of technical capacities of maritime administration and the institutions involved;
2. The development of maritime legislation to achieve EU standards;
3. Development of port infrastructure.

3.4 Strategy for the future

The Project Future 4.0 has achieved three main results:

1. The business results that have been gained by companies through the transfer of new knowledge. These results are measurable in terms of innovation, efficiency, time and cost reduction, skills development, new managerial and operational processes.
2. The creation and development of links, partnerships and connections among companies, universities, public administrations and training centres. Sometimes the relationships were already existing and were renewed and strengthened; sometimes instead they were completely new, some of which were probably unexpected and surprising.
3. The results in terms of sustainability for the impacts on sea mobility, water and energy efficiency.

The strategy of the future can only be developed along two paths that are intertwined like the spirals of the DNA and although distinct, are connected to each other.

Therefore, on the one hand, it will be necessary to continue to work to promote and encourage the transfer of new knowledge in companies by universities and centers of excellence.
The Project has shown that for many SMEs it will be necessary to continue support them in order to follow a path that starts from the search of new knowledge providers, to reach high levels of efficiency obtained by new technologies to end with the change of the entire business models. It is a change towards a social use of key enable technologies for Industry 4.0 and Digital Transformation, where social has the character of environmental sustainability, inclusion, and attention to diversity.

This commitment is relevant because many SMEs are still in the early stages of change and interrupting or only slowing down these processes puts the very survival of businesses at risk.
Preventing this danger and increasing competitiveness are essential conditions to avoid an impoverishment not only of the economic but also of the social and skills fabric. In fact, some knowledge, competences and skills in the nautical and shipyard sector that were once rooted in the territories are becoming rare and may even be at risk of extinction.

On the other hand, it is necessary to strengthen the relational capital that has been developed during the whole life cycle of the project Future 4.0.

Networks have been developed in the Regions, but they need to be fed and enriched in order to avoid entropy processes. For these reasons it is appropriate to design and develop targeted projects aimed at intensifying the density of exchanges, interactions and integrations.

The creation of local ecosystems has started: the next goal in the medium term could be to create a strong Adriatic network of ecosystems that have the capacity to attract an increasing number of ideas, companies and capital.
In this regard, the development of a hub specialised in the nurturing of new ideas and the launch of innovative projects dedicated to the sea and to the people working in and for the sea, can be the Adriatic meeting virtual and physical place for innovation through the contribution of local ecosystems, universities, start-ups, research centers, entrepreneurs, SMEs and large companies. The hub may have the aims to explore new ideas about future trends, to create prototypes based on such ideas and projects, and to promote labs that promote social innovations.

This document has been produced with the financial assistance of the European Union. The content of the document is the sole responsibility of Confindustria Veneto SIAV S.p.A. and can under no circumstances be regarded as reflecting the position of the European Union and/or ADRION programme authorities.