Interreg ADRION ADRIATIC-IONIAN

EUROPEAN UNION

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

FUTURE 4.0

Local Pilot Action Implementation

DELIVERABLE D.T3.2.1

WP4 T3, ACTIVITY A.T3.2

Final Version

December/2020

Project number and acronym	294 – FUTURE 4.0
Lead partner	Veneto Region
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Date, Venue	December 2020, Venice
Delivery Date	02/12/2020

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	Local Pilot Actions Implementation
Deliverable Number	T3.2.1
Deliverable Title	Local Pilot Action Implementation
Dissemination level	~~Public~~ / Restricted / ~~Confidential~~
Main author	PP2, Confindustria Veneto SIAV S.p.A.
Contributors	Future 4.0 Partners
Quality Assurance	LP, SIAV

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As resulting from the "***2019 World Manufacturing Forum Report: Skills for the Future of Manufacturing***"[1], the **skills gap phenomenon** is one of the most pressing issues faced by the industry today, reinforcing the **need for industries to evolve in light of new technologies** brought upon by rapid digitalisation in manufacturing. In addition, the disconnect between institutions and companies, the lack of efficient training programmes and societal megatrends, such as ageing workers, compound the complexity of tackling the skills challenge, increasing the need for more creative solutions.

It is without doubt that manufacturing is in a time of great change and technological advancement. The so-called Fourth Industrial Revolution is moving manufacturing forward through technologies such as the Industrial Internet of Things (IIoT), Robotics, Automation, Artificial Intelligence (AI), Virtual and Augmented Reality among others.

These new technologies are helping to advance manufacturing to unprecedented levels, allowing for highly technical, elaborate, and quality manufactured products and processes. However, the disruption caused by new technology calls for new, innovative solutions that result in a change to the skills and competencies that are required by manufacturers. Increasingly intelligent and technical machines and computers that are necessary to engage in the new era of manufacturing will require employees to understand and operate on an equally intelligent level.

The **skills necessary** to excel in this new environment **are rapidly switching from manual to cognitive based skill** sets to manage intelligence systems such as robotics, AI, and advanced manufacturing.

To adapt to these changing trends, companies need to have a new mindset for building the future workforce and collaborating with educational institutions, industry associations and universities as knowledge providers[2].

[1] 2019 World Manufacturing Forum Report, Skills for the Future of Manufacturing
[2] 2019 World Manufacturing Forum Report, Skills for the Future of Manufacturing, pp.10,11, 23

In addition, at the light of the fast-changing pace of technology, **life-long learning** needs to be highlighted within the manufacturing community as it is crucial to close the gap for Industry 4.0. With the increasing complexity of manufacturing systems, connectivity, exploding number of integrated sensors, etc. the skill level and required depth of knowledge about system integration is and will be changing rapidly. In order for workers to stay relevant in the future, they must be able to adapt to rapidly changing technologies while modifying and adding to their technical knowledge with regard to future innovation.

Among the **top ten WMF's skills** that are projected to be essential and required to be successful in the future, seven of them are particularly relevant to stay competitive and face the challenges represented by 4.0 technologies:

1. **Digital literacy** as a holistic skill to interact with, understand, enable and even develop new digital manufacturing systems, technologies, applications, tools and innovative solutions;
2. **Ability to use and design new AI and data analytics solutions** while critically interpreting results;
3. **Creative problem solving** in times of abundant data and technological opportunities in smart manufacturing systems. With the ability to not only automate physical processes that are dangerous, strenuous and repetitive, but also increasingly automate cognitive tasks, the human operators' focus and value will shift more towards tasks that cannot easily be automated as solving complex problems;
4. **A strong entrepreneurial mindset** including proactiveness and the ability to think outside the box;
5. **Cybersecurity, privacy, and data information mindfulness** to reflect the rapidly increasing digital of the manufacturing value chain;
6. Effective **communication skills** with humans, IT, and AI systems through different platforms and technologies. IIoT platforms and other technologies enable real-time communication and exchange of data. However, the ability to break down a complex problem and explain it to others is a key skill, as workers will change jobs frequently making fast and effective knowledge transfer is more important than ever;
7. **Open-mindedness towards constant change**, and transformation skills that constantly

question the status quo and initiate the knowledge transfer from other domains[3].

Therefore, the knowledge transfer and the acquisition of the right skills and expertise are crucial for SMEs and workers to make productive use of new technologies taking advances of new opportunities for value creation. At this purpose **expert skilling** is necessary to go in depth and capitalise on these specific technologies. Such technical skills are often non-transferable and require vocational or on-the-job training.

According to WMF 2019, a key role is played by **Learning Factories which act ad knowledge transfer platforms between Industry, Education and Research**. Often developed in collaboration with local businesses, universities and municipalities, they make new technologies accessible to a broad audience to facilitate the dissemination of digital skills through peer-to-peer and project-based learning activities such as programming, prototyping and others. These platforms result highly beneficial for companies as they can access state-of-art academic knowledge and facilities to identify and develop new solutions which they can integrate in their own facilities.

Industry-university collaboration is a **powerful mechanism** as it creates benefits in advancing industrial practice and generating new knowledge for both parties: by one side the students gain access to real industrial challenges and hands-on experience while solving real-world problems under the guidance of industry experts; by other side manufacturing companies can actively engage in delivering education through project-based learning and collaborative research projects.

The diverse challenges, regarding gaps and shortages of workforce skills and competences in the different industrial sectors are identified and pointed out also by the ***Committee of the 8th Conference on Learning Factories 2018 – Advanced Engineering Education & Training for Manufacturing Innovation[4].***

[3] 2019 World Manufacturing Forum Report, Skills for the Future of Manufacturing, pp.32-34
[4] Mavrikios, G., Georgoulias K, Chryssolouris G. (2018). The Teaching Factory Paradigm: Development and Outlook. Procedia CIRP, Keynote paper of the 8th Conference on Learning Factories 2018 – Advanced Engineering Education & Training for Manufacturing Innovation

The employment pattern in the manufacturing industry is changing towards more knowledge- and skills- intensive jobs. However, a lack of available personnel, having the requested skills, especially **digital skills**, have been identified in the manufacturing sector. Quality and availability of skilled workforce and its ability to lead innovation constitute the most important factor for manufacturing competitiveness. The accelerated technological evolution is creating a dynamic environment regarding the future skills and competencies. Additionally, the manufacturing sector is entering in a new era, where novel **life-long learning** schemes need to keep up with the rapid advances in production related technologies, tools and techniques.

Novel and innovative knowledge delivery mechanism, utilizing modern technology-enabled (e.g., ICT, high-grade industrial didactic equipment etc.), real-life and life-long learning "environments" for building competence and boosting product and process innovation, **have to be employed.**

The current transformation of research results into new products and processes is inadequate. **Modern concepts of training, industrial learning and knowledge transfer** schemes **can contribute to improving the innovation performance of European manufacturing.**

These new approaches are required in order to i) modernise the teaching process and bring it closer to the dynamic industrial practice, ii) leverage industrial practice through new knowledge, iii) support the transition from the manual to the future knowledge workers and shorten the gap between resource-based manufacturing and knowledge-based manufacturing (information and knowledge) and iv) establish and maintain a steady industrial growth.

The Teaching Factory Paradigm**,** developed by Prof. George Chryssolouris and Director of the *Laboratory for Manufacturing Systems and Automation (LMS), Dept. of Mechanical Engineering and Aeronautics – University of Patras,* is an **effective and innovative knowledge delivery mechanism** introducing **a paradigm shift to the manufacturing education**. The Teaching Factory approach aims at an adaptable and much broader use of novel learning methods for the introduction of young engineers to a wide spectrum of manufacturing problems.

At conceptual level, the Teaching Factory paradigm is **based on the knowledge triangle notion**. Its aim is to effectively **integrate education, research and innovation activities** into a single initiative, involving industry and academia. To that effect, the proposed Teaching Factory paradigm focuses on **integrating industry and academia, through novel adaptations with the teaching / training curricula, achieved by the deployment of ICT-based delivery mechanisms.** [5]

The Teaching Factory follows a two-way **knowledge transfer channel**, where manufacturing topics are the basis for new synergy models between academia and industry (Fig. 1).

The technological topics are independent of the Teaching Factory's operation and can be updated in order to provide the necessary knowledge foundation for the necessities of manufacturing at any given time. The knowledge transfer channels are used for the exchange of novel ideas and solutions, balancing the time and cost required for learning and testing such solutions and deepening the knowledge of both industry and academia, through production innovation or real-life problems. This two-way knowledge transfer channel includes **the "lab-to-factory" operation mode[6].**

[5] Chryssolouris G., Mavrikios G., Rentzos L., (2014). On a new educational paradigm for manufacturing: The Teaching Factory Paradigm
[6] Mavrikios, G., Georgoulias K, Chryssolouris G. (2018). The Teaching Factory Paradigm: Development and Outlook. Procedia CIRP, Keynote paper of the 8th Conference on Learning Factories 2018 – Advanced Engineering Education & Training for Manufacturing Innovation, pp. 5-6

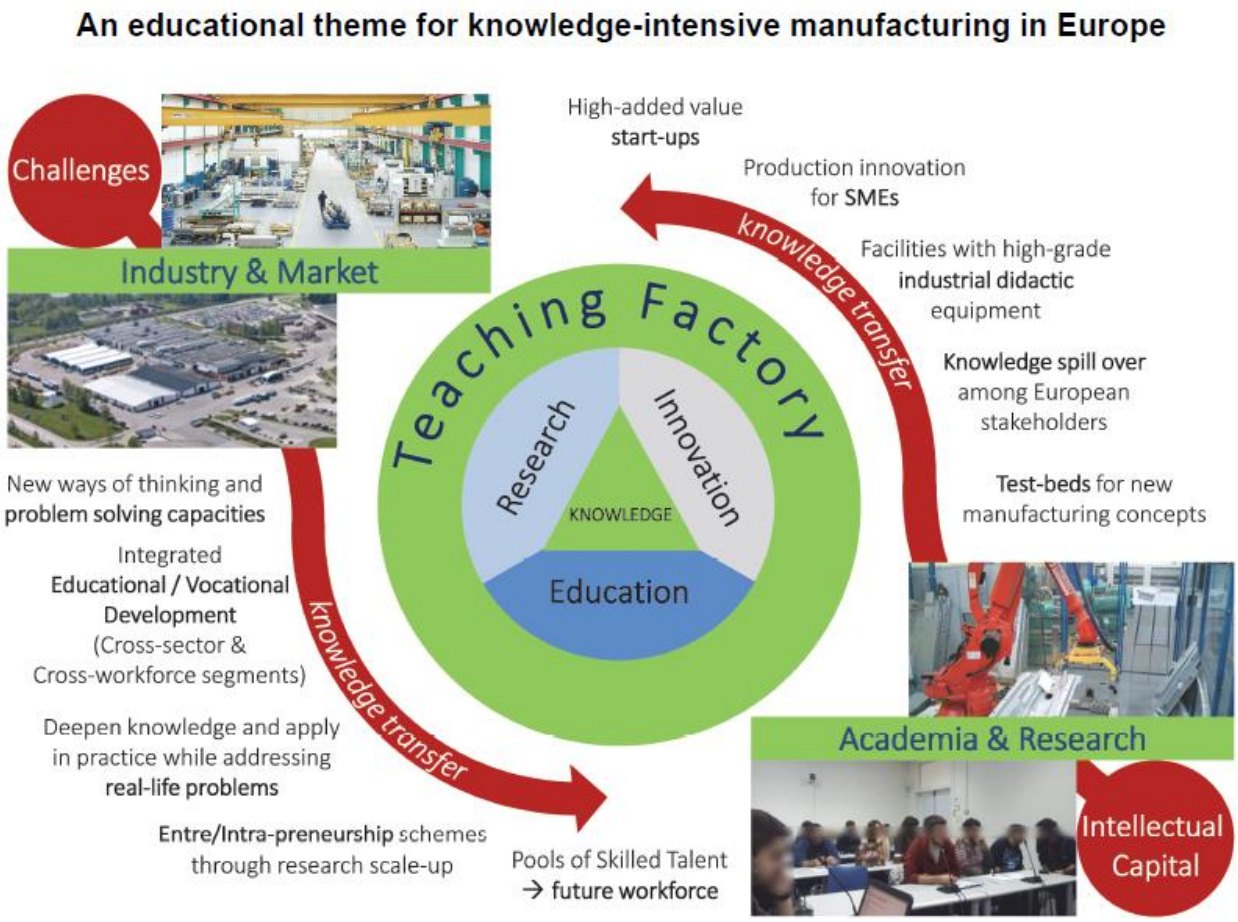


Figure 1: The Teaching Factory Paradigm
(Source: Lab. for Manufacturing Systems and Automation, Director Prof. G. Chryssolouris University of Patras – Greece)

The “lab-to-factory” operation mode aims to transfer the knowledge from academia to industry. Industrial-grade or didactic equipment installed into the academic facilities can be used as test-beds and demonstrators for new technological concepts to be validated by experts and researchers.

The technology and knowledge can be transmitted back to industry for introducing an engineering or management team to the new concept or solution. This mode can also be used for **training and re-training operators on new manufacturing technologies and concepts**. There are numerous manufacturing concepts that might be too costly and time consuming to be initially tested on their actual production. The Teaching Factory can be therefore a useful

facility for the validation of such concepts, while **bridging the gap between innovation and education**.

In the "lab-to-factory" operation mode, **interactive training sessions aim at knowledge transfer from academic to and industrial environment**, e.g., advances in flexible robotic cells and the way they could be applied to real-life problems of a company producing automation and control equipment. Delivery mechanisms comprise live videos and audio interactions, real-time presentations and demonstrators, through advanced ICT configurations.

The crucial and fundamental need to invest in research, to produce new knowledge and to turn the acquired knowledge into innovation is pointed out also by the ***"Lab-Fab-App report – Investing in the future we want"***, report of the independent high-level group on maximizing the impact of EU research and innovation programmes towards 2030[7].
In a rapidly globalising world, **the success depends on the production and conversion of knowledge into innovation**.
Unfortunately, as emerged by the report, the Europe has comparative advantage in producing knowledge but at the same time is not able in turning that knowledge into innovation and growth.

"*Europe is a global scientific powerhouse. But compared to other major economies, Europe suffers from a slow growth due to its* ***innovation deficit****.* ***Europe does not capitalise enough on the knowledge it has and produces****. Europe's challenge and ambition are straightforward: step up investment in its knowledge assets and* ***turn the high volume and quality of its science and research results faster and deeper into innovations*** *which generate value for economy and society.* ***Transform knowledge into economic and societal innovation****. Europe must embrace the transformative power of open science, allowing for a* ***faster circulation of increasing amounts of knowledge, and seize the potential of open innovation to trigger faster and fairer growth,*** *building a knowledge economy that is open to the world. The rich diversity of the EU and its Member States is a strength, but it also makes the articulation of common European research and innovation (R&I) strategies and projects*

[7] "Lab-Fab-App report – Investing in the future we want", European Commission, July 2017

more complex. This is nothing new, but the rate of technological and economic change and the urgency of global challenges continue to outpace Europe's response and reforms. It is imperative for Europe to act, to act now and to act decisively. ***Universities need to modernise; industry and start-ups need to work more intensively with academia; the key innovators need to get support to succeed; society at large needs to be an integral R&I actor****. Research and innovation matter for our future. Especially for advanced economies like Europe's,* ***science and innovation*** *– and education – are what make the difference in* ***enhancing productivity and boosting competitiveness.***

Science and innovation are also key to preserving the values of enlightenment and democracy and to tackling the societal ***challenges*** *of our time: building a digitally****-smart, low-carbon, energy-efficient and circular economy*** *that offers rewarding work and brings good quality of life for all in liveable cities and countryside; ensuring a* ***safe climate****, building a fair society; keeping our oceans clean and productive. Investing in research, innovation and education is an economic necessity, a social obligation as well as a political opportunity for a shared project that makes Europe a pole of attraction in an increasingly connected world*". [8]

The transformed knowledge has an **important impact on society** "*We need to get rid of the notion that research and innovation is not relevant to society. To shape our future together, we need to imagine, invent and create. We need* ***research*** *("Labs"),* ***innovation*** *(competitive fabrication ("Fabs") and* ***applications*** *for the benefit of all ("Apps"). Our society should increasingly become* ***a living laboratory for innovative solutions*** *to the many challenges we face in Europe – be they economic, environmental or social. Through broad-based,* ***impact-focused research and innovation policy and investments****,* ***we can turn these challenges into innovation opportunities****. This requires action and participation by all actors: companies, universities, research institutes, non-governmental organisations and all others engaged in research and innovation*." [9]

As confirmation of the key relevance of this paradigm and of the tight relation and connection Industry, Education and Research the **2019 OECD report "University-Industry Collaboration:**

[8] Ibidem, pp. 5-9
[9] Ibidem

New evidence and policy options"[10] which analyses the impacts of science-industry knowledge transfer on innovation and the various formal and informal channels of knowledge exchange.

According to the OECD report the increasing importance of **knowledge-based capital**, both for competitiveness and to address socio-economic challenges, benefits those countries with strong public research and the ability to effectively use research findings to innovate. It therefore becomes ever more important to understand how public investments in research can generate the greatest impacts on innovation.

Assessing the impact of public research on innovation is a complex task: science-industry knowledge transfer unfolds through various formal and informal channels, the relative importance of which varies across science fields and industry sectors. Formal channels include collaborative and contract research, academic consultancy, intellectual property transactions, labour mobility and academic spin offs. Informal ones of interaction include conferencing and networking, facility, sharing, and continuing education provided by universities to enterprises to few. Therefore, given such diverse channels and the differences in knowledge transfer across economic sector and research disciplines, assessing the impact of **science-industry knowledge transfer on innovation** to reach specific socio-economic objectives is challenging. Additional methodological challenges arise, including accounting for factors shaping knowledge exchange such as the industry context and, most importantly, establishing causality relations.

There are new emerging evidences on various **formal and informal** channels of knowledge exchange, including jointly field patents of higher education institutions (HEIs) and public research institutes (PRIs) with industry; the impact of local innovation of proximity to HEIs and PRIs; student and researcher start-ups. The evidence presented shows that HEIs and PRIs increasingly engage in "**knowledge co-creation**" with industry. **Academic spin-off activities** are another way for research to contribute in important ways to innovation. In addition, exploration of the causal implications of public research institutions for innovation, based on the geographic location of HEIs and PRIs, points to a positive impact on local industry patenting.

[10] OECD (2019), University-Industry Collaboration: New Evidence and Policy Options, OECD Publishing

With regard to **policy instruments to support knowledge transfer,** the emerging policy approaches to knowledge transfer include support for science-industry knowledge co-creation (i.e. the joint creation of knowledge by industry, civil society and research by means of joint labs, joint research projects, etc.); the creation of intermediary organisations that help match supply and demand for new technologies (e.g. R&D centres for science-industry collaboration, business incubators etc.), the use of **new forms of open digital innovation enabled by digital platforms**; and the development of new programmes to support spin-offs (i.e. the **FUTURE 4.0 platform**).

When governments add **new policy instruments for knowledge co-creation, digital innovation, and academic spin-offs**, the impacts of these instruments depend not only on their own features (which vary across countries) but also on the other policies in place. Different policy instruments may reinforce and complement each other when implemented simultaneously, but could also result in contradictions (if one decreases the effectiveness of others) and excessive complexity.
The effectiveness of combining instruments–the policy mix for knowledge transfer–also depends on the governance of public research, which is to say the institutional arrangements that govern policy action regarding publicly funded research in universities and PRIs)[11].

The report provides evidence of key governance practices that shape science-industry knowledge transfer. These include the increasing autonomy of universities and PRIs, which allows them to deploy their own support programmes for knowledge transfer; increasing engagement on the part of the business sector and civil society in university boards and research and innovation councils; and the increasing reliance on performance-based funding mechanisms that reward universities and PRIs for their engagement with industry.

As pointed out by the paper "***In search of knowledge for innovation: a study of Italian SMEs"[12],*** one the main problem is that there is an increasing difficulty among small and medium enterprises to access and acquire new knowledge, especially technological one, by integrating the internal context with the external one, and linking the evolving technology with

[11] Ibidem, pp. 15-19
[12] Bernardi, Garengo Bettiol, "In search of knowledge for innovation: a study of Italian SMEs" – on the learning model developed by Champica Liyanage

internal learning skills.

The need to look for new knowledge, especially advanced and technological knowledge, exactly where it can be found, i.e., in university (and other) research centres, among suppliers of machinery and systems, in large companies with advanced R&D activities and also in the supply chain, has been accelerated by several factors. Among recent factors pushing towards seeking outside for new knowledge, especially technological one, in order to remain competitive, the following trends appear to have a central role:

- The rate of technological advancement and the degree of novelty, whose time constraints make it inadequate to acquire knowledge by experience through a path dependence learning model;
- The development of new transversal technologies made necessary by the increase of the technological bundle in the products (Marsili,2002);
- More stringent regulations on energy saving and sustainability, which has be-come a primary innovation factor (Nidumolu, 2009);
- The shift towards integrated networks, the development of software-embedded logic, and the development of the Internet Of Things -IOT (Porter, 2015).

All this new knowledge does not produce results unless it is integrated within knowledge alliances particularly with university. The acquisition of new external knowledge (Cohen,1990) must be completed with its adaptation and integration of use within the new organisational and production context. It might be **better therefore to speak about transformation** (Bessant,1995) **rather than transfer.**

This transformation is driven by the learning process.

The knowledge transfer process should be facilitated and supported by several different, specifically created agencies with regional governance or of other type. However, following years of investments characterised by the proliferation of these transfer institutes or centres, their actual level of efficiency, and especially of effectiveness still remains to be proved[13].

[13] Ibidem, pp. 4-5

The **knowledge transfer process encounters therefore many barriers.**
The first main barrier is that there is a tendency to consider **technological transfer as limited to technological dimension in the strict sense, without considering instead the need to extend and integrate it within the wider logic of knowledge transfer**. The second one is that people often tend to neglect that **every knowledge transfer implies a transformation**. Once this knowledge is contextualised and implemented within the new organisational situation of the "recipient", it becomes firm specific and only then does it become **generative competence**.

Thus, the final stages of the process are those that give overall concreteness, as they are the only ones that give added value: **a knowledge has value when it generates innovation and it is put into action in a specific context.**

Transfer and adaptation become transformation as both technology and knowledge are transferred into new operational and managerial organizational contexts, in an organization that integrates them into its processes and transforms them through their development. It is this capacity of transformation that creates the competitive differential. Knowledge management is therefore associated with the process of transforming **"knowledge into value**" that is realized when it is acted out and combined with the specific and distinctive enterprise knowledge. The explored field of study shows that **knowledge transfer is a wider concept and includes** once again **technological transfer, as well as change and learning processes.**

"*It is a matter of proving that the technological transfer concept lacks any useful content and must urgently be replaced by knowledge transformation, to be more precise by productive knowledge transformation. The idea that technological transfer is implemented by "shifting" knowledge from one organisation to another is a simplistic and misleading statement. There is no transfer at all, only transformation exists and it is validated by a system of use." (Bonaccorsi, 2011).*

In short, the type of support that enterprises need from several agencies is not so much to be able to replicate implementations contextualised otherwise and elsewhere; what they need is collaboration and support in the transformation of new knowledge in order to produce

generative competencies.

It should be considered also the differences related to the nature and the typology of knowledge to be transferred. Reference is made here to the distinction between the DUI (*Doing Using Interacting*) attitude based on experience and professional learning, and the STI (*Scientific Technology and Innovation*) attitude based on production and on the use of codified technical and scientific knowledge**. Different knowledge also implies different learning modes** (*Ludvall, 2007).* Only by crossbreeding several types of skills, expert know-how and scientific knowledge, without belittling them but integrating them, does a higher level of knowledge develop for the enterprise, like a trigger for the innovation factory. However, difficulties faced by SMEs mainly concern **cognitive distance in the first place**, and subsequently motivational distance (being interested to learn in order to change).

In order for new knowledge to be generative, it also requires that the donor should integrate with the context and get down to the DUI level, to spring into action and thus **transform knowledge in action into mutual competencies**.

In order for new knowledge to be generative, it also requires that the donors should integrate with the context and get down to the DUI level, to spring into action and thus transform knowledge in action into mutual competencies. There can be no collaboration other than two-way: there is no applied research, but applications of the research. These applications are targeted towards a context that implements them and makes them real. In the absence of this "right combination", the potential to innovate appears to be very low and thus science-based collaborations are likely to be very rare. Especially in the university -enterprise case, the two stakeholders start from different skills, and if their cognitive differential persists, integration will be difficult.

The importance of the knowledge transfer for innovation was stressed for the first time at European level by the ***Green Paper on Innovation***[14]***,*** published on 1995.
It identified the main challenges of innovation in Europe by analysing its related context which "*has changed profoundly over the past twenty years, and the increasingly rapid dissemination*

[14] COM (95) 688 final, 20 December 1995 – Communication from the Commission "Green Paper on Innovation"

of new technologies, the constant changes which require ongoing adaptation, are a challenge for society as a whole. The generalisation of markets and the increasing importance of strategic alliances, the emergence of new competing countries in the technological field, the growing internationalisation of companies and of research and innovation activities, the interpenetration of sciences and technologies, the increase in the cost of research, the rise in unemployment and the increasing importance of social factors such as the environment - all these are phenomena which have radically changed both the conditions under which innovations are produced and disseminated and the underlying reasons for intervention by the authorities in this field.

In this new context, the capacity of institutions and firms to invest in research and development, in education and training, in information, in cooperation, and more generally in the intangible, is now a determining factor. Innovation becomes therefore an essential precondition for growth, maintaining employment and competitiveness. However, the situation of the European Union in terms of innovation appears to be unsatisfactory, despite some first-rate scientific achievements.

This ***European paradox indicates the strategic importance of transforming the scientific and technological potential into viable innovations****. One of Europe's major weaknesses lies in fact in its inferiority in terms* ***of transforming the results of technological research and skills into innovations and competitive advantages****.*

Research, development and the use of new technologies - in a word, the technological factor - are key elements in innovation, but they are not the only ones. Incorporating them means that the firm must make an organisational effort by adapting its methods of production, management and distribution.

Human resources are thus the essential factor. In this respect, initial and ongoing training play a fundamental role in providing the basic skills required and in constantly adapting them."[15]

The road through which Europe can become a truly competitive economy "*by improving its ability to produce knowledge through research, spreading it through education and continuous*

[15] Ibidem, pp.1, 5

training and applying it through innovation"[16] is based on the realization of the so-called "**Knowledge triangle**" that highlights the relationship of interaction between **Education, Research and Innovation**, considered the fundamental drivers for the development of a knowledge-based society in which there is an adequate concentration of resources and a close partnership between the academic world and entrepreneurship, an interaction that strengthens the link between research and education, an incentive to the processes of technological transfer of applied research towards commercial outlets, an intensification of the exchange of knowledge between public and private sector.

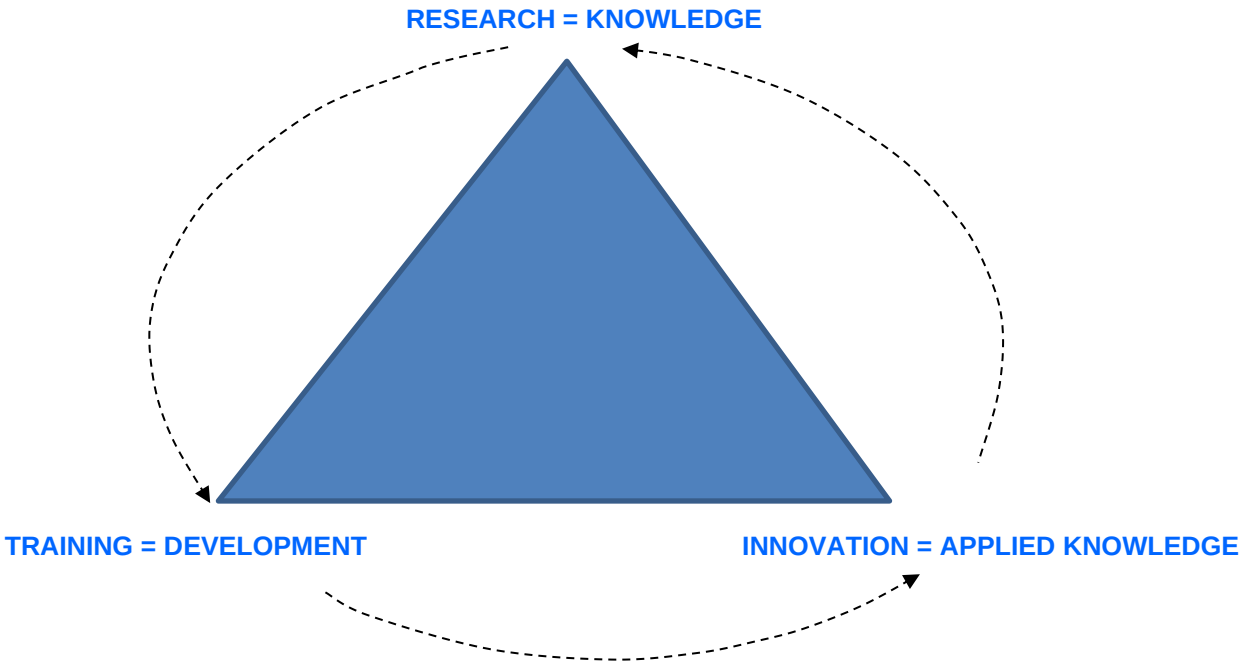


Figure 2: Knowledge triangle concept

Recently, for facing of the situation of economic and financial crisis, the Council of the EU and the Representatives of the Governments of the Member States have pointed out how the Lisbon Strategy, with its emphasis on the **knowledge triangle, can be the basis for an effective and lasting recovery,** providing the European Union with the means to r**espond to the challenges posed by a competitive global economy, climate change and an ageing population,** in particular through the development of people who can be fully realised in society through education, which is not by chance one of the foundations of the triangle.

[16] COM (2005) 118 final – Communication from the Commission "Building the ERA of knowledge for growth"

The knowledge triangle concept, which therefore refers to the needed integration of innovation, research (and technology) and (higher) education is at the base of all the EU innovation networks and clusters, as well as of the **SIAV Factory of Knowledge** and **LMS approach**.

Champica Liyanage, some years later, took as point of reference the "knowledge triangle concept" to develop the so call **Liyanage model**[17], which clearly explicate the whole **knowledge transfer process** articulating it in 5 main phases.

The model represents a sort of guide, for its clarity and completeness, to face the difficulties which lies mainly in the transformation association and application phases.

KTA, ***knowledge transformation and application***, indicates the organization's final capability to effectively absorb the new external knowledge, unknown respect to the previous experience, developing in this way new routines to integrate the stock of pre-existing know-how and mutually adapting the new codes and cultural models to assimilate them. The reference assumption of the Liyanage model is that "**the acquired knowledge requires some sort of a conversion of knowledge in order to make it "useful" for innovation;** the receiver will be then able to produce new knowledge or improve knowledge, skills or capabilities"[18]

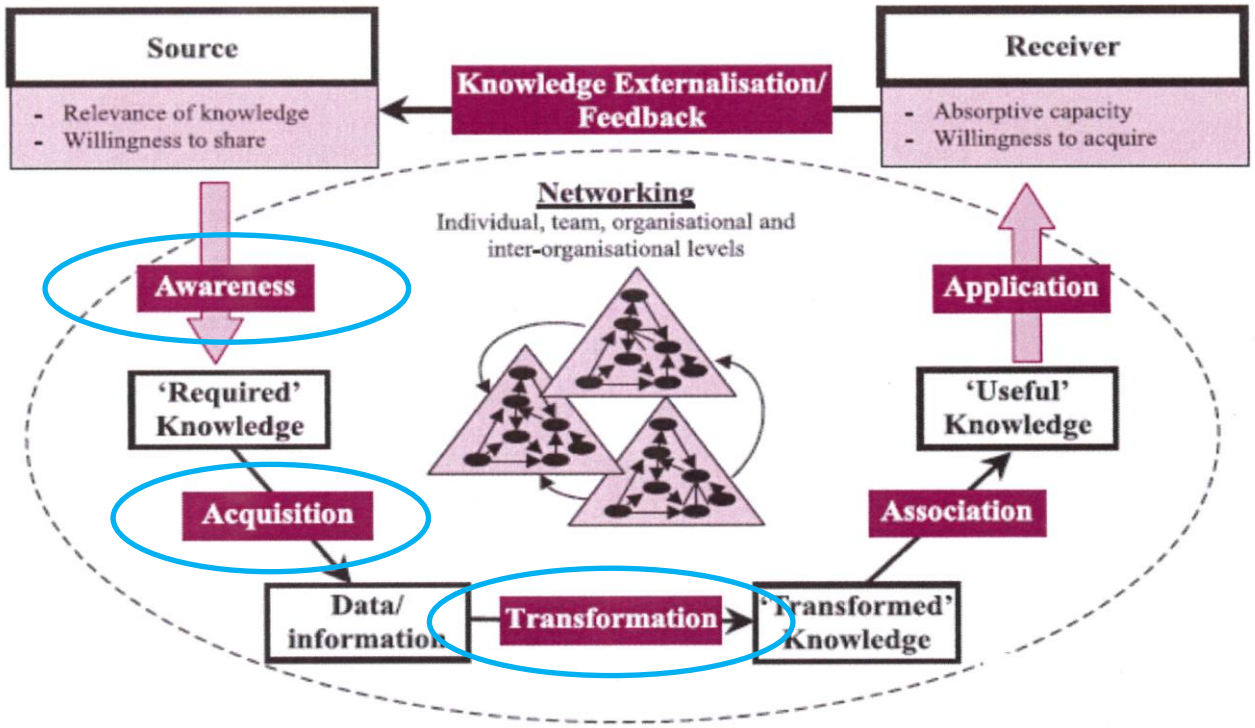


Figure 3: A model for knowledge transfer (adapted from Liyanage et al, 2009)

[17] Liyanage C, Elhag T., Ballal, Li Q., (2009), "*Knowledge communication and translation – a knowledge transfer model*", Journal of Knowledge Management, Vol. 13 Issue: 3, pp.118 -131
[18] Ibidem

The FUTURE 4.0 project main aim has been to test and experiment the **concept of "knowledge transfer for innovation" in the companies active and operating in the Naval Industry, the Shipbuilding and the related supply chain,** by the implementation of a piloting phase structured in 5 Local Pilot Actions, designed by each region involved in the project.

Experimenting the **knowledge transfer activities** for the **Validation of the FUTURE 4.0 Smart Learning Model**, given the complexity of knowledge transfer processes from the industrial point of view, meant acting according to the **learning model developed by Champica Liyanage** and Bernardi, Garengo, Bettiol, focusing on the first three levels of:

1. **AWARENESS**: according to the Lyanage model it is the phase in which **the company identifies the new knowledge deemed most appropriate to use and that responds adequately to its innovation needs**. It is a critical phase since there are many options on the global market.

   In the FUTURE 4.0 experimental knowledge transfer activities it corresponded to the provision to target companies **of basic knowledge and potential applications for advance manufacturing skills regarding KETs enabling technologies**, selected in the previous Analysis project phase, through actions of awareness – mostly seminars and webinars – **of main technological megatrends** also related Green Manufacturing and Logistics. In this phase was also investigated and discussed the current status of the companies and their needs for facing the challenges of Industry 4.0 revolution.
   In this phase were involved not only the companies but also public institutions, research centres and universities and business organisation representatives, associations based on quadruple helix system approach to discuss about the benefits that Naval sector will have moving from now from traditional maritime industry to 4.0 in terms of relations between ship and coast, ship and authority, ship and ship, ship and the related supply chain and port authorities and community.
   The next step is to gain deeper knowledge.

2. **ACQUISITION:** in this phase **the company identifies the "supplier" of knowledge deemed most credible and accessible**. Both parties must ensure the ability and the motivation to manage complex processes. It refers to the **company's ability to identify and acquire the knowledge** which is essential to be done. The success of this phase will generate data or information. Because it should be converted in advance that knowledge will be useful and generate into new knowledge or enhance the existing knowledge.
   In the FUTURE 4.0 piloting phase, according to the Lyanage model, it has been translated **in personalized in-company interventions** (16 hours each), held mainly in blended learning methodology, in order to provide a **deeper knowledge on one or more selected KETs technologies for company's product and process innovation**. In detail theoretical and intermediate knowledge was provided for its application into company real context and reality, by experts studying the specific situation of the company in advance and developing a strategy for its implementation.

3. **TRANSFORMATION**: as pointed out by Champica Liyanage the **acquired knowledge requires it to be processed, "worked out**" so that it can become usable by the company: first it is necessary to perform an adaptation activity so the new knowledge can be integrated into the heritage of already existing business knowledge. In some cases, it will also be necessary to abandon the knowledge that has become obsolete.
   Following the Lyanage reference model, the main purpose of the implemented FUTURE 4.0 transformation in-company personalized interventions (32 hours each), foreseen in each of the 5 implemented Local Pilot Actions, was **to support the applied knowledge into companies of innovation of products, processes and logistics in terms of Industry 4.0 and digitalisation** boosting in this way the competitiveness of the Naval Industry, the shipbuilding and of the related supply chain.
   Advance knowledge transfer on selected KETs was therefore provided for their concrete applications on specific process and product as well as **a personalized ad hoc plan** by experts to better direct each company to the I4.0 world and to facilitate the integration of one or more technologies into the heritage of already existing business model.

Due to the limit of resources and time the experimentation of knowledge transfer, in the FUTURE 4.0, was applied to these first phases. But the transformation level is not the final level of Champica Lyanage KTA Knowledge Transfer and Application model. According to Lyanage **the knowledge acquired requires a kind of conversion** to make it usable by the receiver/company.

The transformation of knowledge, prior to its application, can be simply added or substituted for the previous one by linking the transformation to internal needs and internal capabilities. According to Liyanage's assumption, in order **for the new knowledge to be generative or to produce value, two more final levels** are needed:

4. **ASSOCIATION**: in this phase **the potential benefits of the new knowledge are recognised** and, at the same time, the company carries out a further **personalisation of the new knowledge** to make it usable in the activities and in the business processes. The company should be therefore able to tailor the knowledge which is needed by the organization.

5. **APPLICATION**: it is the most significant phase since the **new knowledge is used to solve the concrete problems that arise. New knowledge is incorporated into new processes**, roles and structures or is formalized into rules and procedures. Only at this stage will the new knowledge create value and improve business results.

Each of the five phases must be carefully managed in order to resolve organizational critical issues, conflicts and resistance to change that may arise at any time along the way. In excellent companies, the process of knowledge transfer from the outside to the inside of the company is a continuous process that has found rapid stimuli in increasing the speed of technological innovation related to Industry 4.0.
For the transfer process to deliver the expected concrete results, it is in any case necessary:
-a continuous and intensive cooperation between the parties;
-a series of phases in which the newly acquired knowledge is integrated and made productive

As resulting the **knowledge, formal or informal, must become transformed organisational competence in order to become generative capacity**. "*Often there is the implicit assumption*

that the point at which adaption takes place is the end point of the innovation process. Yet experience suggest that simply possessing a technological resource is no guarantee of its effective use, building technological competence requires a learning process to absorb and optimise technology" (Bessant, Rush 1995)

The road to innovation therefore passes through the transformation and application of knowledge to specific business, technological and managerial problem solving….." *the specialised knowledge to be integrated must be transformed to deal with the consequences identified to generate a collective solution" (Carlie 2013).*

In the following sections will be firstly illustrated the process that led to the selection, in the Analysis project phase, of the 6 KETs technologies particular relevant for the Naval Industry, the Shipbuilding and the related supply chain. Secondly will be presented and investigated the implemented experimental activities in each Local Pilot Action based on the first three phases of the Lyanage model, with a focus on the methodological approach applied, the different regional contexts, the companies and actors involved, the supporting learning materials adopted, the related monitoring process activated as well as the feedbacks and main evidences resulting from each Local Pilot Action.

1.2. Technological Map and foresight of the Shipyard & Nautical Logistic Supply Chain

The challenges brought about by the fourth industrial revolution are at the very heart of the project FUTURE 4.0. The further developmental stage in the organization and management of the entire value chain process involved in manufacturing industry is radically changing even the concept of enterprise. EUSAIR area societies and economies are affected as well by this paradigm shift, which has effects on production, intercompany relations, human capital development. To face this, since the FUTURE 4.0 Kick off Meeting held in Venice on April 2018, the partners decided to focus the knowledge transfer for enterprises operating in the naval, shipyard & nautical logistic supply chain on six of the nine KETs enabling technologies brought by the Industry 4.0: 1) Additive Manufacturing 2) Advanced Manufacturing Solutions, 3) Augmented reality, 4) Cloud computing, 5) Big Data 6) Cyber security. (See Figure 4 below).

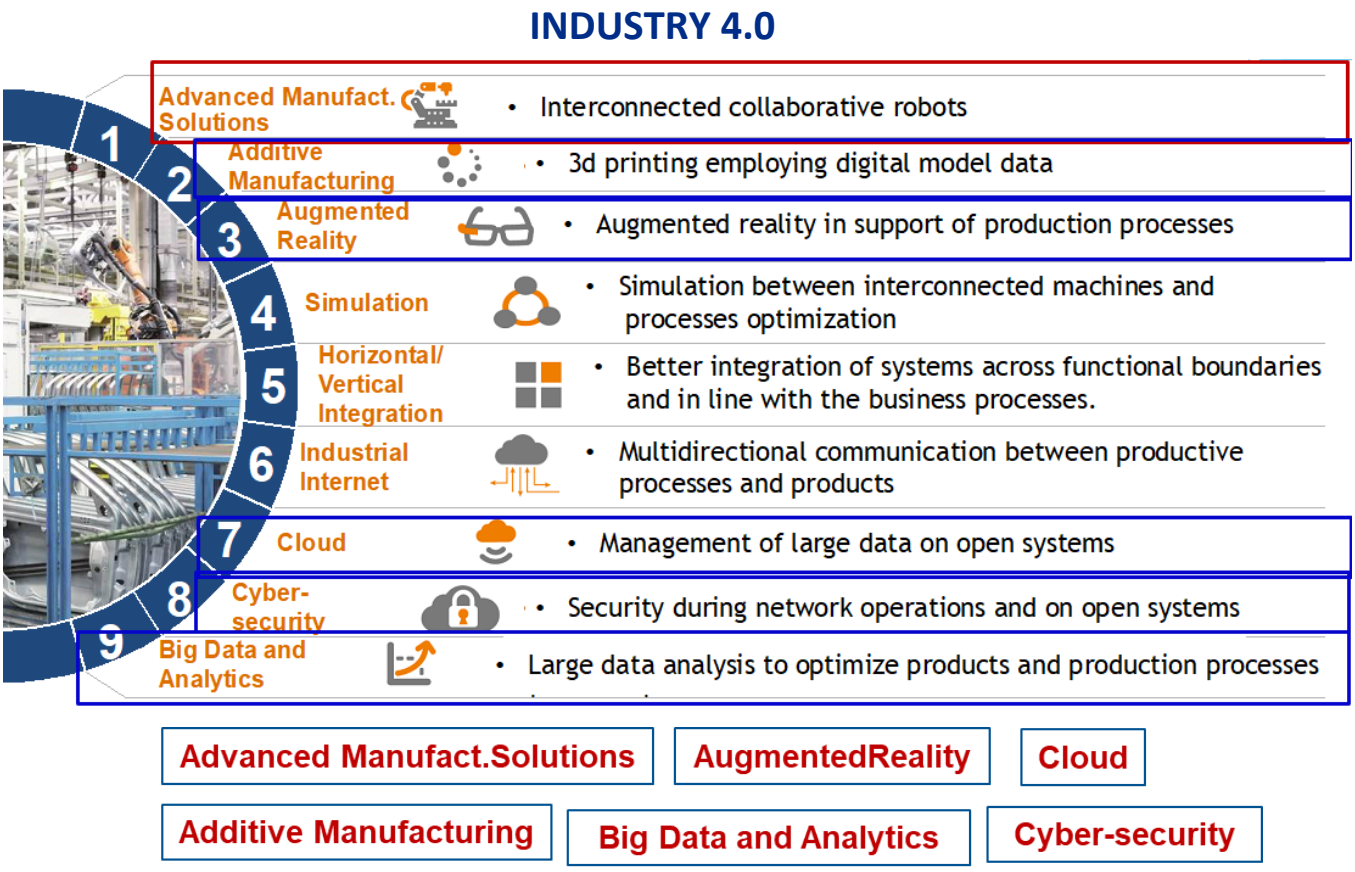


Figure 4: Industry 4.0 & six selected KETs enabling technologies

In the first project phase has been carried out by the Polytechnic of Bari a quantitative and qualitative analysis concerning the Smart Industrial Change, Technologies and Future Job in the context of the Industry 4.0 on which main results are based the Local Pilot Actions experimentation phase and the present Smart Learning Model proposal.
The procedure adopted for the analysis included four synergistically techniques for data acquisition and analysis: i) Desk Studies to collect data in the existing literature, ii) multi criteria decision methods such as the Analytic Hierarchy Processes to derive quantitative data from the Desk Studies, iii) interviews with companies iv) and a Card Game specifically designed to analyse the perception of companies.

In this analysis and research process has been involved and reached about **29 companies** though companies' interviews in all five regions of the project. In detail the partners have turned to companies in different ways: through meetings or by involving them electronically, pursuing the common objective of validating the results obtained and capturing future objectives in the Industry 4.0 field.

In detail the steps of the data acquisition process have been the followings:

- ***A first Desk Study*** to analyse the state of art of the Smart & Green features of the Industry connected to the Blue Economy and the national and regional industrial development and transformation related to the global macroeconomic and technological megatrends.
- An ***Analytic Hierarchy Processes*** based on the results of the *Desk Study* to understand how economic and technological megatrends influences the manufacturing sectors in the last 20 years in the investigated regions. The AHP is based on the decomposition of the problem in independent criteria. In this first desk study the criteria considered were the followings: Professional skills, Productivity and Improvement of sustainability. In addition, the alternatives of the problem are the phenomena that influence the defined criteria.
  Such alternatives are: 1) demographic change; 2) new emerging markets; 3) scarcity of resources; 4) climate change; 5) acceleration of technological progress; 6) and financial environment
- ***A second Desk Study*** about the enabling technologies of industry 4.0. Analyse the definition of trends/mechanisms to forecast tech developments and identify a set of needs

and related technologies required to satisfy shipyard and logistics industry KSC updating.

- **An *Analytic Hierarchy Processes*** based on the results of the second *Desk Study* to analyse the potential of enabling technologies of industry 4.0 by considering advantages and disadvantages of the six main enabling technologies. In addition, the analysis has been performed on the base of six criteria: 1) Professional skills; 2) Short-term economic benefit; 3) Long-term economic benefit; 4) Initial costs; 5) Operating costs; 6) Improvement of sustainability.
- A ***Card Game*** to analyse the perception of companies regarding the enabling technologies of industry 4.0. This methodology and its concrete application are illustrated and explain in section 1.3 Methodological Approach (See p. 38 -39).

The technical approach focused especially of 3 main methodology:

- Methodology 1: Analytic Hierarchy Process
- Methodology 2: Card Game Analysis
- Methodology 3: Road Map

In particular the last one, the Road Map, consists in a set of data pointed out from the results of the desk study and the company interviews and stored in suitable tabs.
This analysis provides a global roadmap in the Adrion area by provide the priorities of the professional skill and competences to be offered by the trainers in every region.

One of the evidences resulting from the whole analysis process is that the most important parameter that have influenced the macroeconomic and technological megatrends are:
1) financial environment parameter
2) the demographic change and labour market
3) the acceleration of technological progress.
Such a condition is shared and approved by the analyses performed for each involved region.

By the study on the Professional Skills required in the technologies 4.0, **the most important parameter influencing the skills needed in the last decades in the Adriatic Ionian area has been the Labour Market.** Only in Puglia the **Acceleration of technological progress** had a greater influence. Moreover, for all regions the rank-by-second parameter is the **Financial environment**.

Regarding the companies' perception on six enabling technologies of industry 4.0 - in which have been considered also as parameters the company size, the type of production, the geographical location and the economic context - it resulted a **medium knowledge of the technologies** and a **need of Big Data and Cloud technologies** especially for large and very large companies. Such a result is predictable and coherent since large companies have to manage a large amount of data. The **Cloud is a key technology** also for medium companies along with the **Cyber Security.** SMEs have indeed a very different perception: the parameter that unites them all is the desirability of **Big Data.**

It should in any case pointed out that the only **really constant parameter in all the regions regards the Cloud technology that is considered indispensable.**

Focusing in detail on the **nautical companies**, it resulted that overall companies based on the handcraft production of nautical typology have a **similar desirability on all technologies**. Instead, it has been noticed once again that only large companies prioritize the technologies of Cloud and Cyber Security. **Small and medium nautical companies** use traditional and artisanal production processes and they **do not perceive the potential of Advance Manufacturing technology.** (See Figure 5)

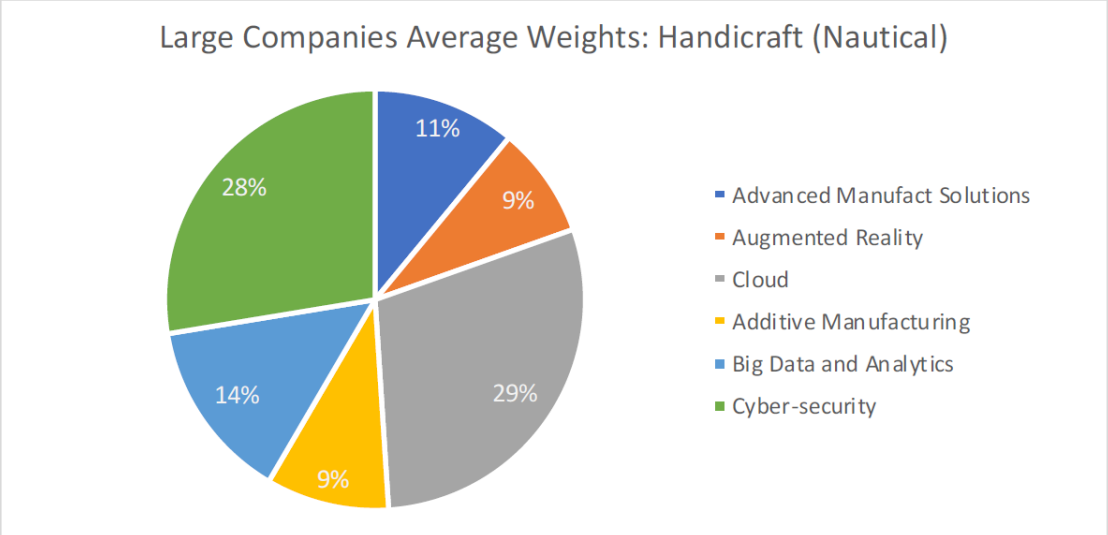


Figure 5: Perception result considering Nautical companies

For the **companies operating on Shipping and transport** sector the most significant technology is considered the **Cloud** that is necessary to store all relevant information of a transport company.

Particular relevant are also considered **Augmented Reality, Big Data and Analytics and Cyber-security**. Additive Manufacturing resulted instead an undesirable technology for most of them. (See Figure 6)

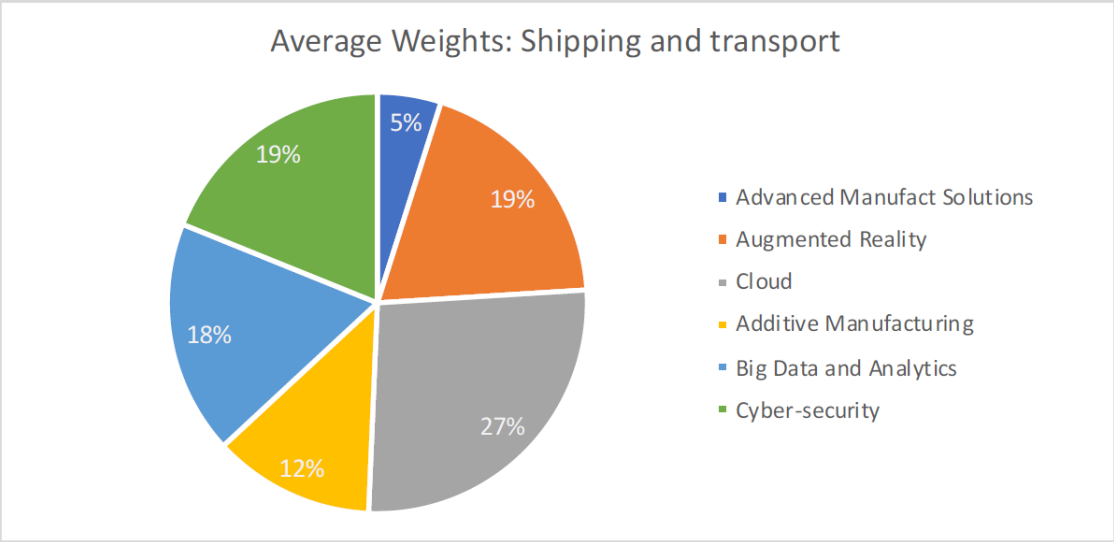


Figure 6: Perception result considering Shipping and transport companies

An interesting and clear overview resulted by the Road Map on the priorities of the education for 6echnologies and the related professional training in each region, which is ranked as follow:

1° Not provided in the region

2° Training in company

3° Doctorate

4° University

5° Technical Colle

As resulting from the Puglia Road Map of learning content, **training on company is provided only for Cyber Security and Advanced Manufacturing Solutions**. For all the other technologies professional training is provided only at Doctorate, University and High school levels at exception for Augmented Reality for which is not available any type of training in the region.

In Veneto region, training in company training on technologies 4.0 is not provided at all; only some training on Cyber Security, Advanced Manufacturing Solutions and Additive manufacturing is delivered at High school, Technical College and University levels.

A similar situation is the one of Croatia where in company training is provided only for Cloud; Cyber Security is provided mainly at High school while Additive Manufacturing only at University.

In Greece professional in company training is available only for Cloud and Cyber Security technologies; for other enabling KETs technologies professional training is provided only at University, Technical College and High school levels. In detail Big Data and Analytics training is provided exclusively at High school

Finally, in Albania, as in Veneto region, in company training on 4.0 technologies is not provided at all. Professional training on technologies 4.0 is delivered mainly at University and Augmented Reality results to be provided also at Technical College.

Therefore, considering the innovation challenges to be faced by the manufacturing industry of the shipyard and nautical logistic supply chain as well as their need and desirability on technologies 4.0, the FUTURE 4.0 intended to boost their competitiveness by supporting the introduction and implementation of new technologies - brought by the Industry 4.0 - through experimental and personalized in - company and intercompany knowledge transfer actions in the five regions involved.

1.3. Methodological approach

For the implementation of the experimental actions foreseen within the Local Pilot Actions it has been adopted a methodological approach which includes the recourse to a balanced use of a set of different methodologies allowing to support and accelerate the whole process of knowledge transfer as outlined by Liyanage model.

In the earlier phases of DISSEMINATION and AWARENESS of FUTURE 4.0 project, foreseen within the Local Pilot Actions, it has been mainly adopted a **Face-to-face knowledge transfer** approach.
It is a method where contents, learning materials, know-how and knowledge are shared by academic and experts to a group of people (IT Manger, Data Protection Manager, HR & Finance Manager, Operation Manager, Production Manager, Logistic Manager, Sales & Commercial Manager, R&D Manager and H&R Manager), coming from enterprises, mainly SMEs. This allows for a live interaction between speakers/experts and participants allowing a continuous transfer of contents and know-how as well as the exchange of experiences, ideas and feedbacks. Despite being one of the most traditional type of learning methodology, the participants can benefit from a **greater level of interaction contents with the experts/speakers and intensity in terms of contents**. The underlying rationale is that facilitating physical proximity and verbal interaction makes knowledge sharing more effective.

The **DISSEMINATION and AWARENESS** actions implemented within the five Local Pilot Actions have been traduced mainly in **Seminars,** realized in **physical way** in attractive locations. A seminar may be defined as a gathering of people for the purpose of discussing a stated topic. Such gatherings are usually interactive sessions where the participants engage in discussions about the delineated topic. The sessions are usually led by one or more speakers/experts who serve to steer the discussion along the desired path.
The FUTURE 4.0 DISSEMINATION (from to 2 to 8 hours) and AWARENESS (8 hours) actions have seen the involvement of both representatives of companies operating in the naval sectors, shipyard and the related supply chain and stakeholders such as local authorities, higher education and research institutions, education/training centres, knowledge providers and business support organisations. These actions have been mainly coordinated by partners'

staff members, but have been **led mainly by academics from universities and external experts as well with different and high levels of expertise in fields of Industry 4.0, applied technologies to business realities and 4.0 Industrial Revolution**.

The DISSEMINATION actions had the purpose to inform and present the FUTURE 4.0 project, goals, outcomes achieved in the project analysis phase and to spread the Local Pilot Action means (in the Figures below some Dissemination seminars realized within the Local Pilot Actions)

Dissemination seminars realized within FUTURE 4.0 project

The AWARENESS ones aimed to spread the technological megatrends and to provide to companies active in Naval Industry, shipbuilding and related supply chain basic knowledge on 4.0 and digital technologies illustrating them their potential applications into their realities for the innovation of product and process. At this purpose have been also illustrated the

knowledge transfer opportunities offered by the FUTURE 4.0, represented by the personalized in -company ACQUISITION and TRANSFORMATION interventions on selected 4.0 technologies.

As one of the main objectives of this phase was to understand the companies and stakeholders' perception on the Industry 4.0 revolution and related needs in terms of new requested skills and competences, in many interventions were implemented a **blended learning approach** which includes the recourse to **supporting materials as video and examples of concrete applications of 4.0 technologies** as well as the combination of **plenary and working groups sessions**, coordinated by involved academics and experts in order to stimulate and collect relevant feedbacks (in the Figures below some AWARENESS seminars realized within the Local Pilot Actions)

AWARENESS seminars realized within FUTURE 4.0 project

A very effective methodology for catching companies' feedbacks, points of view, perceptions and priorities related to 4.0 technologies and related skills is the **Card Game Analysis,** developed by the Polytechnic of Bari and already tested in the previous analysis project phase.

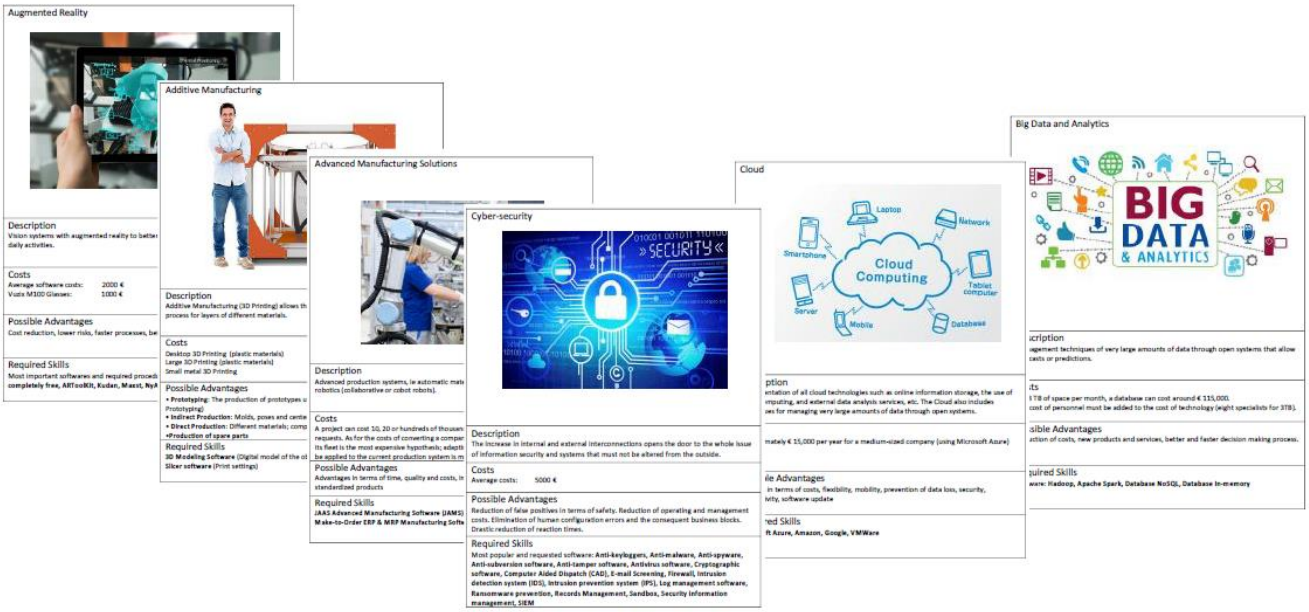
This innovative methodology, which has been tested in various AWARENESS actions, is a very simple and **visual methodology for selecting the priority on the interesting technologies for the company connected with the costs, advantages and skills requirement**.

This methodology is based on the assumption that in a decision aiding context, knowing the preferences of the Decision Maker (DM) and determining weights of criteria are very hard questions. Several methods can be used to give an appropriate value to the weights of criteria. J. Simos proposed a very simple procedure, using a set of cards, allowing to determine indirectly numerical values for weights. In this project such a method is used to derive weights of a problem structured according to a hierarchical scheme, in order to provide a detailed, simple, systematic and structured decomposition of the general problem into its basic components.

According to this methodology the problem is structured in Goal, Criteria and alternatives. The goal is "understand the company perception of the Enabling technologies of industry 4.0" by considering advantages and disadvantages of the six main enabling technologies (the alternative of the problem): i) Advanced Manufacturing Solutions; ii) Augmented Reality; iii) Cloud Computing; iv) Additive Manufacturing; v) Big Data and Analytics; vi) Cyber-security

In addition, the analysis is performed on the base of six criteria: 1) Professional skills; 2) Short-term economic benefit; 3) Long-term economic benefit; 4) Initial costs; 5) Operating costs; 6) Improvement of sustainability.

Once the criteria and alternatives are defined it is possible to realize the cards of the Enabling technologies of industry 4.0. Data and description of such card are obtained from the second desk study regarding the Enabling technologies. In particular the card of the six main enabling technologies is showed in the Figure below.



The Card Game Analysis (Polytechnic of Bari)

During the AWARENESS seminars with companies the Card Game Analysis has been applied in some sessions (about 1/1,5 hours each) with companies to understand their desirability on the Enabling technologies of industry 4.0.

The requests during the card game are listed as follows:

- Order the technologies from the one that requires less Professional Skills to the one that provides more Professional Skills
- Order the technologies from the one that provides less Short-term economic benefit to the one that provides more Short-term economic benefit
- Order the technologies from the one that provides less Long-term economic benefit to the one that provides more Long-term economic benefit
- Order the technologies from the one which implies less Initial Costs to the one that provides more Initial Costs
- Order the technologies from the one which implies less Operational Costs to the one that provides more Operational Costs
- Order the technologies from the one which implies less Improvement of sustainability to the one that provides more Improvement of sustainability

As results this methodology provided the companies perception related to the desirability of technologies 4.0 which allowed partners, but also experts and academics, to better focused the contents of the personalized **in-company AQUISITION (16 hours) and TRANSFORMATION (32 hours) interventions** on **deeper and applied knowledge** into companies of **one or more selected KETs enabling technologies.**

At this regard it should be pointed out that the companies who benefited from these AQUISITION and TRANSFORMATION in-company actions in the five Local Pilot Actions, in most cases, requested expressly **the involvement of the academics and experts who led the awareness interventions:** the companies recognised their high level of expertise and competence on specific technologies 4.0 representing an added value for fostering the innovation through ad-hoc Industry 4.0 plans.

The methodology initially implemented in the personalized in-company AQUISTION (16 hours) and TRANSFORMATION (32 hours) interventions, foreseen in the five Local Pilot Actions, has been the **Action Learning for innovation** as considered the most effective, which is based on the active knowledge transfer to a small group of companies' human resources. (see Figures at page 32 of the Action Learning for innovation methodology applied in some in-company acquisition and transformation in-company interventions).

The creator and first experimenter of Action Learning was Reg Revans, a multifaceted figure: he participated in the Olympics in 1928, obtained his PhD in physics at Cambridge, and was a researcher in one of the most prestigious laboratories in Great Britain. At the end of the Second World War Revans decided to leave the University to work as an engineer in a British mine with responsibility for managing training activities. In the mine Revans developed his interest in learning processes, but it was only in 1971 that he began to elaborate and describe the principles of Action Learning. With Revans the learning process starts a path of change that continues to this day. An increasing importance is strictly linked to the context in which learning takes place, attention is paid to people's experiences and the real dynamics in the work teams.

Action Learning for innovation realized in the AQCUISITION and TRANSFORMATION in-company interventions within FUTURE 4.0 project

Revans overturns the traditional balance of the learning process. To give more importance to the often-unexpressed potential of people and their ability to solve practical problems means to find new balances with the training that:

1. descends "from above" as it is the product of predefined knowledge;

2. is born "outside" and far away from the work contexts and from the daily actions of those who participate in professional growth programmes

For Revans, Action Learning means working on real problems with the **ability to continuously focus on learning, designing and implementing solutions**. It is a form of **learning at work**,

where you learn from others and with others in a position of mutual equality.

The principles of Action Learning can be summarised in:

1. people learn **most effectively** from sharing the problems they face **in implementing projects**;

2. real working environments are the most effective environments for learning;

3. as much time as possible should be devoted to questioning, workshops and group work: theoretical lessons should be limited to what is essential;

4. top management and participants must have clear and shared objectives and support change programmes with sincere interest, with no hidden ulterior motives;

5. the presence of a facilitator in the teams is only appropriate to help people and teams to learn. For example, he or she may ask questions about the reasons for success or failure, but he or she should only intervene in the team dynamics in cases of real need;

6. sense of openness and transparency are necessary when the team discusses complex and sensitive issues;

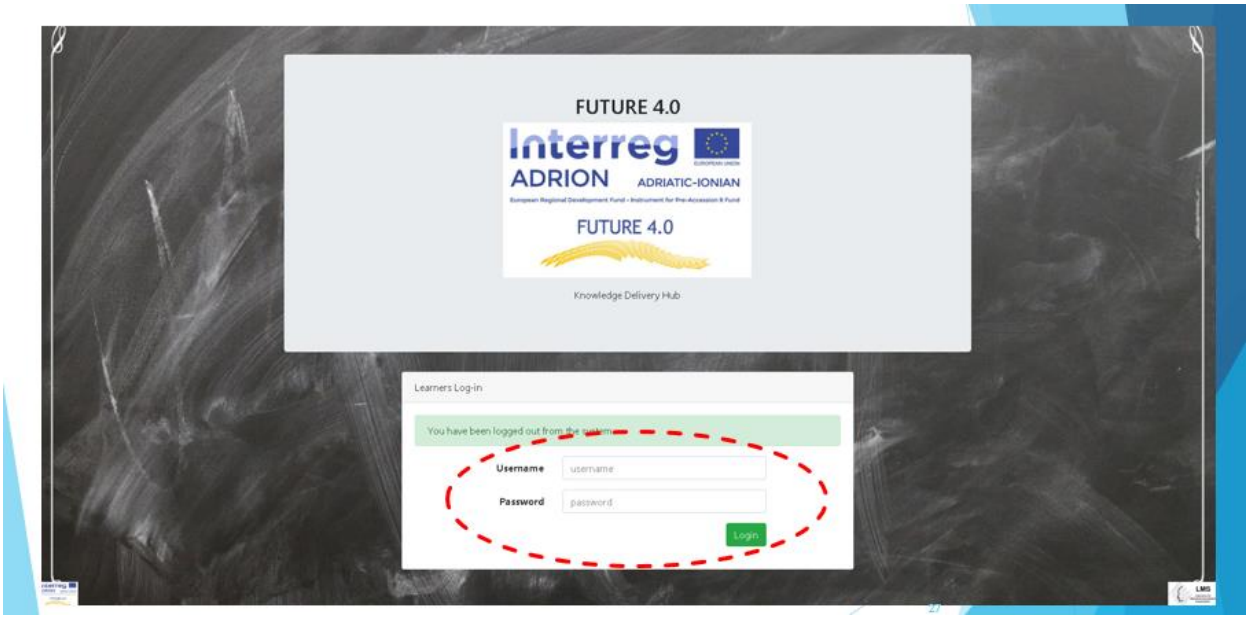
7. the performance of training activities must be flexible in order to follow and support group dynamics.

Generally, the Action Learning work process is developed in 4 main phases: analysis of the problem; research and construction of possible solutions; choice of the most suitable solution; presentation of the proposal to the client/company and comparison.

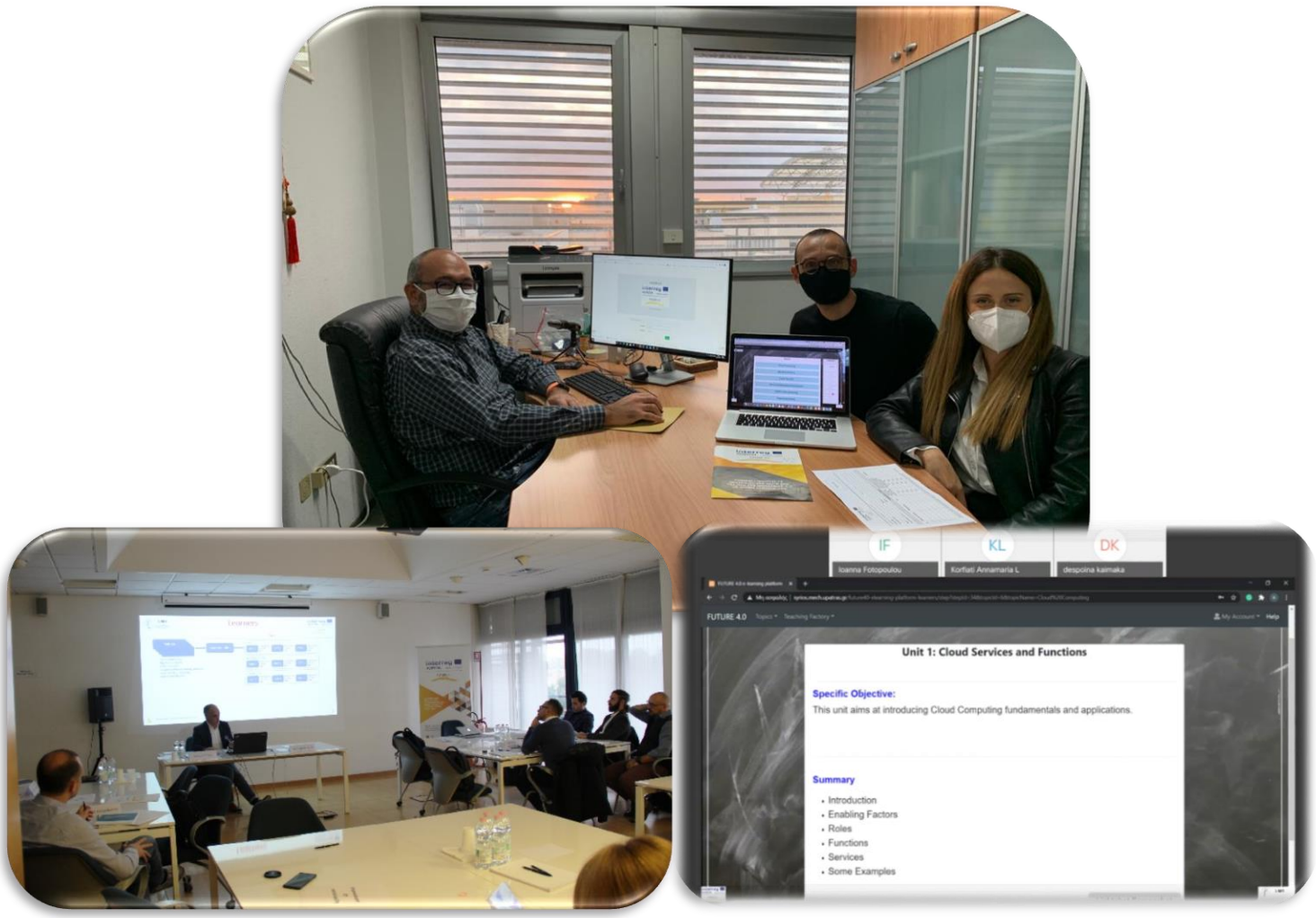
This methodology has been already successfully applied in a very wide range of situations: in factories, services and public administration. Confindustria Veneto SIAV in 1999 began experimenting the Action Learning to **accelerate organisational change and improve the performance of production processes**. Over the years a methodology, created for large companies and organisations, has become an effective **tool for the development and renewal of SMEs in the area supporting especially the technological knowledge transfer applied to processes and product for boosting innovation and competitiveness**. According Action Learning programmes have been **implemented for developing new skills and knowledge in managers who are called to take on new responsibilities bring up by new technologies and to improve productivity and companies' internal processes**.

In the FUTURE 4.0 project the Action Learning has been applicated into AQUISITION (16 hours) and TRANSFORMATION (32 hours) interventions with the specific main aim of **introducing 4.0 technologies and innovations as well as developing related news skills and knowledge for their proper management.** Through this methodology each company human resources received knowledge and competence in order to supervise company growth strategies. In this way enterprises benefited from the interventions in terms of know-how and sharing of valuable knowledge for the survival and further development of the enterprise in the context of 4.0 Industrial revolution.

In these phases the Action Learning has been combined with the **Platform FUTURE 4.0,** as supporting tool and collaborative e-learning in the technologies 4.0. The FUTURE 4.0 Learning Platform was designed to provide training to employees of companies in the Shipyard and Nautical Logistic Supply Chain, and was conceived as a **flexible solution** that is versatile enough to satisfy the potential learners. It integrates collaboration and practice throughout the learning process encouraging the learners to ask, advice and share their ideas during the training. Regarding the learning contents of the Platform, these are articulated in six learning modules: one for each of the six identified KETs enabling technologies - additive manufacturing, big data and analytics, cyber security, advanced manufacturing, cloud computing and augmented reality (in the Figures below the application of Future 4.0 Platform within the Local Pilot Action activities with companies)



The FUTURE 4.0 Platform



The application of the FUTURE 4.0 Platform within the Local Pilot Actions activities with companies belonging to naval, shipyard sectors and the related supply chain

For each topic, a pathway is defined containing the steps needed for achieving the specific topic and each one has three pre-defined levels for each topic (beginner, intermediate, advanced) according to the current expertise of the learner. For each topic, a pathway is defined containing the steps needed for achieving the specific topic. Each topic is connected to some learning material that could have a number of different formats (file, link etc...).

The 6 learning topics are scheduled to be performed online, mostly in an asynchronous and individual way, and will use the web to deliver the content. The FUTURE 4.0 Platform facilitates the integration of different and heterogeneous learning objects - such as videos, presentations, documents etc - into a common learning procedure. The teaching providers on one side are able to create new learning topics and insert material to the platform, while the users/trainees

on the other side are able to use the available material.

Therefore, **the FUTURE 4.0 online tool integrates collaboration and practice throughout the learning process** encouraging the learners to ask, advice and share their ideas during the training.

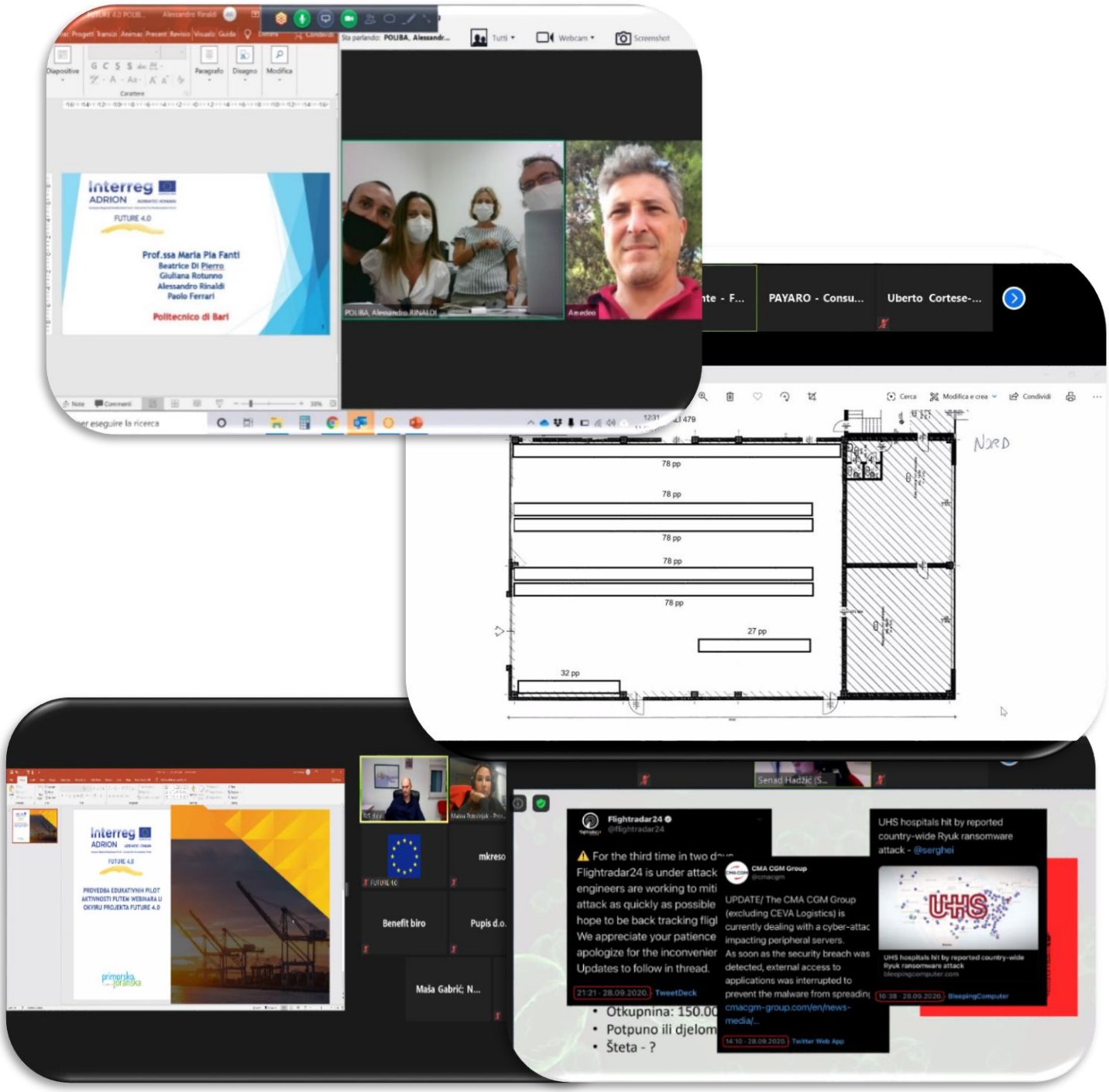
The aim of the Platform has been and remains to allow learners, and particularly companies resources operating shipbuilding, shipyard and the related supply, to deepen one or more modules related to the technologies of interest, also activating a **self-learning process** (see definition of self-based learning above).

At this regard it should be also pointed out that since the really early steps of the design of the Future 4.0 project, as well as in experimental interventions foreseen within the five Local Pilot Actions, the **e-learning** has been a **methodology and an essential asset** to rely on to achieve the overall objectives and aims. The choice was also consistent with the aim of spreading and rooting the innovative and digital culture in SMEs.

Companies increasingly need environments and methodologies that allow their human resources to train and develop skills in more flexible places and times. These must be different from the methods and places typical of training paths and interventions in presence and must allow company resources to deepen some contents by acquiring knowledge related to the evolution of 4.0 technologies. The knowledge delivered in on-line training responded to this need becoming crucial. The possibility of using contents related to 4.0 technologies in e-Learning platforms, developed mainly on community initiatives, means for companies to carry out a **personalized path that allows them to acquire knowledge and to deepen some characteristics of Enabling Technologies (KETs).**

Due to Covid-19, e-learning has become an essential and in the last months almost unique tool, given the impossibility to provide “face to face” training.

The project partners have been very flexible and agile to move from in person programs to **Digital Learning** in a fast way. In few days many Local Pilot Action activities have been **partially and,** in some cases, **completely digitalized** by the recourse to the digital or virtual learning formula and approaches such as webinars, web meetings, web conferencing and virtual training sessions (in the Figures below the Digital Learning applied to the Local Pilot Actions for the knowledge transfer and acquisition of the 4.0 technologies).



The recourse and application of the Digital Learning within the Local Pilot Actions experimental activities

In detail for delivering and transferring knowledge on 4.0 to companies were used digital platforms and means ensuring both the **training efficacy**, by the sharing in real time of training materials and the continuous exchange of feedbacks, and the **traceability** of participants.

The concept of Digital Learning goes far beyond what we commonly call e-learning. According to the HR Innovation Practice Observatory of the Politecnico di Milano, the +Digital Learning refers to an integrated platform of channels and tools to support training programmes - from webinars to social networks, from mobile applications for training to gamification initiatives - that allow people to be trained more effectively, using the means best suited to the use of content. It is an **educational approach that can be used in synchronous or asynchronous mode and implemented in different ways according to the needs of use: face to face, remotely or in the workplace.**

The **interest of companies in digital training**, as also resulting from the high level of involvement of companies who benefited from the experimental actions foreseen in the Local Pilot Actions, **is growing** and digital didactics and learning is becoming more and more central: according to the HR Innovation Practice Observatory, more than a third of the training days now include Digital Learning programs and activities. According to data from the Observatory of the Politecnico di Milano, the most widespread Digital Learning tool is the video course (adopted by 63% of organizations), followed by **webinars** (60%).

The webinars in particular have been also the tool most adopted by partners and experts for implementing the Local Pilot Actions experimental interventions for the knowledge transfer on 4.0 technologies. Webinars are web-based training sessions, typically synchronous. A tool that has seen its boom in this period of health emergency. This type of training modifies the traditional training system, making it go from long and isolated in time and space to chunked content, i.e., short, immersive, consistent and connected sessions. They are particularly useful when there is a need to train a wide target spread over a vast territory. The main feature of live webinars is the **interactivity** and the ability to discuss, send and receive information in real time, thanks to the possibility to share the screen, to record the interventions and then review them later, to intervene with questions in chat and to create real virtual blackboards where you can explain concepts and take notes.

Another advantage is that they also lead to greater interaction, because the possibility of asking questions remotely, perhaps with the room switched off, makes even the most shy - who would never stand up to ask a question in a room crowded with people - proactive.

The webinar methodology applied for the knowledge transfer on 4.0 technologies within the Local Pilot Actions experimental activities

However, as resulting from the FUTURE 4.0 project and implemented companies' activities, the adoption of digital means and the implementation of digital learning approaches require an **organisational effort and proper management to be effective**. In fact, it is important to take time to gain experience in the coordination of digital learning sessions and devices, especially in terms of active involvement of participants and to experiment different methodologies/ techniques for collecting enterprises feedbacks.

In the FUTURE 4.0 most of experimental actions have combined the digital learning - webinars, web meetings, web conferencing and virtual training sessions – with face-to-face knowledge transfer and the action learning methodology, experimenting and fostering in this way the recourse to a blended learning approach.

The strategy adopted within the project by partner which consisted in the **reinforcement blended learning** approach **with the recourse to the digital or virtual learning resulted successful:** despite the difficult times due to the Covid19 pandemic, the enterprises and companies surprisingly responded well to the proposed digital FUTURE 4.0 activities for the knowledge transfer on technologies demonstrating willingness to be involved in the project.

In the most of regions involved in the project there has been in fact a **good response and feedbacks from the companies belonging to the shipbuilding, shipyard and the related supply chain which are the main target of the project**. As evidence of the effectiveness of the methodological strategy chosen, in all five regions more than one company actively participated to the three main levels of AWARENESS, AQUISITION and TRANSFORMATION levels foreseen in the Local Pilot Actions.

In the FUTURE 4.0 project the partner took advantage of the Covid-19 particular timeframe in which entrepreneurs, technicians and professionals were inactive, willing to invest their time in new challenges and in the future of their company for facing the 4.0 Industrial Revolution.

Therefore, the constraint has been turned into an opportunity. **The digitalization of learning process has made training more accessible to SMEs and probably allowed to expand the number of companies involved in the Project.**

In conclusion the high-quality learning results of the Future 4.0 project in terms of acquisition and transformation on knowledge on some 4.0 technologies, as well as in terms of development of new competencies show the effectiveness of a more balanced mix among learning methodologies: face-to-face knowledge transfer, seminars structure in both plenary and interactive working group sessions, Card Game Analysis on technologies 4.0, Action Learning for Innovation, FUTURE 4.0 platform, e-learning, digital learning, webinars and the blended learning approach (face-to-face knowledge transfer & digital learning). In the Figure below the key methodological approach adopted in the FUTURE 4.0, within Local Pilot Actions experimental activities for the innovation of the naval industry, the shipbuilding and the related supply chain)

The benefits have been achieved through the broadening and combination of learning methodologies: the companies have realized that lifelong learning can be implemented through a dynamic “tools box” that becomes wider and richer of methodologies over time with the evolution of technological innovations.

The methodological approach implemented in the FUTURE 4.0 project within the Local Pilot Actions

2. Local Pilot Actions: implementation in the five Adriatic Regions

2.1. Regional Contexts

The involved regions – Veneto, Apulia, Western Greece, Jadranska Hrvatska (Primorje-Gorski Kotar County) and Albania -, despite sharing the same challenges about the shipyard sector and facing the same transformations and the need for their productive systems to be more integrated present considering differences as emerged by the analysis carried out on the state of art of the smart industrial changes, the technologies, the economic situations and the future jobs of the considered ADRION regions. This analysis focused in particular on some relevant criteria: **demographic change and labour market, new emerging markets**, **climate change and especially acceleration of technological progress.**

In general terms, as expected, considering existing differences in local markets, the situation is not homogeneous as for the economical structure, the attitude towards innovation and enterprise demography.

Regarding the **VENETO REGION** situation, as for **demographic change** and the **labour market,** Veneto showed considerable growth of employment and a dynamic structure of the market. As for the **acceleration of technological progress**, this is partly favoured by the National Industry 4.0 plan that has two key directions referred to innovative investments and development of competence. Key directions encompass also the development of infrastructure enablers and the development of public support tools in terms of investments.

Besides internationalisation, the **green economy** area is another field for development.

Environmental engineering, bio architecture, solar plant design, eco-brand management and energy saving are just some of the most requested **green skills areas**. Veneto confirms itself to be a region particularly sensitive to green issues, with 37,210 green businesses

And besides the green skills, **digital skills** are the other area for developing human capital that cannot be set aside. **Digital transformation** creates a disruption with the past, and introduces a new production paradigm and new organizational models. These innovations have influence on the workforce as well as on the demand for new professional skills and new jobs. According to a survey made with companies, the skill that records the highest frequency of requests by

enterprises (57.7% in Italy, and 55,7% in Veneto) refers to "digital skills" defined through the "**use of internet technologies and the ability to manage visual and multimedia communication tools."** These are followed **by "the ability to use mathematical and computer languages to organize and evaluate qualitative and qualitative information**" (50.9% in Italy, and 49,1% in Veneto) and the ability to "**manage and apply 4.0 technologies**" (34.2% in Italy, and 32, 8% in Veneto).

In terms of **employment**, in comparison with other regions in Italy and with other areas abroad, the employment situation in Veneto is not bad and was able to resist to the effects of the global crisis. However, it must be underlined that the regional population is characterized by a **progressive ageing** which affects the labour force as well.

As for **REGION APULIA**, the **varied manufacturing industry** is rapidly moving towards a future where inclusion, sustainability, responsibility and innovation are the levers for growth. The regional model for economic development aims at the creation of a local economy that takes into account the need for **social responsibility and environmental sustainability.**
As far as productivity, Puglia has a broad and varied economic structure, with great margins for improvement in the fields of human capital development, broad band access, digitization of business and Public Administration.
A criticality from the economical point of view is the long-lasting crisis of the steel industry concentrated in Taranto. Despite that, **technological innovation** and the globalization of economy are influencing the long-term dynamics of the labour market. In fact, **technological innovation requires more and more qualified work with increasing knowledge content**.
With reference to new emerging markets, the region offers a lot of advantages to potential investors. In fact, the regional government takes benefits from a high level of autonomy and thanks to the significant commitment of recent years to local development and **investments in training, research, innovation and internationalization**.
As for the **climate change**, strategies for reducing greenhouse gases include various types of interventions, including the application of technologies that optimize production processes, significantly reducing energy consumption.
With reference to the **acceleration of technological progress**, Apulia produced some outstanding experiences in the field of digital transformation in companies through the

introduction of platforms to manage company processes, which led to measurable improvements that turn out into increased competitiveness on the market.
Apulia is also **protagonist of innovation in the aerospace sector**. The region intends to be a bio architecture context where aerospace lives strongly of the synergy between companies and research centers

As for Greece, the region of **WESTERN GREECE** was greatly affected by the economical downturn of 2008. However, there is a **significant lack in participation in Lifelong Learning (LL) programs** with a downward trend.
As for **demographic change,** the calculation of the aging index for the Region shows that in the year 2012 for every 100 children there were 144.7 elderly people, while for the country this ratio was 137. This indicator is significantly higher for women (165.9 elderly women for every 100 girls). Western Greece shows an overall **high production concentration in the primary sector and moderate-to-high concentration in the commercial-transport-storage-tourism sector.**
Referring to new emerging markets, besides the primary sector, the **IT sector is also important,** maintains research activity and presents significant synergies with the other industries.

It is also important to emphasize that the **Strategy of Smart Specialization includes energy technologies** as a horizontal sector. For what concerns the regional strategy for smart specialization, it is based on the mobilization of all funding sources that can be used for **implementation of innovation and ICT actions**.
Regarding the **acceleration of technological progress**, the expenditure of Greece in research and development is one of the lowest in the EU; however, in the West Greece region, research is carried out mainly in higher education institutions and less in companies. The largest part of the approved **public funding for research is concentrated in the materials and microelectronics sector** (59%) **biotechnology** (8%), and **computer science** (7%).
After the primary sector, **the Region of Western Greece is highly concentrated in the field of entrepreneurship and SMEs.** It is therefore a **strategic priority to strengthen the competitiveness of enterprises**, mainly **focusing at the technological, sectoral and cross-sectoral priority of areas** of smart specialization

In **CROATIA - PRIMORJE-GORSKI KOTAR COUNTY** is one of the largest and most populated counties in Croatia, although still small compared to other EU regions. The county is, is known for tourism, **shipbuilding industry**, and as a port, and port logistic centre. **One of the greatest manufacturing is the maritime engineering**.
Most of the engineering companies work for big multinational engineering and shipbuilding companies abroad.

In terms of **employment**, the largest number of unemployed people in the Primorje-Gorski Kotar County make up to 29 years of age (31%), indicating one of the biggest problems facing the region, as well as the Republic of Croatia. Here, the **necessity to harmonize vocational education programs** with the needs of the economy and the interests of students is emphasized in a way that will enable them to acquire the **relevant knowledge and skills that are required in the labour market**

The strongest industry in the County is **shipbuilding**, driven by an extremely competitive environment and business problems to the edge of survival, and the wood industry that stagnates in development. This group of activities is characterized by problems of **insufficient degree of entrepreneurial connectivity and clustering** and insufficient level of investment in research and development.
County entrepreneurship infrastructure is relatively developed but it is necessary to improve the work of entrepreneurial support institutions that will in particular aim at: **the development of a society based on knowledge and innovation**; their exploitation and application; strengthening the linkage between the economy and institutions of higher education, science and research.

Regarding **the competitiveness of the economy** in the County, it is of particular **importance** to strengthen the activities that drive innovation and the **application of new technologies,** namely professional, scientific and technical activities, besides information and communication activities.

Finally, the County also promotes the development of **social entrepreneurship**, co-operative and self-employment of young people.

Regarding **ALBANIA**, it is economic transformation continues to build on its huge potential and opportunities. As for productivity, the Albanian productivity is led by the services sector. Within industry, **manufacturing is relatively small** (6.4 %) and mainly produces low value added and labour-intensive products such as textiles and footwear.

The age structure of the Albanian population has changed significantly in the last two decades, although Albania remains a country with the population of younger age in Europe
Women in the labour market have on average about 1.3 years of additional education compared to men. Nonetheless, they receive lower wages of about 20%.

Opportunities exist for foreign exports of equipment and services, including **energy efficient technologies**. The see water resources, represent an important and durable opportunity for the economic development of the country.

Albania is also State Party to all the three *Rio Conventions*, on **climate change, desertification and biodiversity.** However, a national strategy on climate change consistent with the EU 2030 framework on climate and energy policies still needs to be adopted.

The **digitalisation of the economy is gradually being developed**. However, **the capacity for technological absorption, research, development and innovation remains low**.
On research and innovation policy, the national strategy for scientific research, technology and innovation for 2017-2022 was adopted following broad public consultation. The strategy's action plan is designed to promote the EU research and innovation programme Horizon 2020. Within this context, there are a number of organisations that actively support innovative start-ups and existing SMEs. Foreign Direct Investments are the main factor to the growth of the competitive ability of the Albanian products in the international markets. However, **the level of entrepreneurship** in Albania is generally considered to be **low.**
In conclusion it should be also pointed out that, in the five regions, the **statistics on research and innovation are discouraging,** despite some regions presents the high level of entrepreneurship and numerous excellent companies, especially in the manufacturing sector.

In general, it should be considered that the model of regional development of the ADRION area is based on the birth and growth of numerous SMEs that - in addition to the **"limit" of the size** - are characterized especially by the adoption of B2B business models. Also, **the shipbuilding and nautical sector**, except some important and consolidated companies, which are excellences with a leadership position in the sector, is composed especially by **small and medium-sized enterprises** and the product production is the result of the supply chain.

Very often, therefore, the development and innovation of these realities have been induced above all by the large reference customers, thanks to which they have been able, with vision, creativity and flexibility, to adapt and modify their business. The deep and sometimes unique **knowledge of the product** that distinguishes these companies, has allowed them to make incremental and continuous changes and improvements on the product and the process, but **rarely have been made external investments in research and innovation as result of a continuous partnership with the centres of knowledge**.

Therefore, one of the main purpose of the FUTURE 4.0 has been to break these barriers to innovation between university, centre of research and enterprises by developing an **experimental model of knowledge transfer addressed to** the companies operating in the naval Industry, Shipbuilding and the related supply chain and implementing **new methodologies that cut time from theory and applied knowledge.**

2.2 Implemented activities in each Local Pilot Action

2.2.1 The Monitoring Process

As the FUTURE 4.0 Smart Learning Model is based on the results of a piloting phase constituted of **experimental actions and methodologies**, tested through Local Pilot Actions in a sample of companies in five regions with **different levels of digital maturity, innovation,** economic development and cultures, it has been necessary to identify and adopt a similar and transversal approach to the test the concept of **"knowledge transfer for innovation".** The need of a **common and shared strategy of action and approach**, especially for reaching the enterprises, resulted crucial also in consideration of the **various nature of the project partners**: regional public authorities, universities, higher education and research institutions, Chambers of Commerce and knowledge providers as SIAV which is the operational company of the Industrial Federation of the Veneto Region.
At this purpose, during the Tirana meeting, it was agreed by partnership the activation of a **monitoring process**, coordinated by SIAV as WP4 (T3) Leader, in order to check the state of advancement and implementation of activities planned under WP4 T3, especially in each Local Pilot Action.

The activated monitoring process of the WP4 (T3) activities, especially of Local Pilot Actions implementation, results even more fundamental because of the Covid-19 emergency and national restrictive measures. The monitoring actions have been the occasion to reason with the whole partnership about the Covid-19 emergency that affected the implementation of FUTURE 4.0 project in order to find operative solutions and suitable mitigation measures to this particular moment.
Because of the changed conditions in partners' and training organisations and enterprises' interventions as well, with more difficulties in reaching the enterprises, it was recommended and encouraged a strategy of **reinforcement of** the foreseen **blended learning** approach with the recourse to the **digital or virtual learning formula and approaches** such as webinars, web meetings, web conferencing, virtual training sessions and e-learning platforms. A particular attention was pointed out on the adoption of digital devices or tools able to ensure both the training efficacy and the traceability of participants.

According to the emerged needs Confindustria Veneto SIAV, as WP4 (T3) Leader, structured and activated an ongoing and regular monitoring process of the action foreseen in each Local Pilot Action, based on:

a) **Monitoring Tools**: SIAV designed and developed for each Local Pilot Action a tool that partners updated regularly with the quantitative and qualitative data and information on LPA actions planned, activated and completed.

b) **Monthly Monitoring Conference Calls** with the partnership: in the Tirana meeting it was agreed to have monthly Calls and, in proximity of each one, it was requested to partners to update the provide Monitoring Tool referred to their own LPA. During the scheduled time of implementation of Local Pilot Actions – D.T3.2.1, which was extended to end of October 2020 as concorded with partnership and the Managing Authority/Joint Secretariat, took place 9 Monitoring Conference Calls.
The aim of each Conference Call, coordinated by SIAV along with LP – Veneto region, was to present and share with all the partners the state of advancement of the activities planned in the Local Action Plans and of professional profiles interviews, considering as well the adoption of digital learning approaches and formula in reaching the target enterprises in these critical months.

Regarding the **reinforcement of** the foreseen **blended learning** approach **with the recourse to the digital or virtual learning** SIAV, as WP4 T3 Leader, was the first partner who experimented with successful results and inputs the use of digital means in order to replace the physical meetings, events and training session, by reorganizing and reviewing some LPA actions with the companies engaged.
For encouraging the project partners to implement the LPA actions in digital learning mode, going on with their scheduled interventions and taking advantage of the Covid timeframe, SIAV shared its positive experiences and provided them suggestions, guidelines and operational indications on the proper documentation to be collected as evidences attesting both activities implemented and companies involved.

Furthermore, SIAV provided assistance to partners along the whole timeframe of implementation of the Local Pilot Actions and designed the templates for the collection of the documentations (signature sheet, certificates of attendance, awareness online evaluation questionnaire, acquisition and transformation reports), to be collected for reporting the realized interventions for each of the three phases and attesting the target companies effectively reached.

2.2.2 VENETO REGION

LPA N.	Action	Contents	Methodogy/ies	State of art (Planned, Activated, Completed)	Entreprises n. (including SMEs)	Stakeholders	Enterprises Names	Date(s)	N. of hours	PP Staff/ Trainer/ Experts Name(s) and Profile(s)	Materials collected: 1. Signature sheets/Participants report 2. Certficates of attendances (for digital learning) 3. Photo, Agenda, presentation(s) 4. Awareness evaluation questionnaire 5. Acquisition/transformation report 6. Professional Profiles Report	Location(s) / Digital tool adopted
1	**DISSEMINATION**	Dissemination of local pilot action means	Seminar Plenary sessions, working groups	Completed	7	11	1. LEGACOOP 2. RAYMARINE 3. ACTV 4. CLUSTER TECNOLOGICO NAZIONALE TRASPORTI 5. ARZLIFE 6.THETIS 7. CAPITANERIA DI PORTO DI VENEZIA	21.06.2019	4	PP1 Giulio Cavinato PP2 Gabriella Bettiol	1. Signature sheet 2. Agenda, photo 3. SIAV ppt presentation	Salone Nautico Venezia Venice, Italy
1	**AWARENESS**	Digital Technologies 4.0 for the Naval Industry, Shipbuilding and the related Supply Chain	Face-to-face knowledge transfer (Plenary sessions, working groups, Card Game Analysis, Video)	Completed	9	4	**1. CANTIERE CROSERA** **2. LAGUNA TRASPORTI SRL** **3. COMPAGNIA DELLA VELA** **4. CANTIERI VIZIANELLO SRL** **5. ING. RUGGERO VIO SRL** **6. ZF PADOVA S.R.L.** **7. MYWOOD SRL** **8. STUDIO ARCHITETTI** **9. CANTIERE NAVALE VISENTINI**	29.11.2019	8	PP2/ Gabriella Bettiol PP2/ Stefano Miotto PP2/ Claudio Beltrame (ICT manager) **Prof. Alessandro Beghi:** Prof at University of Padova, Department of Information Engineering & Scientific Director of the Regional Innovation Network IMPROVENET-ICT **Prof. Gianluca Toschi**: Prof. at University of Padua - Department of Economics and Management and Fondazione Nord Est think tank **Tomaso Santi**: Cloud & Cybersecurity Expert	1. Signature sheets, 2. Agenda, photo 3. Experts' presentations 5. Awareness evaluation questionnaires 6. Report on main evidences of the seminar	Confindustria Veneto SIAV S.p.A.
1	**AWARENESS**	Logistics & Digital Technologies for The Naval Industry, Shipbuilding and the Supply Chain	Face-to-face knowledge transfer (Plenary sessions, working groups, Card Game Analysis, Video)	Completed	6	3	**1. M31 Italia Srl** **2. NAVI di IVAN Ghidoni** **3. Videotecnica** **4. ATROOS** **5. VIDEOTEC** **6. SELC SOC. COOP.**	07/02/2020	8	PP2/ Gabriella Bettiol PP2/ Stefano Miotto PP2/ Claudio Beltrame (ICT manager) **Prof. Andrea Payaro:** PhD and Specialization Course in Management Engineering at the University of Padua. ELA Certified Consultant and Management Consultant **Prof. Gianluca Toschi:** Prof. at University of Padua - Department of Economics and Management and Fondazione Nord Est think tank **Tomaso Santi**: Cloud & Cybersecurity Expert **Andrea Strassera:** CEO - ASTRA Yacht Srl	1. Signature sheets, 2. Agenda, photo 3. Experts' presentations 5. Awareness evaluation questionnaires 6. Report on main evidences of the seminar	Confindustria Veneto SIAV S.p.A.
1	**AWARENESS**	Innovative Design & Technologies 4.0	Ditigal learning: I tematic Webinars	Completed	9	3	**1. O. Creations Srl** **2. Engineering 365** **3. MHT Srl** **4. SHIP & BOAT SRL** **5. MCA DIGITAL** **6. Monte Carlo Yachts** **7. Plastitex s.r.l.** **8. Veneto Vetro SRL** **9. Biko Meccanica**	28.04.2020	2	PP2/ Chiara Cortese PP2/ Claudio Beltrame (ICT manager) **On benalf of Galileo Visionary District:** Mrs. Valeria Adriani - Chemical Engineer R&D Materials Mr. Cesar Arroyo - Senior Designer- R&D Design	1. Participants' report 2. Certificates of Attendance 3. Agenda, photo, screenshots 4. Presentations and materials 5. Online awareness questionnaire	Digital Learning Tool used: Zoom Pro
1	**AWARENESS**	INDUSTRY 4.0 - Robotics & Augmented Reality	Ditigal learning: II tematic Webinars	Completed	7	1	**1. Thinkplace Srl** **2. Bisognin Automazioni Industriali** **3. SerTech Elettronica Srl** **4. BNP SRL** **5. Seneca Automation Interfaces** **6. TECOMA Srl** **7. SOGEA SRL**	25.06.2020	2	PP2/ Chiara Cortese and Gabriella Bettiol PP2/ Claudio Beltrame **Representative of 2 innovative start-ups:** Rosa Buson, Hybrid Reality s.r.l. Luca Barbazza, co-founder of Prorob srl	1. Participants' report 2. Certificates of Attendance 3. Agenda, photo, screenshots 4. Presentations and materials 5. Online awareness questionnaire	Digital Learning Tool used: Zoom Pro

1	**ACQUISITION**	Roadshow on 4.0 technologies	Digital learning	Completed	1	//	**INGECOS S.r.l.** (2 participants)	19.09.2020 21.09.2020	16	**IFOA Istituto Formazione Operatori Aziendali - Alessandro Ortolan:** Project Manager and Quality Consultant; specialised onn product innovation and Industry 4.0	1. Participants' reports 2. Acquisition Report 3. Professional Profile Reports (n.2)	Digital Learning Tool used: Zoom Pro
1	**ACQUISITION**	Roadshow on 4.0 technologies	Face-to-face knowledge transfer	Completed	1	//	**CANTIERI MANCINI S.r.l.** (1 participant: the owner)	10/07/2020 17/07/2020 24/07/2020 31/07/2020	16	**IFOA Istituto Formazione Operatori Aziendali - Paolo Lasagni:** Prof. At University of Modena and Reggio Emilia, Department Communication and Economics; Business consultant and expert in new technologies and business innovation	1. Signature sheets 2. Acquisition Report 3. Professional Profile Reports (n.2)	CANTIERI MANCINI S.r.l. Mirano, Venice IT
1	**ACQUISITION**	Roadshow on 4.0 technologies	Digital learning	Completed	1	//	**S.P.V. Servizi Portuali Venezia S.r.l.** (2 participants)	30/07/2020 31/07/2020	16	**IFOA Istituto Formazione Operatori Aziendali - Alessandro Ortolan:** Project Manager and Quality Consultant; specialised onn product innovation and Industry 4.0	1. Participants' reports 2. Acquisition Report 3. Professional Profile Reports (n.2)	Digital Learning Tool used: Zoom Pro
1	**ACQUISITION**	ICT for the Process Management	Face-to-face knowledge transfer	Completed	1		**WIFORCE ITALIA SRL** (1 participant: the owner)	10/01/2020 20/01/2020 24/01/2020	16	**Tomaso Santi**: Cloud & Cybersecurity Expert	1. Participants' reports 2. Acquisition Report 3. Professional Profile Reports (n.2)	WIFORCE ITALIA SRL Venice, IT
1	**TRANSFORMATION**	Logistic flow & ICT Logistic Management	Action Learning for Innovation & Blended learning (Face to face + Digital learning)	Completed	1	//	**CONEPO SERVIZI SCARL** (2 participants)	Activated on 19.02.2020 Completed on 18.12.2020	32	**Andrea Payaro**: Degree in Computer Engineering, PhD and Specialization Course in Management Engineering at the University of Padua. ELA Certified Consultant and Management Consultant in the areas of strategies, business operations, logistics and warehouse organization. Member of the Scientific Committee International Congress of Contemporary Marketing Issues and Vice President of Supply Chain Management **PP2/ Claudio Beltrame:** ICT manager	1. Signature sheets & Participants' reports 2. Transformation Report 3. Professional Profile Reports (n.2)	Digital Learning Tool used: Zoom Pro & CONEPO SERVZI Venice, IT
1	**TRANSFORMATION**	Logistic flow & ICT Logistic Management	Action Learning for Innovation + Face-to-face knowledge transfer	Completed	1	//	**VECON SPA** (5 participants)	Activated on 08.06.2020 Completed on 23.09.2020	32	**Experts of MAPS SPA**: ICT company that designs and implements innovative solutions to support companies' decision-making processes. Areas of expertise: System Integration, Performance Management, BPM, Operational Intelligence, Text Mining, Business Intelligence, Semantic Search Engine, DSS, Business Software Solutions www.mapsgroup.it	1. Participants' reports 2. Acquisition Report 3. Professional Profile Reports (n.2)	VECON SPA Venice, IT
1	**TRANSFORMATION**	Logistic, Human Resources Development and Cybersecutity	Action Learning for Innovation & Blended learning (Face to face + Digital learning)	Completed	1	//	**CANTIERE NAVALE VITTORIA** (5 participants)	Activated on 23.04.2020 Completed on	32	**Andrea Payaro**: Degree in Computer Engineering, PhD and Specialization Course in Management Engineering at the University of Padua. ELA Certified Consultant and Management Consultant in the areas of strategies, business operations, logistics and warehouse organization. Member of the Scientific Committee International Congress of Contemporary Marketing Issues and Vice President of Supply Chain Management	1. Signature sheets & Participants' reports 2. Transformation Report 3. Professional Profile Report (n.1)	Digital Learning Tool used: Zoom Pro & CANTIERE NAVALE VITTORIA Adria, IT
1	**TRANSFORMATION**	Cybersecurity for the internal process management	Digital learning	Completed	1	//	**VENEZIA TERMINAL PASSEGGERI SPA** (4 participants)	Activated on 08.09.2020 Completed on 16.10.2020	32	**Cybersecurity experts of Infomatic All Srl:** company operating since 2004 in the ICT sector and specialised n management applications, software development and cybersecurity www.informaticall.it	1. Signature sheets & Participants' reports 2. Transformation Report	Digital Learning Tool used: Zoom Pro
					39	**22**			**216**			

2.2.3 APULIA

LPA N.	Action	Contents	Methodogy/ies	State of art (Planned, Activated, Completed)	Entreprises n. (including SMEs)	Stakeholders	Enterprises Names	Date(s)	N. of hours	PP Staff/ Trainer/ Consultant Name(s) and Profile(s)	Materials collected: 1. Signature sheets/Participants report 2. Certficate of attendances (for digital learning) 3. Photo, Agenda, presentation(s) 4. Awareness evaluation questionnaire 5. Acquisition/transformation report	Location(s)
2	**SEMINAR**	Dissemination "Enabling technologies and their use in Industry 4.0"	working groups, discussions and feedback	Completed	5	100	1. FABLAB BITONTO, 2. PUTIGNANO COSTRUZIONI SPA, 3. SITES SRL 4. NEETRA SRL, 5. AC BARI	8.10.2019	8	Giuliana Rotunno, Giorgio Iacobellis, Valentino Sangiorgio, Beatrice Di Pierro	1. Signature sheets 2. photo	Nicolaus Hotel Bari
2	**AWARENESS**	Dissemination about I4.0 technologies and possible methodologies	Face-to-face Konwledge transfer: individual or working groups sessions, discussions and feedback.	Completed	6	30	**1. DE.OL. SRL,** **2. DE PALMA THERMOFLUID SNC,** **3. MBL SOLUTION SRL,** **4. RESOLTEAM SRL, RAM** **5. ELETTRONICA SRL,** **6. ISOTTA FRASCHINI MOTORI**	12.11.2019	8	Giuliana Rotunno, Giorgio Iacobellis, Valentino Sangiorgio, Beatrice Di Pierro	1. Signature sheets 2. photo	CONFINDUSTRIA ITINERANTE MBL SOLUTIONS, CORATO
2	**AWARENESS**	Dissemination about I4.0 technologies and possible methodologies	Face-to-face Konwledge transfer: individual or working groups sessions, discussions and feedback.	Completed	15	150	**1.DIFAST SRL,** **2. IDEA75 SRL,** **3. CNC ROBOT SAS,** **4. ECSA SRL,** **5. ESCELSIOR CAMIERATI SRL,** **6. RL ENGINEERING,** **7. FABCRAFT SRLS,** **8. TEKNA AUTOMAZIONE E CONTROLLO SRL,** **9. TECNOACCIAI SRL,** **10. DIAGNOSTIC ENGINEERING SOLUTIONS SRL, 11. ENERGY@WORK SCARL,** **12. CREA 3D SRL,** **13. DARTXPLORE SNC,** **14. EXPERIS SRL,** **15. AXIST**	28-30.11.2019	8	Giuliana Rotunno, Giorgio Iacobellis, Valentino Sangiorgio, Beatrice Di Pierro	1. Signature sheets 2. photo	MECSPE BARI
2	**AWARENESS**	Dissemination about I4.0 technologies and possible methodologies	Face-to-face Konwledge transfer: individual or working groups sessions, discussions and feedback.	Completed	1	3	**1. FABLAB BITONTO**	30.10.2020	8	Giuliana Rotunno, Alessandro Rinaldi, Beatrice Di Pierro Paolo Ferrari - Adjunct Professor of Industrial Design at different Universities	1. Signature sheets 2. photo	Company headquarter in Bitonto/online meeting
2	**AWARENESS**	Dissemination about I4.0 technologies and possible methodologies	Face-to-face Konwledge transfer: individual or working groups sessions, discussions and feedback.	Completed	1	3	**1. BReD srl**	17/04/2020	8	Giuliana Rotunno, Alessandro Rinaldi, Beatrice Di Pierro	1. Signature sheet, 2. Awareness evaluation questionnaire **3. Professional profiles report**	BReD srl
2	**ACQUSITION**	Study of each company and possible applications	Blended learning	Completed	1	2	**MICAD srl**	1) 12.09.2020 2) 19.09.2020	16	Giuliana Rotunno, Alessandro Rinaldi, Beatrice Di Pierro, Paolo Ferrari - Adjunct Professor of Industrial Design at different Universities	1) Signature sheet 2) Awareness evaluation questionnaire 3) Professional profiles report 4) Acquistion report 5) Photo	Digital Learning
2	**ACQUSITION**	Study of each company and possible applications	Action Learning for innovation & Blended learning	Completed	1	2	**Navalmeccanico Rettifiche RanieRi S.r.l**	1) 10.09.2020 2) 23.09.2020	16	Giuliana Rotunno, Alessandro Rinaldi, Beatrice Di Pierro, Paolo Ferrari - Adjunct Professor of Industrial Design at different Universities	1) Signature sheet 2) Awareness evaluation questionnaire 3) Professional profiles report 4) Acquistion report 5) Photo	Port Authority

2	**ACQUSITION**	Study of each company and possible applications	Action Learning for innovation & Blended learning	Completed	1	2	**IMPIANTISTICA MANGINI**	1) 08.09.2020 2) 03.10.2020	16	Giuliana Rotunno, Alessandro Rinaldi, Beatrice Di Pierro, Paolo Ferrari - Adjunct Professor of Industrial Design at different Universities	1) Signature sheet 2) Awareness evaluation questionnaire 3) Acquistion report 4) Photo	Company headquarter in Putignano
2	**ACQUSITION**	Study of each company and possible applications	Action Learning for innovation & Blended learning	Completed	1	2	**MOTONAUTICA RUGGIERO**	1) 22.09.2020 2) 29.09.2020	16	Giuliana Rotunno, Alessandro Rinaldi, Beatrice Di Pierro, Paolo Ferrari - Adjunct Professor of Industrial Design at different Universities	1) Signature sheet 2) Awareness evaluation questionnaire 3) Acquistion report 4) Photo	Company headquarter in Bari
2	**TRANSFORMATION**	Provide to each company an ad hoc plan	Action Learning for innovation & Blended learning	Completed	1	1	**Ferrari Yacht Design**	1) 1.09.2020 2) 02.09.2020 3) 03.09.2020 4) 04.09.2020	32	Giuliana Rotunno, Alessandro Rinaldi, Beatrice Di Pierro, Paolo Ferrari - Adjunct Professor of Industrial Design at different Universities	1) Signature sheet 2) Awareness evaluation questionnaire 3) Professional profiles report 4) Transformation report 5) Photo	Ferrari Yacht Design Office
2	**TRANSFORMATION**	Provide to each company an ad hoc plan	Action Learning for innovation & Blended learning	Completed	1	1	**TECH-MARINE**	1) 07.09.2020 2) 25.09.2020 3) 01,10,2020 4) 02.10.2020	32	Giuliana Rotunno, Alessandro Rinaldi, Beatrice Di Pierro, Paolo Ferrari - Adjunct Professor of Industrial Design at different Universities	1) Signature sheet 2) Awareness evaluation questionnaire 3) Transformation report 5) Photo	TECH-MARINE Office
2	**TRANSFORMATION**	Provide to each company an ad hoc plan	Action Learning for innovation & Blended learning	Completed	1	2	**MARINA SPORT S.R.L.**	1) 09.09.2020 2) 14.09.2020 3) 21.09.2020 4) 24.09.2020	32	Giuliana Rotunno, Alessandro Rinaldi, Beatrice Di Pierro, Paolo Ferrari - Adjunct Professor of Industrial Design at different Universities	1) Signature sheet 2) Awareness evaluation questionnaire 3) Professional profiles report 4) Transformation report 5) Photo	Port Authority
					30	**298**			**200**			

2.2.4 DYTIKI ELLADA

LPA N.	Action	Contents	Methodologies	State of art (Planned, Activated, Completed)	Entreprises n. (including SMEs)	Stakeholders	Enterprises Names	Date(s)	N. of hours	PP Staff/ Trainer/ Consultant Name(s) and Profile	Materials collected: 1. Signature sheets/Participants report 2. Certficate of attendances (for digital learning) 3. Photo, Agenda, presentation(s) 4. Awareness evaluation questionnaire 5. Acquisition/transformation report 6. Professional Profiles Report	Location(s)
3	**SEMINAR**	Dissemination of: •FUTURE 4.0 Project Description and Goals •Technological megatrends and how they can influence professional skills •Current Technological status and future developments in the Region •Brief description of Industry 4.0 enabling technologies •New technological skills and competences emerging from 4th Industrial Revolution •New professional Profiles emerging from 4th Industrial Revolution •Smart Learning model for Education of Industry 4.0 Enabling technologies •Knowledge transfer approach and its methodologies •Teaching Factory Concept and Benefits •FUTURE 4.0 online tool for the skills development •Conditions for participating to the programme	Face-to-face Knowledge transfer	Completed	7	35 (42 partcipants)	1. Fermenta-bltd 2. LUX 3. Camping Cato Alissos 4. SAMMY 5. ODYSSEIA OE 6. West Sea Project 7. AQUATERRA	14.04.2019	2	University of Patras, Chamber of Achaia	1. Siignature sheets 2. Photos of Part+O24:P24icipants 3. Agenda 4. Report 5. Speakers presentation(s)	Opls South Port Patras
3	**AWRENESS**	**Content_1st day:** **-** presentation of FUTURE4.0 project,objective and goals; - New Revolutionary Technologies in the Shipping Sector; - Digital Transformation and Automation in the Post-Covid Era; - New Technologies and Human Resources Management. **Content_2nd day:** **-** presentation of the Smart Learning Model and FUTURE 4.0_ Platform - the challenge of redefining the prof. profile in the context of the 4th Industrial Revolution - Evaluation of the KETs - Card Game Analysis - Polling-Best practices for innovation and blue growth - Evaluation of the online Seminar	Digital Learning	Completed	15	9	**1. Georgia Tifliori Freelancer** **2. TOBEA** **3. Fotiadis Lawyer** **4. Super Cargo** **5. Patras Science Park** **6. EY Sailing** **7. Zarkada Freelancer** **8. Retsinas Lawyer** **9. Sammy Yacht** **10. CTI** **11. Liofyllo** **12. Ferry Services** **13. Tzola Lawyer** **14. Albatros** **15. Roumpini Engineer**	30/09/2020 01/10/2020	2 days (4 h each) TOTAL: 8 hours	**Danai Katsanat, Chamber of Achaia** **Panagiotis Christias**, Financial Project Manager, **Chamber of Achaia** **Anna Maria Korfiati, Research Engineer, LMS** – Laboratory for Manufacturing Systems and Automation **Ext. expertise Ioanna Fotopoulou,** subcontractor	University of Patras, Chamber of Achaia+O24:P24+O26	Virtual WEBEX Platform
3	**ACQUISITION**	• 1st topic: "FUTURE 4.0 PLATFORM-USER EXPERIENCE / e - Learning Webinar" • 2nd topic: "Cloud and automation softwares" • 3rd topic: "Cyber Security & GDPR»	Digital Learning	Completed	5 (2 of them attending to the AWARENESS action + 3 new companies)	6	1. Liofyllo 2. SammyYacht **3. ENALIA (new)** **4. Aqua Terra (new)** **5. NIREAS Boats (new)**	Activated on 25/10/2020 Completed by 04/11/2020	3 training sessions (4 h each) = 12 h 3 training sessions (1 h each) = 3 h 1. training session1 (2 h each) = 2 h TOTAL: 17 hours	For the e-learning webinar: **Ms. Anna-Maria Korfiati, representing the LMS**, Laboratory for Manufacturing Systems and Automation. For the GDPR and Cyber Security webinar: **Mr. Christos Derventlis.** He is an expert on GDPR issues, an accomplished professional despite the young of his age and a very knowledgeable individual through his studies and work experience on the correlation of Cyber Security and GDPR issues. For the Cloud Automation Software's webinar: **expert of the COMIDOR**. Comidor is an English company that has a Greek Chapter. They are experts on ERPs, cloud software and automations. Their team of business development experts and engineers led the various workshops.	1. Certificate of attendances (for digital learning) 2. Photos of Participants 3. Agreggated Evaluation questionnaire 4. Speakers presentations 5. Professional Profiles Report 6. Aquisition Report	Virtual WEBEX Platform

3	**TRANSFORMATION**	• 1st topic: "Big Data & Analytics" • 2nd topic: "Cyber Security - technical issues" • 3rd topic: "FUTURE 4.0 PLATFORM-USER EXPERIENCE / e - Learning Webinar enhanced" - 4rth topic: "Cloud Automation Software - enhanced" • 5th topic: Digital Tools for online scalable sales"	Digital Learning	Completed	11 (6 of them attending to the AWARENESS & ACQUSITION actions + 5 new companies)	13	**1. More yachting (new)** 2. SammyYacht **3. Karel Boats (new)** 4. Aqua Terra 5. NIREAS Boats 6. EY Sailing 7. Roumpini Engineer **8. Leuteriotis George (new)** **9. Achaia Marine Company (new)** 10. Liofyllo **11. FEAC Engineering (new)**	ompleted by 04/11/202	2 training sessions (3 h each) =6 h 9 training sessions (1 h each) =9 h 3 training sessions (1,5 h each) =4,5 h 6 training sessions (2 h each) =12 h TOTAL: 31,5 hours	For the Big Data & Analytics webinar: **Mr. Elias Tsaldaris,** the Founder and Managing Director of Innovation Group. He is also a Google Partner on Google AdWords, Youtube Ads and Google Analytics. For Cyber Security webinar **Mr. Stefanos Nastos,** Greenlight expert at UBER, IT manager at Balkans Beyond, Cyber Security Trainer at Youth Makers Hub and an MSc on Cyber Security from University of London. For the Cloud Automation Software's enhances webinar: **a member of COMIDOR** - an English company that has a Greek Chapter. They are experts on ERPs, cloud software and automations. For the Digital Tools for online scalable sales webinar: the **company Pirate Scale**. It has worked with many multinational companies in Greece, the UK and the USA. They have given speeches in some of the biggest institutions and events worldwide like the One Young World Summit in Johannesburg, Global Shapers by World Economic Forum in Greece and Cyprus, Athens Municipality, Impact Hub in Switzerland and many more, educating executives and companies on sales and the new accelerated technologies.	1. Certificate of attendances (for digital learning) 2. Photos of Participants 3. Aggregated Evaluation questionnaire 4. Speakers presentations 5. Professional Profiles Report 6. Transformation Report	Virtual - WEBEX Platform
					23	**28**			**56,5**			

2.2.5 JADRANSKA HRVATSKA

LPA N.	Action	Contents	Methodologies	State of art (Planned, Activated, Completed)	Entreprises n. (including SMEs)	Stakeholders	Enterprises Names	N. of Actions	Date(s)	N. of hours	PP Staff/ Trainer/ Consultant Name(s) and Profile	Materials collected: 1. Signature sheets/Participants report 2. Certficate of attendances (for digital learning) 3. Photo, Agenda, presentation(s) 4. Awareness evaluation questionnaire 5. Acquisition/transformation report 6. Professional Profiles Report	Location(s)
4	**DISSEMINATION**	Introducing with Big data analytic, Cyber Security, Cloud Computing topics	Ditigal learning: webinar	Completed	15 enterprises and stakeholders		1. BENEFIT BIRO, 2. CIMERA I SURADNICI, 3. CT-CON d.o.o., 4. QFACT d.o.o., 5. HBL inžinjerski biro d.o.o., 6. Brodogradilište 3 maj d.d, 7. Seaquest ship management, 8. Ris d.o.o., 9. Pupis d.o.o., 10. Smart4, 11. Ustanova Smoković, 12. PAR, 13. Nomen d.o.o., 14. FMTU Opatija, 15. Partnerteam d.o.o.	1	15.09.2020.	8	Sanja Čandrlić, PhD Alen Jakupović, PhD	Materials collected: 1. Signature sheets/Participants report 2. Certficate of attendances (for digital learning) 3. Photo, Agenda, presentation(s) 4. Awareness evaluation questionnaire 5. Acquisition/transformation report 6. Professional Profiles Report	Digital Learning Tool used: Zoom Pro
4	**DISSEMINATION** Added because of COVID 19	Introducing with Big data analytic, Cyber Security, Cloud Computing topics	mentored analisys	Completed	5	//	1. Alarm automatika 2. Erste bank, 3. Financial agency, 4. City of Rijeka, 5. Prospect doo,	1	April - October 2020	30	Mirjana Fabić Grčić, PhD, Jana Katunar, PhD,	Report	Digital Learning
4	**AWARENESS**	Basic knowledge regarding Big Data, Cloud computing and Cyber Security in Future 4.0 industries	Ditigal learning: webinar	Completed	12 enterprises and stakeholders		**1. BENEFIT BIRO,** **2. CIMERA I SURADNICI,** **3. CT-CON d.o.o.,** **4. QFACT d.o.o.,** **5. Brodogradilište 3 maj d.d,** **6. Seaquest ship management,** **7. Ris d.o.o.,** **8. Pupis d.o.o.,** **9. Nomen d.o.o.,** **10. FMTU Opatija** **11. Odjel za informatiku** **12. Odvjetnički ured Pranjić**	1	17.09.2020.	8	Sanja Čandrlić, PhD Alen Jakupović, PhD	Materials collected: 1. Signature sheets/Participants report 2. Certficate of attendances (for digital learning) 3. Photo, Agenda, presentation(s) 4. Awareness evaluation questionnaire 5. Acquisition/transformation report 6. Professional Profiles Report	Digital Learning Tool used: Zoom Pro
4	**ACQUSITION**	Intermediate knowledge regarding Big Data, Cloud computing and Cyber Security in Future 4.0 industries	Ditigal learning: webinar	Completed	10 enterprises and stakeholders (9 attending to the AWARENESS action + 1 new company)		1. BENEFIT BIRO, 2. Brodogradilište 3 Maj d.d,, 3. Ris d.o.o., 4. Pupis d.o.o., 5. Smart4, 6. Odjel za informatiku 7. Nomen d.o.o., 8. FMTU Opatija	1	21.09.2020.	8	Sanja Čandrlić, PhD Alen Jakupović, PhD Coordinator: Partnerteam d.o.o.	Materials collected: 1. Signature sheets/Participants report 2. Certficate of attendances (for digital learning) 3. Photo, Agenda, presentation(s) 4. Awareness evaluation questionnaire 5. Acquisition/transformation report 6. Professional Profiles Report	Digital Learning Tool used: Zoom Pro
4	**ACQUSITION**	Intermediate knowledge regarding Big Data, Cloud computing and Cyber Security in Future 4.0 industries	Ditigal learning: webinar	Completed			1. BENEFIT BIRO, 2. CIMERA I SURADNICI, **3. ERAČUN, (new)** 4. Brodogradilište 3 maj d.d, 5. Ris d.o.o., 6. Pupis d.o.o., 7. Smart4, 8. Nomen d.o.o., 9. CT-CON d.o.o., 10. QFACT d.o.o.	1	23.09.2020.	8	Sanja Čandrlić, PhD Alen Jakupović, PhD	Materials collected: 1. Signature sheets/Participants report 2. Certficate of attendances (for digital learning) 3. Photo, Agenda, presentation(s) 4. Awareness evaluation questionnaire 5. Acquisition/transformation report 6. Professional Profiles Report	Digital Learning Tool used: Zoom Pro
4	**ACQUSITION** Added because of COVID 19	Intermediate knowledge regarding Big Data, Cloud computing and Cyber Security in Future 4.0 industries	Mentored analisys, platform online tools, Report - knowledge transfer	Added becauso of COVID 19	**5**	//	**1. Alarm automatika (new)** **2. Erste bank, (new)** **3. Financial agency, (new)** **4. City of Rijeka, (new)** **5. Prospect doo, (new)**	1	April - October 2020	120	Mirjana Fabić Grčić, PhD, Jana Katunar, PhD,	Report	Digital Learning

4	**TRANSFORMATION**	Advance Knowledge transfer and application on specific process and products regarding Big Data, Cloud computing and Cyber Security in Future 4.0 industries	Ditigal learning: webinar	Completed	10 enterprises and stakeholders (the same ones attending to the AWARENESS and ACQUISITION actions + 2 new companies)	1. BENEFIT BIRO, 2. CIMERA I SURADNICI, 3. Ris d.o.o., 4. Pupis d.o.o., 5. Smart4, 6. Nomen d.o.o., 7. ERAĆUN, 8. Odvjetnički ured Pranjić	1	28.09.2020.	8	Hari Zamlić, IT Industry	Materials collected: 1. Signature sheets/Participants report 2. Certficate of attendances (for digital learning) 3. Photo, Agenda, presentation(s) 4. Awareness evaluation questionnaire 5. Acquisition/transformation report 6. Professional Profiles Report	Digital Learning Tool used: Zoom Pro
4	**TRANSFORMATION**	Advance Knowledge transfer and application on specific process and products regarding Big Data, Cloud computing and Cyber Security in Future 4.0 industries	Ditigal learning: webinar	Completed		1. BENEFIT BIRO, 2. CIMERA I SURADNICI, 3. Ris d.o.o., 4. Pupis d.o.o., 5. Smart4, 6. Nomen d.o.o., 7.Aquatherm, **8. Partner Team, (new)** **9. Studentski centar Rijeka (new),** 10 Odjel za informatiku	1	29.09.2020.	8	Senad Hadžić, IT Industry	Materials collected: 1. Signature sheets/Participants report 2. Certficate of attendances (for digital learning) 3. Photo, Agenda, presentation(s) 4. Awareness evaluation questionnaire 5. Acquisition/transformation report 6. Professional Profiles Report	Digital Learning Tool used: Zoom Pro
4	**TRANSFORMATION**	Advance Knowledge transfer and application on specific process and products regarding Big Data, Cloud computing and Cyber Security in Future 4.0 industries	Ditigal learning: webinar	Completed		1. BENEFIT BIRO, 2. CIMERA I SURADNICI, 3. Ris d.o.o., 4. Pupis d.o.o., 5. Smart4, 6. Nomen d.o.o., 7. Odjel za informatiku 8. Prospekt d.o.o.	1	30/09/2020	8	Teo Brusić, IT Industry Nikola Anić, IT Industry	Materials collected: 1. Signature sheets/Participants report 2. Certficate of attendances (for digital learning) 3. Photo, Agenda, presentation(s) 4. Awareness evaluation questionnaire 5. Acquisition/transformation report 6. Professional Profiles Report	Digital Learning Tool used: Zoom Pro
4	**TRANSFORMATION**	Advance Knowledge transfer and application on specific process and products regarding Big Data, Cloud computing and Cyber Security in Future 4.0 industries	Ditigal learning: webinar	Completed		1. BENEFIT BIRO, 2. CIMERA I SURADNICI, 3. Ris d.o.o., 4. Pupis d.o.o., 5. Smart4, 6. Nomen d.o.o., 7. Odjel za informatiku	1	01.10.2020.	8	Filip Kordić, IT Industry Ivan Tomljenović, IT Industry	Materials collected: 1. Signature sheets/Particpants report 2. Certficate of attendances (for digital learning) 3. Photo, Agenda, presentation(s) 4. Awareness evaluation questionnaire 5. Acquisition/transformation report 6. Professional Profiles Report	Digital Learning Tool used: Zoom Pro
					20				**206**			

2.2.6 ALBANIA

LPA N	PPs	Action	Contents	Methodologies	State of art (Planned, Activated, Completed)	Entreprises n. (including SMEs)	Stakeholders	Enterprises Names	Date(s)	N. of hours	PP Staff/ Trainer/ Consultant Name(s) and Profile(s)	Materials collected: 1. Signature sheets/Participants report 2. Certficate of attendances (for digital learning) 3. Photo, Agenda, presentation(s) 4. Awareness evaluation questionnaire 5. Acquisition/transformation report 6. Professional Profiles Report	Location(s)
5	PP8-Chamber of Commerce and Industry, Tirana;	**SEMINAR**	Dissemination of local pilot action means	Plenary sessions, working groups, discussions and feedback	Completed	39		R&D Organisation, R&Ttagencies, Busines, adzm, nastoing boat,rcdc alb	18.11.2019	8	PhD Mirela Koci, PhD Benard Xhaferraj	1. Invitations, 2. Agenda, 3. Report, 3. List of Participant, 4. Pictures, 5. Data protection, 6. Presentation	Regina City Hotel st. Pavlo Flloko Vlore
5	PP8-Chamber of Commerce and Industry, Tirana;	**AWARENESS**	Basic knowledge and applications for advance manufacturing skills.	Blended learning(one to one)	Completed	10	22	**1. Vip Saloti,** **2. Metaj Fros,** **3. Alb Albadriatiko,** **4.Teknoplastik,** **5. Nasto ING,** **6. HAG,** **7. Almarina,** **8. MCP Ltd,** **9. Oriku shpk,** **10. Shehaj metal,**	29.05.2020	8	PhD Mirela Koci, PhD Benard Xhaferraj Facilitator: Ergita Kamberi	1. Invitations, 2. Agenda, 3. Report, 3. List of Participant, 4. Pictures, 5. Data protection, 6. Presentation 7. Professional Profiles report	Digital Learning Tool used: Zoom
5	PP8-Chamber of Commerce and Industry, Tirana;	**ACQUISITION**	Advance Manufacturing training	Face to face knowledge transfer	Completed	5 (3 attending to the AWARENESS action + 2 new companies)	23	1. Vip saloti, 2. Shehaj metal, 3. Teknoplastik, **4. Europashpk (new)** **5. Regina group (new)**	27-28/05/2020	16	PhD Mirela Koci, PhD Benard Xhaferraj Enginner Lendi Nasto Facilitator: Ergita Kamberi	1. Invitations, 2. Agenda, 3. Report, 3. List of Participant, 4. Pictures, 5. Data protection, 6. Presenation 7. Acquisition Report 8. Professional Profiles report	Pallati Kultures "Laberia" lst floor
5	PP8-Chamber of Commerce and Industry, Tirana;	**TRANSFORMATION**	Knowledge transfer and application on 3 D modelling, and advanced materials (First session 8 hours)	Blended learning (on site transformation session)	Completed first session	10 (the same ones attending to the AWARENESS and ACQUSITION action)	15	1. Vip Saloti, 2. Metaj Fros, 3. Alb Albadriatiko, 4. Teknoplastik 5. Nasto ING, 6. HAG, 7. Almarina, 8. MCP Ltd, 9. Oriku shpk, 10. Shehaj metal,	24.06.2020	8	PhD Mirela Koci, PhD Benard Xhaferraj Facilitator: Ergita Kamberi	1. Invitations, 2. Agenda, 3. Report, 3. List of Participant, 4. Pictures, 5. Data protection, 6. Presentation 7. Transformation Report 8. 8. Professional Profiles report	Pallati Kultures "Laberia" lst floor
5	PP9-The Mediterranean University of Albania	**SEMINAR**	Dissemination on the project, New industries 4.0 need in the sector The "Knowledge Triangle" / quadruple helix logic; Industry behaviors concerning the effects of Industry 4.0 on the organisational structures and Involvement in Technological Roadmapping activities of relevant private, public and research stakeholders.F31 Results of FUTURE 4.0 previous work and stimulating the design of further initiatives as follow-ups, including also concrete proposals to ensure further implementation. The event also contribute to the achievement of the Communication Objectives of raising relevant stakeholders awareness, and increase knowledge.	Face to face knowledge transfer In-company workshop Plenary sessions, working groups, discussions and feedback	Completed	8	24	**1. Albsea transport, (new)** **2. Blumare shipping, (new)** **3. Vital Shipping, (new)** **4. Coli sh.p.k, (new)** **5. Fenikas Company, (new)** **5. Pelican LTD, (new)** **6. Shega Sh.a, (new)** **7. Mediterranean Shipping (new)** **8. Company MSC**	21-22.06.2019 (SMEs European Week)	8	MC staff: Nevila Xhindi; Vladimir Mici; Vebina Resuli; Alqi naqellari	1. Invitations, 2. Agenda, 3. Report, 4. List of Participant, 5. Pictures, 6. Data protection, 7. Presentation	The academy for SMEs in Albania'

5	PP9-The Mediterranean University of Albania	**ACQUISITION**	Main technological megatrends in Green Manufacturing and Logistics and impact of professional profiles and skills	Inter-company training	Completed	8 (the same ones attending to the DISSEMINATION action)	17	1. Albsea transport, 2. Blumare shipping, 3. Vital Shipping, 4. Coli sh.p.k, 5. Fenikas Company, 6. Pelican LTD, 7. Shega Sh.a, 8. Mediterranean Shipping Company MSC	25-26-27. 09.2019	12	MC staff: Nevila Xhindi; Vladimir Mici; Vebina Resuli; Alqi naqellari	1. Invitations, 2. Agenda, 3. Report, 4. List of Participant, 5. Pictures, 6. Data protection, 7. Presentation	Albsea transport
5	PP9-The Mediterranean University of Albania	**ACQUISITION**	Shipbuilding being so complex in nature, calls for involvement of engineers from a wide range of fields. The online platform-cooperation with research centers and universities	Inter-company training	Completed		8		Nov 18.2019	16	MC staff: Nevila Xhindi; Vladimir Mici; Vebina Resuli; Alqi naqellari	1. Invitations, 2. Agenda, 3. Report, 4. List of Participant, 5. Pictures, 6. Data protection, 7. Presentation	Mediterranean University
5	PP9-The Mediterranean University of Albania	**TRANSFORMATION**	Knowledge transfer and application on 3 D modeling, communication in management level, product and process needs analyzing	Face to face knowledge transfer	Completed		20		15.11.2019	32	MC staff: Nevila Xhindi; Vladimir Mici; Vebina Resuli; Alqi naqellari	1. Invitations 2. Agenda 3. Report 4. List of Participant 6. Pictures 7. Presentation	Mediterranean University
						20	**29**			**100**			

3. Best Practices

In the following section there will be presented and analysed more in deep, for each of the main phases of DISSEMINATION, AWARENESS, ACQUISITION and TRANSFORMATION, some actions implemented within the five Local Pilot Actions which represent Best Practices as particular relevant in terms of knowledge transfer on technologies 4.0, contents dealt, target companies and participants involved, results and companies' feedbacks.

In tale below are indicated the Best Practices, selected by partners for their regions, according to the most successful actions implemented in their Local Pilot Action.

LPA	DISSEMINATION LEVEL *Seminar/Webinars*	AWARENESS LEVEL (8 h.) *Seminar/Webinars*	ACQUISITION LEVEL (16 h.) *In-company/intercompanies interventions*	TRANSFORMATION LEVEL (32 h.) *In-company/intercompanies interventions*
1.VENETO		1. Seminar held on 29.11.2019 "DIGITAL TECHNOLOGIES 4.0 FOR THE NAVAL INDUSTRY, SHIPBUILDING AND THE RELATED SUPPLY CHAIN" 2. Webinar held on 28.04.2020, organized in collaboration with Galileo Visionary District: "INNOVATIVE DESIGN & TECHNOLOGIES 4.0"		1. "VENEZIA TERMINAL PASSEGGERI" in-company intervention: focus on Cybersecurity for internal process management applied specifically to the marine and naval sector 2. "CONEPO SERVIZI" in-company intervention: focus on logistic flow and IT logistic management 3. "CANTIERE NAVALE VITTORIA" in-company intervention: focus on logistic flow and human resources management
2.APULIA		1. Seminar held on 28.11.2019 "MECSPE BARI-Tecnologie per l'Innovazione – Industrie 4.0"	1. "NAUTICA RANIERI" - in-company intervention: focus on Cloud and Big Data technologies towards an ICT platform of the nautical network	1. "MARINA SPORT"- in-company intervention: focus on Digitalization and ICT tools for the process management of the company
3. DYTIKI ELLADA	1. Seminar held on 14 April 2019 "Actions for Blue Growth in the Region of Western Greece" in the framework of 6th PATRAS IQ-Patras Innovation Quest - IQ-Patras Innovation Quest	1. Webinar "The challenge of reinventing the working profiles in the light of the 4rth Industrial Revolution" Thursday, October 1st, Webinar via WEBEX	1. "Cyber Security and GDPR" inter-company webinar	1. "Cloud Automation Software Enhanced" inter-company webinar
4.JADRANSKA HRVATSKA	1. Webinar held on 15.09.2020, organized in collaboration with Prospekt d.o.o.: "Introduction to Big data analytics, Cloud Computing, Cyber Security, AR, AMS and Additive Manufacturing in the context of Industry 4.0"	1. Webinar held on 17.09.2020, organized in collaboration with Prospekt d.o.o.: "Basic knowledge regarding Big Data, Cloud computing and Cyber Security AR, AMS and Additive Manufacturing in Future 4.0 industries"		
5. ALBANIA			1. Workshop "Advanced manufacturing and Quality control in the industry" held on 27-28 May 2020 at Pallati Kultures "Laberia"	1. Workshop "Advanced manufacturing and 3D modelling" held on 24 June 2020 at Pallati Kultures "Laberia"
TOT	2	5	3	6

3.1 Dissemination Level

Dytiki Ellada - Best Practice

Seminar "Actions for Blue Growth in the Region of Western Greece"
in the framework of 6th PATRAS IQ-Patras Innovation Quest

14 April 2019 - IQ-Patras Innovation Quest

Coordinators & Speakers:

Theodoros Tsoumbelis, *General Secretary of the Chamber of Achaia*
Platonas Marlafekas, *President of the Chamber of Achaia*

Panagiotis Spyropoulos, *Assistant Professor of LMS the Department of Mechanical and Aeronautical Engineering of the University of Patras*

Participants': *about 50 in total*

- Companies belonging to Manufacturing Sector:
  - **Fermenta-bltd**
  - **LUX**
  - **Camping Kato Alissos**
  - **SAMMY**
  - **ODYSSEIA OE**
  - **West Sea Project**
  - **AQUATERRA**

- Stakeholders:
  - **Local public authority:** 8 participants from the Chamber of Achaia
  - **Regional public authority:** *3 participants from the Western Greece Region (WGR); 1 from SYDNA;*
  - **Higher Education and research:** *2 participants from Patras Science Park; 4 from University of Patras; 1 from University of Ioannina; 1 from ITYE "DIOFANTOS"*;
  - **Education/training centre and school:** *1 participant from education centre;*
  - **Business support organisation:** *2 participants from BLUE GROWTH NETWORK, 1 from SAVE COAST, 1 person from OBI;*
  - **General public:** *17 participants (7 men & 10 women);*

Aim of the seminar:

The purpose of this event was to attract Regional Companies in the field of Blue Growth and support the initiative of Chamber of Achaia to organize a Blue Economy Business Network or improve Blue Growth in Western Greece. The Seminar aimed also to disseminate the possibility of intervention with innovative technologies for knowledge transfer and training. In detail the main aim was fasten the Research and Innovation results for the development of a sustainable blue economy in the Region of Western Greece.
At this purpose the event was the occasion to present the FUTURE 4.0 project, its objectives and goals, but especially to illustrate the actions and opportunities in terms of knowledge transfer on 4.0 technologies, addressed mainly to companies active in the Naval Industry, Shipbuilding and related supply chain foreseen within the Dytiki Ellada Local Pilot Action as well as the FUTURE 4.0 Platform.

Focus & Contents:

"Actions for Blue Growth in the Region of Western Greece": main focus on collaboration between Public administration, universities/research, training institutions and companies to disseminate the possibility of intervention with innovative technologies for knowledge transfer and training.

Contents:

- FUTURE 4.0 Project Description and Goals;
- Digitalisation Impact;
- Current Technological status and future developments in the Region
- Industry 4.0 Key Terms
- New professional Profiles emerging from 4th Industrial Revolution
- New technological skills and competences emerging from 4th Industrial Revolution
- Industry 4.0 & Education 4.0
- Teaching Factory Concept and Benefits
- FUTURE 4.0 online tool for the skills development

Methodology:

Face-to-face knowledge transfer *(Plenary sessions, Working groups, discussions)*

What's happened in brief:

During the seminar many executives were involved not only from academic but also from business world. During the event Dr. Panagiotis Stavropoulos from LMS presented and described the main objective, the goals and the progress of FUTURE 4.0 program. This event, that corresponds to the Dissemination phase of the WP4 "Local Pilot Action Design and Implementation", was the occasion to present to the audience, in particular companies and professionals, the Local Pilot Action designed for Greece and the tool developed by the Project in order to support Partners in the knowledge transfer on main technological megatrends: the FUTURE 4.0 Platform.

Jadranska Hrvatska - Best Practice

Webinar **"Introduction to Big data analytics, Cloud Computing, Cyber Security, AR, AMS and Additive Manufacturing in the context of Industry 4.0"**

Date & Location

Experts:

Sanja Čandrlić: *PhD, Associate Professor*, *Department of Informatics of University of Rijeka*

Alen Jakupović: *PhD, Associate Professor, Polytechnic of Rijeka*

Coordinators: *Project Managers of Prospekt d.o.o. - a creative agency of Rijeka that provides integrated marketing communication services and modern web solutions. Its main aim is to facilitate the companies' business process with their IT department designs and programs.*

Participants' companies: *the 15 companies active in the fields of IT – software development, IT - Cyber Security, Nautical and shipbuilding consultant, Energy Consulting, IT – Industrial Software development*

1. **BENEFIT BIRO,**
2. **CIMERA I SURADNICI,**
3. **CT-CON d.o.o.,**
4. **QFACT d.o.o.,**
5. **HBL inžinjerski biro d.o.o.,**
6. **Brodogradilište 3 maj d.d,**
7. **Seaquest ship management,**
8. **Ris d.o.o.,**
9. **Pupis d.o.o.,**
10. **Smart4,**
11. **Ustanova Smokrović,**
12. **PAR,**
13. **Nomen d.o.o.,**
14. **FMTU Opatija,**
15. **Partnerteam d.o.o.**

Aim of the seminar:

The participants will acquire and extend knowledge regarding topics related to Big Data, Cloud computing and Cyber Security AR, AMS and Additive Manufacturing in Future 4.0 industries, which they can adapt and use in their everyday jobs inside companies. Through this seminars, experts will provide information,discuss and develop new approaches in implementing Business informatics, Information and Communication Technology related to Big Data, Cloud Computing, Cyber Security, AR, AMS and Additive Manufacturing in Future 4.0 industries.

Methodology:

***Digital learning*:** *online meeting, lasted 8 hours, realized through the Zoom platform allowing both traceability of company participants and training efficacy.*

What's happened in brief:

Through this seminar the project partners involved SMEs that are supporting organizations from sectors such as shipbuilding (and its supply chain), shipping, nautical services, logistics, manufacturing, maritime transport, platforms and software development for defined sector needs, and other Blue Economy established and emerging sectors.

In addition, we included relevant public institutions, public bodies, educational institutions, chambers, associations etc., in order to provide information, discuss and develop new approaches in implementing Business informatics, Information and Communication Technology related to Big Data, Cloud Computing, Cyber Security, AR, AMS and Additive Manufacturing in Future 4.0 industries.

Conclusions & feedbacks

Participants feedbacks:

The experts were notably competent and responded intensively to our specific requirements. The know-how transfer was very good and comprehensible. Organizing the training was done in a professional and flexible manner, and the course atmosphere was very constructive."

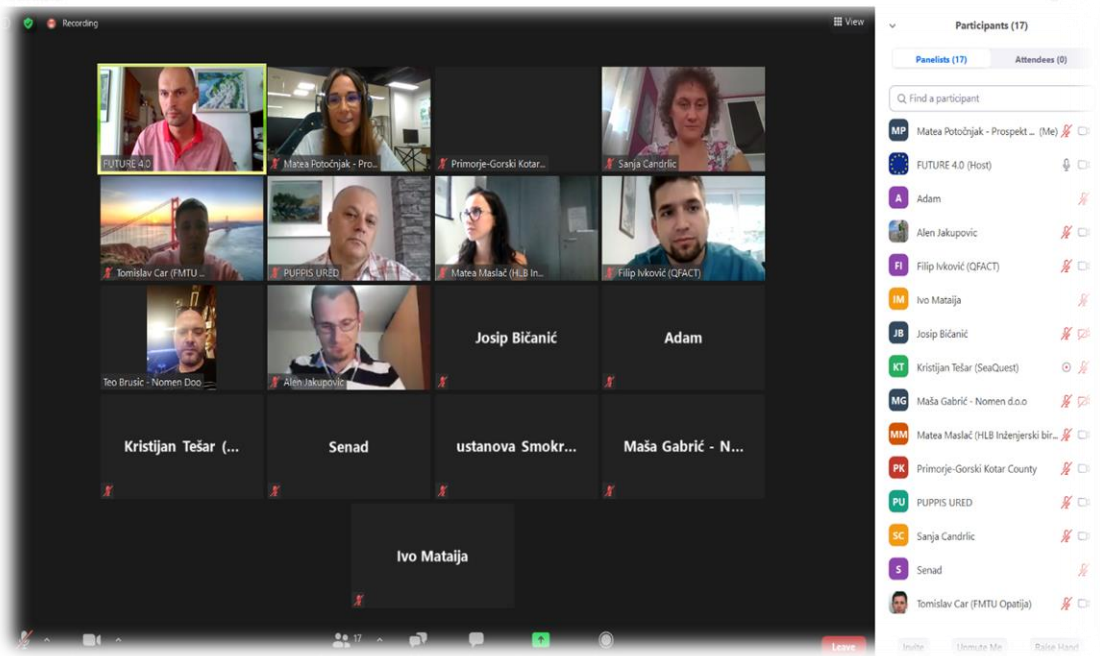
Participants believe that they will successfully apply the knowledge and experience gained from experts and other participants in practice.

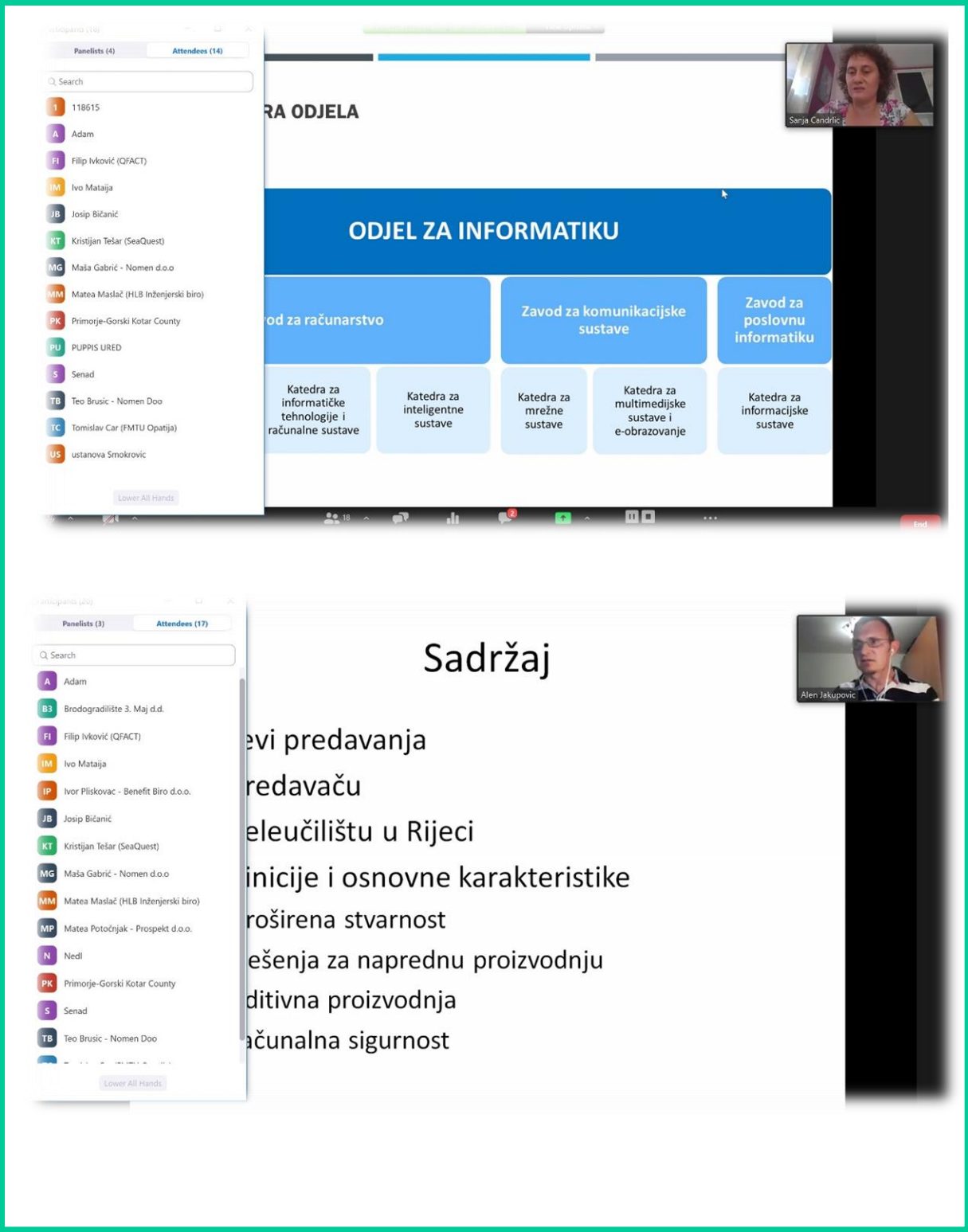
Expert feedbacks:

"We are very satisfied with choice of companies that participated in this project and engagement of participants during sessions."

"Companies of different industries were represented on the project and the participants were very interested in the topics that were covered."

Feedback from experts was very positive and they are satisfied with choice of companies that participated in this project. Experts found that participants successfully adopted the knowledge and prepared a plan to improve its business.




Panelists (4)
Attendees (14)
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Adam
Filip Ivković (QFACT)
Ivo Mataija
Josip Bičanić
Kristijan Tešar (SeaQuest)
Maša Gabrić - Nomen d.o.o
Matea Maslač (HLB Inženjerski biro)
Primorje-Gorski Kotar County
PUPPIS URED
Senad
Teo Brusic - Nomen Doo
Tomislav Car (FMTU Opatija)
ustanova Smokrovic
Lower All Hands
RA ODJELA
ODJEL ZA INFORMATIKU
od za računarstvo
Zavod za komunikacijske sustave
Zavod za poslovnu informatiku
Katedra za informatičke tehnologije i računalne sustave
Katedra za inteligentne sustave
Katedra za mrežne sustave
Katedra za multimedijske sustave i e-obrazovanje
Katedra za informacijske sustave
Sanja Candrlic
Panelists (3)
Attendees (17)
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Brodogradilište 3. Maj d.d.
Filip Ivković (QFACT)
Ivo Mataija
Ivor Pliskovac - Benefit Biro d.o.o.
Josip Bičanić
Kristijan Tešar (SeaQuest)
Maša Gabrić - Nomen d.o.o
Matea Maslač (HLB Inženjerski biro)
Matea Potočnjak - Prospekt d.o.o.
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Senad
Teo Brusic - Nomen Doo
Lower All Hands
Sadržaj
evi predavanja
redavaču
eleučilištu u Rijeci
inicije i osnovne karakteristike
roširena stvarnost
ešenja za naprednu proizvodnju
ditivna proizvodnja
ačunalna sigurnost
Alen Jakupovic

3.2 Awareness Level

Veneto Best Practice

Seminar **"DIGITAL TECHNOLOGIES 4.0 FOR THE NAVAL INDUSTRY, SHIPBUILDING AND THE RELATED SUPPLY CHAIN"**

29.11.2019 - Confindustria Veneto SIAV Spa

Experts:

Alessandro Beghi: *Full Professor at University of Padua - Department of Information Engineering and Scientific Director of the Regional Innovation Network IMPROVENET-ICT*

Gialunca Toschi: *Professor at University of Padua - Department of Economics and Management and Senior Researcher at Fondazione Nord Est*

Tomaso Santi: *Cloud & Cyber Security Expert and Consultant*

Confindustria Veneto SIAV coordinators:

Stefano Miotto: *Confindustria Veneto SIAV S.p.A. - General Director*

Gabriella Bettiol: *Confindustria Veneto SIAV S.p.A. - Innovation Manager & Head of the Knowledge and Innovation Unit "Factory of Knowledge"*

Participants' companies: *mainly local shipyards, with consolidated experience and history, specialized in the naval construction and operating in the nautical world for professional use as **Cantiere Navale Visentini Srl, Wiforce Italia S.r.l, Cantieri Navali Vizianello Srl, Cantiere Navale Vittoria and Cantiere Nautico Crosera**. Most of these shipyards are looking with interest to the investments in new technologies and material for advanced and sustainable production.*
*In addition, **ZF Marine Electronics**, **MYWOOD Srl** and **ING. RUGGERO VIO Srl**, who also actively participated to the seminar, belong to the supply chain of the shipyards and naval industry being specialised in the field of control of propulsion for boats, marine propulsion, naval technical accessories, components and custom-made and complete furnishings.*
*The seminar saw also the involvement of **Conepo Servizi Scarl, Laguna Transporti and Venezia Terminal Passeggeri Srl** as relevant Venice companies' operating in the maritime and environmental transports and touristic sectors as well, strongly connected with the Port Authority.*

Aim of the seminar: *The main aim of the awareness seminar has been to promote the transfer of knowledge on 4.0 technologies for companies, mainly SMEs, active in the Naval Industry, shipbuilding and related supply chain. In detail the seminar focused on potential applications of the 4.0 technologies, identified by the FUTURE 4.0 project, for fostering digital innovation and competitiveness. The seminar purpose was also to investigate and analyse the companies' needs in order to face the challenges represented by the Industry 4.0 revolution and, accordingly, to illustrate them the opportunities offered by the project for the acquisition and transformation of knowledge related to most relevant KETs technologies for the sector, to be applied for process and product innovation.*

What's happened in brief: *during the seminar, which was held mainly in plenary session, the six KETs technologies 4.0 (Additive Manufacturing, Cloud, Cyber Security, Advanced Manufacturing Solutions, Augmented Reality, Big Data & Analytics) were presented in detail by Prof. Beghi who provided an overview of potential applications of 4.0 technologies into companies operating in the naval industry, shipbuilding and the related supply chain. He focused especially on advantages and innovation on companies' products and processes, by sharing experiences, concrete cases and projects of applied research through explicative videos. A key concept transferred is that the implementation of one or more technologies can generate value and innovation only if there is clear vision of the "Industry" 4.0 project and strategy by the company.*
The companies' needs and perceptions, in terms of Industry 4.0 and related skills required, were investigate by Prof. Toschi through a working groups session and the Card Game Analysis who encouraged the exchange of visions, feedbacks and the networking among the participants. A focus was made by Tomaso Santi on Cloud and Cybersecurity, with a particular attention to main cyber threats, encryption and decryption techniques, security problems for the naval manufacturing, but also to the Cyber Security prevention mechanisms, models and protocols. At this regard, Claudio Beltrame – SIAV ICT Manger showed the ***FUTURE 4.0 platform*** *and its functionalities, especially for Learners, with a focus on Cloud and Cyber Security contents as supporting tool providing know how and materials at companies' disposal.*
As conclusion, Dr. Miotto illustrated some companies' as Veneto region excellences, in terms of advanced production systems and robotics, which are part of the "100 places of Industry 4.0" network, coordinated by Confindustria Veneto, which aims to map and to promote the networking of companies, universities, research centers, coworking and innovation.

Conclusions & feedbacks: *the participating companies gave positive feedbacks respected to the contents dealt enabling them to reflect on new potential applications of 4.0 technologies within their businesses. In detail most of them consider relevant and strategic the transfer of knowledge on 4.0 technologies in order to face the evolution of the markets and remain competitive contributing to find new solutions, to solve internal process and to update and innovate business processes.*
The companies understood the importance of the networking with other companies treating contents on 4.0 technologies and facing common problems concerning the implementation of the current technological 4.0 transformation, but also with the knowledge providers such as universities, experts and research centers. As evidences of their interest on the topics and purposes of the FUTURE 4.0 project, five companies asked to benefit of the experimental in-company personalized acquisition and transformation interventions with skilled experts, offered by the Veneto region Local Pilot Action, in order to activate ad-hoc plan and strategy of digitalisation and innovation processes.

Veneto II Best Practice

Webinar "INNOVATIVE DESIGN & TECHNOLOGIES 4.0

28.04.2020 – Digital Learning (Zoom Platform)

Experts:

Valeria Adriani: *Project Manager for the Design Division - Galileo R&D District and Chemical Engineer at MaTech*

Cesar Arroyo: *Project & Account Manager for Design Division - Galileo R&D District and Coordinator of SID creActive LAB*

Confindustria Veneto SIAV coordinators:

Alessio Zini: *Galileo Visionary District, Project Manager*

Claudio Beltrame: *Confindustria Veneto SIAV S.p.A., IT Manager*

Chiara Cortese: *Confindustria Veneto SIAV S.p.A. – Assistant Project Manager*

Participants' companies: *in the webinar were involved mainly companies which belong to the supply chain of the shipbuilding and naval industry, such as:* ***Veneto Vetro SRL****, leader in the industrial process of glass processing operating in the nautical, naval, architecture and interior design;* ***O'Creations*** *- one of the most important Italian companies in the architectural lighting design industry, specialized in the design, build and manufacturing of bespoke decorative and contract light fittings installation for the naval sector (cruise ships and luxury vessels);* ***Plastitex*** *- leader in the development of ultra-performing technical fabrics for indoor, outdoor and design furniture;* ***Biko Meccanica Srl*** *with consolidated experience in the design and manufacturing of machines and plants for the conversion of flexible materials;* ***MCA DIGITAL*** *one of first retailer active in Italy specialised in small and large format digital solutions (from printing systems to equipment, from consumables to software) and* ***MHT Srl*** *and* ***Engineering 365*** *specialised in services and solutions based on the Microsoft technology platform by designing, developing and managing innovative solutions for the business areas where digitisation generates the greatest changes. Two relevant companies operating in the naval and shipbuilding fields also participated:* ***Monte Carlo Yatchs*** *which is leader in the production of luxury yachts and* ***SHIP & BOAT SRL*** *specialised in the design, engineering and management for shipowners and shipyards. The webinar*

Aim of the seminar: *The aim of the awareness seminar has been to promote the transfer of knowledge on 4.0 technologies for companies, mainly SMEs, active in the Naval Industry, shipbuilding and related supply chain. In detail the seminar focused on potential applications of the 4.0 technologies, with a particular attention to the potential applications of the Additive Manufacturing and new Materials for the Innovative Design, Customization and Product Innovation. The seminar purpose was also to collect companies' feedbacks, experiences and needs with regard to 4.0 technologies and, accordingly, to illustrate them the opportunities offered by the project, and the* ***FUTURE 4.0 platform*** *as well, for the acquisition and transformation of knowledge related to most relevant KETs to be applied for process and product innovation.*

What's happened in brief: *during the webinar it was firstly presented the FUTURE 4.0 project, the 6 KETs technologies selected in the Analysis phase, the applied Card Game Analysis as tested methodology and the project main purpose, in terms of opportunities and experimental actions for supporting the implementation and the acquisition of one ore more technologies into companies operating in the naval industry, the shipbuilding and the related supply boosting in this way the innovation and competitiveness of the sector.*
*The main focus has been then on the potential applications of 4.0 technologies, with a particular attention to Additive Manufacturing for the Innovative Design of Product. At this regard the Galielo Visonary District R&D experts proposed the integrated approach "**Design** - **Technology Transfer – Materials"** by illustrating a Galileo recovery project of a Venetian ferry boat through the adoption of 4.0 technologies and new materials for innovative design and the valorisation of Venetian excellence. The starting point of the project has been the need to combine the classic and unique Venetian style with the modern one, in order to select technologies enabling the ferry boat aesthetic valorisation and, at the same time, a complete and unique customer experience of passengers. It was then be studied the revision of the interior architecture of the ferry boat by analysing and considering innovative furniture, lighting and smart materials available according to new frontiers of technology (smart glazing, surfaces, electrochromic materials, modern coverings, materials and fabrics for acoustic and thermal well-being, hydro repellent fabrics). As conclusion Claudio Beltrame – SIAV ICT Manger showed the FUTURE 4.0 platform and its functionalities, especially for Learners, with a focus on Additive Manufacturing contents as supporting tool providing know how and materials at companies' disposal.*

Conclusions & feedbacks: *the participating companies have been satisfied with the webinar as the technological aspects of innovation, specifically applied in the naval and the shipbuilding sectors, were clearly illustrated. Most of participants believe that the integrated approach Design - Technologies 4.0 - Materials can be partially replicated and taken as a point of reference for supporting the product innovation process. They gained advantages by the participation to the activity being inspired by new ideas, in particular some information, knowledge and know how related to Additive Manufacturing and innovative materials could find concrete applications in shipbuilding and naval industry. In their opinion the Augmented reality and the use of VR can surely play a key role in contributing into a more effective user/customer experience.*
The companies belonging to the shipbuilding and naval industry had the possibility to better understand the main design trends and the related future potential developments; in detail the glass technology and new materials resulted very interesting for participants. For them many indications and suggestions, especially in relation to different materials and their use can really open unexplored horizons to different designers. In general, the transfer of knowledge on 4.0 technologies, proposed by the FUTURE 4.0 project, is considered useful for companies active in the shipbuilding and shipbuilding sector and the related supply chain. Unfortunately, some 4.0 technologies, are still too expensive for small shipyards and naval realties.
Finally, all participants expressed positive feedbacks on FUTURE 4.0 Platform, as useful tool supporting the transfer of knowledge om 4.0, and the willingness to be informed about the next activities and main results of the FUTURE 4.0 project.

Apulia - Best Practice

Seminar "MECSPE BARI-TECNOLOGIE PER L'INNOVAZIONE – INDUSTRIE 4.0"

Bari, 28-30 November 2019

Experts:

Giuliana Rotunno: *Mechanical Engineer, Polytechnic of Bari*

Valentino Sangiorgio: *PhD in Risk and environmental, territorial and building development, Polytechnic of Bari*

Agostino Marcello Mangini: *Senior Researcher, Polytechnic of Bari*

MECSPE organizers and coordinators:

MECSPE is the reference fair dedicated to innovations for the manufacturing industry for the manufacturing industry.

Participants' companies:

1. **Difast***: a leading company in the field of Lifting and Hydraulics;*
2. ***Idea75:*** *an engineering company which provides industrial projects, innovative solutions, and R&D activities, in the fileds of industrial automation, process optimization, energy efficiency;*
3. **CNC ROBOT**: *company who is at the forefront in the industrial automation sector which create complete solutions in the field of Software Development and System Integration, offering advanced and integrated solutions in Industrial Automation and Industrial Informatics;*
4. **ECSA SRL:** *System Integration company that is set as a customer partner in the process of change and digitalization that leads to Industry 4.0, providing solutions in the field of process automation, MES, Industrial IOT, integration of machines and systems with information systems, monitoring and analysis of production data and predictive maintenance;*
5. **Esclesior Lamierati:** *produces aluminium furniture and carries out sheet metal processing on behalf of third parties;*
6. ***RL-Engineering:*** *a company involved in the engineering and production of new products in thermoplastic material, zamak, die-cast aluminium and steel;*
7. **FABCRAFT SRLS:** *a start-up based on digital manufacturing;*
8. **TEKNA AUTOMAZIONE E CONTROLLO SRL:** *company specialised in the design, production, installation and commissioning of automatic systems for production lines and automatic machines;*
9. **TECNOACCIAI SRL:** *a company specialised in the processing and distribution of special steels for the mechanical, plant engineering and carpentry industry;*
10. **DIAGNOSTIC ENGINEERING SOLUTIONS SRL***: spin-off of the Politecnico di Bari specialised in experimental mechanics and structural diagnostics;*
11. ***ENERGY@WORK SCARL:*** *a company providing innovative, sustainable and replicable hardware and software solutions on a large scale for improving energy efficiency;*
12. **CREA 3D SRL***: professional solutions for 3D printing of plastics and metals;*
13. **DARTXPLORE SNC:** *company specialized in surveys carried out using remotely piloted aircraft systems;*
14. **EXPERIS SRL:** *global leader in professional resourcing and project-based workforce solutions;*
15. **AXIST:** *company specialized in the provision of dimensional measurement services through the use of photogrammetry instruments.*

Aim of the seminar:

The aim of this event was to strengthen the level of knowledge of southern companies, create business exchanges and discuss issues related to Industry 4.0. On this occasion, analyzes and forecasts of SMEs in Southern Italy and the islands of the mechanical, mechatronics and electronics sectors were presented.

MECSPE Bari gave voice to the excellences of the various industrial sectors, to support local companies, discovering enabling technologies, new production models and skills in a 4.0 perspective capable of creating added value.

In this context POLIBA took the opportunity to present FUTURE 4.0 project through the intervention of its experts.

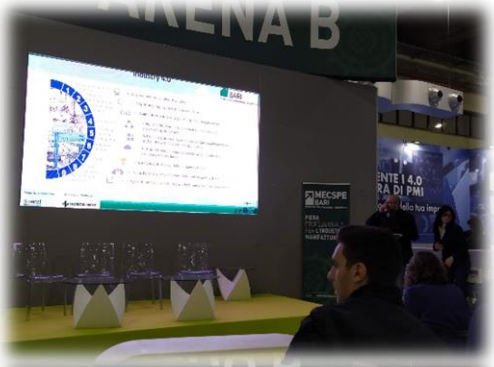
What's happened in brief:

During the MECSPE event which involved several stakeholders and companies from the manufacturing environment coming from all the national territory, FUTURE 4.0 project was presented by POLIBA experts. In particular, the potential applications of Industry 4.0 technologies were discussed, by showing to the audience the benefits that the companies can obtain by the application of these, also thanks to the training courses offered by the project. During the intervention, the ***FUTURE 4.0 platform*** *was introduced to the participants.*

Conclusions & feedbacks:

A target composed by fifteen Apulian companies was reached for this event; nevertheless, also other companies coming from other Italian regions showed their interest for the project.

The involved companies got knowledge of the project; while showing the Industry 4.0 technologies though the FUTURE 4.0 platform, the attention of some participants was caught by specific technologies, such as 3Dprinting, Augmented Reality, Advanced Manufacturing solutions.



Dytiki Ellada - Best Practice

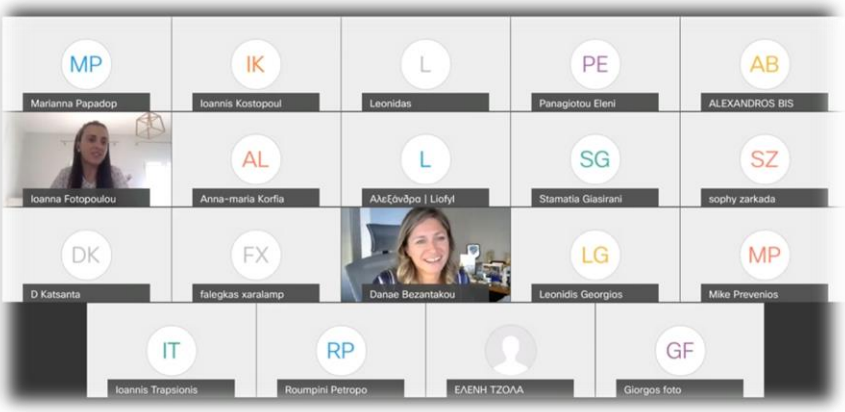
Webinar "The challenge of reinventing the working profiles in the light of the 4rth Industrial Revolution"

Thursday, October 1st, Webinar via WEBEX

Expert:
*The expert of this session during our 2-days webinar was **Ms. Danae Bezantakou**.*
She is the CEO of NAVIGATOR SHIPPING CONSULTANTS. She has a vast experience in the shipping sector in Greece, she is a Young Global Leader of the World Economic Forum, she was named as 40 under 40 European Young Leaders and she runs the SHE in SHE-PPING events with her non profit called iforU.

Coordinators:
Danai Katsanat, *Chamber of Achaia*
Panagiotis Christias, *Financial Project Manager, Chamber of Achaia*
Anna Maria Korfiati, *Research Engineer, LMS – Laboratory for Manufacturing Systems and Automation*
Ioanna Fotopoulou, *subcontractor*

Participants' companies:
14 companies attended the meeting, including many freelancers that are working in the nautical sector and the blue economy
*Namely, **TOBEA** company, **Liofyllo** company, **Patras Science Park Institution**, **Ferry Center** company, **EY Sailing** company, **Super Cargo** Company, **3 lawyers on nautical law** (Elena Tzola, Aias Retsinas & Leonidas Fotiadis), **one archaeologist/tourist guide** Sofia Zarkada, **one e-learning expert** Tifliori Georgia, **Ferry Services** company, **Freelance Engineer** Ms. Roumpini Petropoulou and **CTI Institution**.*



Aim of the seminar: *This section of our 2 –day webinar wanted to clarify and throw light to the new needs that arise with the 4rth Industrial Revolution. Working patterns change, mobility issues arise, technology is more present than ever and the distances practically disappear.*
With all these changes happening really fast, the nautical sector and the blue economy also change. Hindrances on growth appear but also opportunities present themselves, ready to automate things and interconnect them even more. Thus, Ms. Danae Bezantakou wanted to clarify the new scene of the new era workers, point out the positives and negatives of the situation and of course provide some guidelines and solutions on what the future might hold.

What's happened in brief:

Ms. Danae Bezantakou prepared a meaningful presentation. She broke down the issues in 3 different pillars, the new technologies, the lifelong education {e-learning} and the agile working. The participants listened to her closely. Her speech was a definite best practise because no one interrupted during the speech, all the participants stayed till the end and the questions were numerous. Once her speech ended, the floor was given to the participants. Many companies as well as our freelancers had a lot of inquiries, especially on the guidelines Ms. Danae Bezantakou provided regarding the future of the nautical sector.

Overall, it was a very successful session. While Ms. Bezantakou urged the participants to search more, to read more things regarding the 4rth Industrial Revolution and also reach out to her again if her help or her company's help was needed.

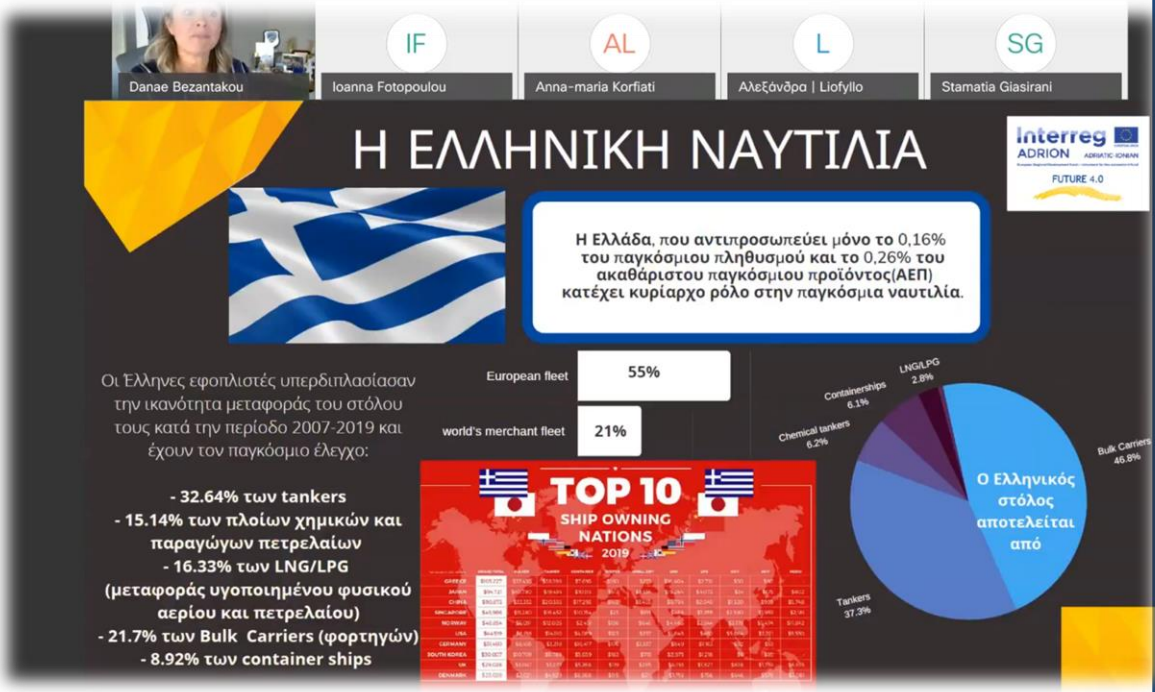
It should be pointed out that during the webinar was also presented to participating companies the FUTURE 4.0 platform and its functionalities, especially for Learners.

Conclusions & feedbacks:

The feedback was really positive. The participants felt great with the fact that they got the chance to speak with Ms. Danae Bezantakou. She is a huge name in the Greek Shipping Industry and a real potent speaker. The issues she discussed were definitely of interest, this is why there were so many questions in the end of her speech.

We should note here that she stayed with us for 25 minutes more than was planned. Because the participants simply had more and more questions and wanted to learn more from her.

An interesting feedback regarding this session was that they would love if Ms. Bezantakou spoke more and analyzed contemporary events as well, like the COVID situation.



Jadranska Hrvatska - Best Practice

Webinar **"Basic knowledge regarding Big Data, Cloud computing and Cyber Security AR, AMS and Additive Manufacturing in Future 4.0 industries"**

17.09.2020. via Zoom platform

Experts:

Sanja Čandrlić: *PhD, Associate Professor*, *Department of Informatics of University of Rijeka*

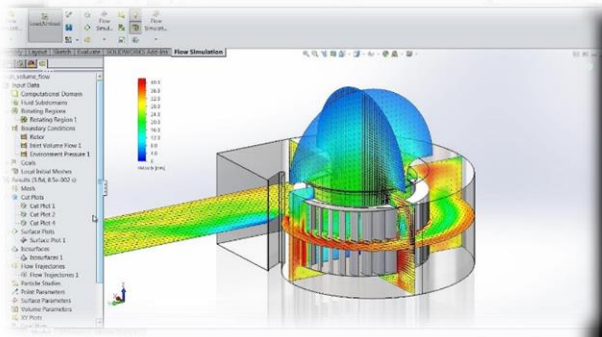
Alen Jakupović: *PhD, Associate Professor, Polytechnic of Rijeka*

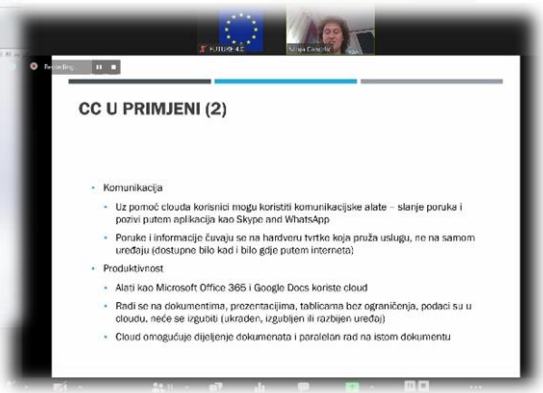
Coordinators: *Project Managers of Prospekt d.o.o. - a creative agency of Rijeka that provides integrated marketing communication services and modern web solutions. Its main aim is to facilitate the companies' business process with their IT department designs and programs.*

Participants' companies: *the 12 companies active in the fields of IT – software development, IT - Cyber Security, Nautical and shipbuilding consultant, Energy Consulting, IT – Industrial Software development*

1. *BENEFIT BIRO*
2. *CIMERA I SURADNICI,*
3. *CT-CON d.o.o.,*
4. *QFACT d.o.o.,*
5. *Brodogradilište 3 maj d.d,*
6. *Seaquest ship management,*
7. *Ris d.o.o.,*
8. *Pupis d.o.o.,*
9. *Nomen d.o.o.,*
10. *FMTU Opatija*
11. *Odjel za informatiku*
12. *Odvjetnički ured Pranjić*

Aim of the seminar: *The participants will acquire and extend knowledge regarding topics related to Big Data, Cloud computing and Cyber Security AR, AMS and Additive Manufacturing in Future 4.0 industries, which they can adapt and use in their everyday jobs inside companies. Through this webinar, experts will provide information, discuss and develop new approaches in implementing Business informatics, Information and Communication Technology related to Big Data, Cloud Computing, Cyber Security, AR, AMS and Additive Manufacturing in Future 4.0 industries.*





What's happened in brief:

In the previous 25 years, since the introduction of the Internet to the general public, data production rate has been rising tremendously. Thus, many organizations have obtained successful solutions to store and analyze these big amounts of data that are generated by different sources such as various gadgets or connected devices, PCs, social platforms etc.
That is the reason why technologies such as big data can be supported by cloud computing to provide major benefits regarding automation, connection, configuration and processing of data. All these technologies and their applications such as AR and AMS, that can also be efficiently coupled with CS are new necessities for organizations, because cloud services can help to achieve organizational aims.
Therefore, cloud systems that store and manage big data can be necessary to develop technical specifications and organizational security plan, in order to strengthen data protection that can result with significant savings. Topics such as Big data analytics, Cyber security, AR, AMS… can provide enterprises and organizations with viable solutions to solve many problems in sectors such as manufacturing, telecommunications, logistics, government, education, energy, retail, transportation, and healthcare.

Conclusions & feedbacks:

Participants feedbacks:
The experts were notably competent and responded intensively to our specific requirements. The know-how transfer was very good and comprehensible. Organizing the training was done in a professional and flexible manner, and the course atmosphere was very constructive."
Participants believe that they will successfully apply the knowledge and experience gained from experts and other participants in practice.

Experts feedbacks:
"We are very satisfied with choice of companies that participated in this project and engagement of participants during sessions."
"Companies of different industries were represented on the project and the participants were very interested in the topics that were covered."
Feedback from experts was very positive and they are satisfied with choice of companies that participated in this project. Experts found that participants successfully adopted the knowledge and prepared a plan to improve its business.

RAZVOJ INTERNACIONALNOG OBRAZOVNOG PROGRAMA VELERI-OI IOT SCHOOL

- Razvoj novog internacionalnog obrazovnog programa na području IoT
- Provedba pilot projekta kojim će se provesti edukacija prve generacije polaznika
- Izrada poslovnog plana kojim će se planirati održivost obrazovnog programa
- Na engleskom jeziku, moderan pristup poučavanju, individualni projekti za kompetencije koje pozitivno utječu na mogućnost zapošljavanja i samozapošljavanja.

3.3 Acquisition Level

Apulia Best Practice "NAUTICA RANIERI"

NAUTICA RANIERI: *Nautica Ranieri is probably the only place, for dimension and comprehensiveness of its structure and organization, able to compete with shipyards located in the rest of Europe. The Ranieri Shipyard is able to carry out dry docking for sailing and motor boats up to 30 meters of length x 8 meters of width, maximum 3,5 meters of draft. NAUTICA RANIERI is equipped with 60 berth places available for mooring of yachts up to 40 meters in length and 3.50 meters draft, and dry storage of boats up to 30 meters of length. There are special moorings places for yachts in transit which need assistance or a technical support.*

The Ranieri Shipyard carries out: repairs of hulls made of fiberglass, wood, light alloys and steel, renewal of teak decks, partial or total refitting operations, reconstruction of the interior fittings, realizations or external modifications of platforms, anti-osmosis treatments of fiberglass hulls. Protective covers are produced with heat-shrinking and caulking, cabinet-making, upholstery and thermal-acoustic insulation are carried out. The Ranieri Shipyard is able to carry out the installation and maintenance of mechanical, electric, electronic and hydraulic in-board systems: inverters, propeller shaft lines, S-drive, IPS, electric generator, walkways, bow thruster, winches, watermakers, air conditioners, refrigerators, radar, VHF, GPS, depth sounders, autopilot, satellite TV, instrumentation. Revision of fire-fighting systems and repair / maintenance of sailing equipment.

Companies' resources involved:

Antonio Ranieri: *Owner, Nautica Ranieri*

Tommaso Ranieri: *Account Manager, Nautica Ranieri*

Experts' and coordinators profiles:

- ***Paolo Ferrari:*** *Naval Architect, specialized in Interior Design, Yacht Design and Industrial Design and Adjunct Professor of Industrial Design at different Universities*
- ***Giuliana Rotunno:*** *Mechanical Engineer, Polytechnic of Bari*
- ***Alessandro Rinaldi:*** *Architect-building Engineer, Polytechnic of Bari*
- ***Beatrice Di Pierro:*** *Management Engineer, Polytechnic of Bari*

Focus of the in-company experimental intervention:

Cloud and Big Data technologies towards an ICT platform of the nautical network

Considering the existing situation and the needs of the company, the experimental intervention is mainly focused on the digitalization of the process management and on the application of the Cloud, Big Data and Augmented Reality technology. MARINA SPORT operates in the nautical sector for over 35 years, offering continuous assistance to all its customers: storage operations and shipbuilding work are carried out at its shipyard.

Methodologies:

- ***Digital learning*****:** *online meetings realized through the Zoom platform allowing both traceability of company participants and training efficacy.*
- ***Face-to-knowledge transfer****: physical meetings realized at Nautica Ranieri headquarter, in Port Authority of Bari*
- ***FUTURE 4.0 Platform***

Main results & evidences:

Definition of a platform where data and services such as maintenance, private mooring and refueling, organization of excursions etc. from multiple users (customers/suppliers) can converge, in order to have a local network that allows the growth of boating in Puglia. The collaboration among the experts of POLIBA and NAUTICA RANIERI for the creation of the above-mentioned nautical network will be functional of the growth of Apulian nautical sector. To these aims, the technologies of Industry 4.0 such as Cloud, Big Data and Cyber Security will be taken into consideration.

Feedbacks:

- ***From the company:***

According to the company owner, the project can have positive impact since it can optimize and help the digitalization of the whole business process.

- ***From the expert:***

Currently, low digitalization resulted in business process of the company, but thanks to the know-how of POLIBA experts and by the FUTURE 4.0 tools, many opportunities of improvement can be offered to the company, also by the application of the above-mentioned technologies of Industry 4.0.

Dytiki Ellada Best Practice "Cyber Security & GDPR"

1. LIOFYLLO: *is a leading company for providing with an eco-friendly material in the creation of the internal of high-end boats and ships. Also, the material to put on the floor or the deck.*

2. MORE YACHTING: *is among the biggest companies for Yacht renting in Greece, based in Patra. Apart from the agency branch, More Yachting also operates its own fleet of sailboats with exclusive bases in Lefkas & Zakynthos. Having a privilege to run an own fleet, More Yachting is very well acquainted with all the details of chartering operations in the field, which is gifting them better understanding of sailors' daily needs and wishes.*

3. SAMMY YACHT: *is a company that helps Yachters and ship owners to find the best port for their boats and yachts in Greece and Cyprus.*

Companies' resources involved:

On behalf of Liofyllo, *the Owner and Managing Director Ms. Alexandra Makrigeorgou*

On behalf of More Yacthing*, the Onwer and Business Development Manager, Mr. Georgiopoulos*

On Behalf of Sammy Yacht, *Ms. Fountzoula, engineer and Customer Success Manager*

Expert profile:

Our expert for the Cyber Security and GDPR seminar was ***Mr. Christos Derventlis****.*

He is an expert on GDPR issues, an accomplished professional despite the young of his age and a very knowledgeable individual through his studies and work experience on the correlation of Cyber Security and GDPR issues. He had participated in many different European project as the main GDPR consultant and mentor while he is now preparing his corporate prortfolio as well.

Focus of the in-company experimental intervention:

The Cyber Security and GDPR webinar was a real challenge for the companies that participated. Not only because it was a 4-hour long webinar but also because it showed the extend that GDPR and cyber security threats are present whenever a company connects to the internet and stores there their customers' data.

During the webinar, our expert urged the companies to find the places that might be vulnerable in their daily operations, think of possible ways to strengthen them and also acknowledge the fact that they need to abide with the crazy rhythm of growth due to new technologies.

Methodologies:

- ***Digital learning:*** 3 online training sessions *realized through the Webex platform allowing both traceability of company participants and training efficacy*
- ***FUTURE 4.0 Platform***

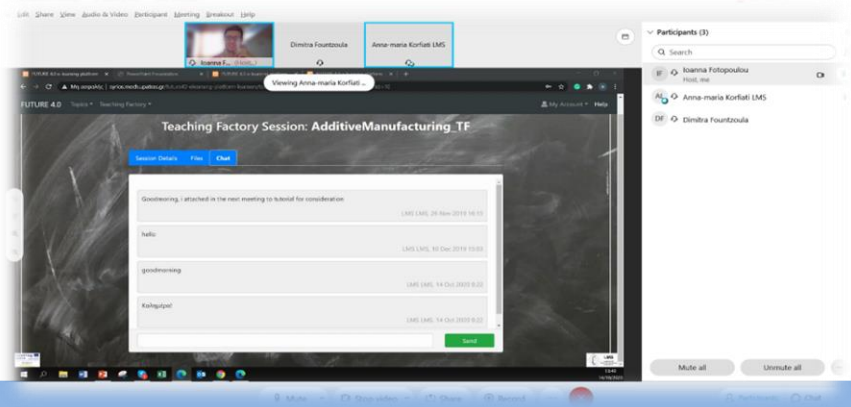
*For the Cyber Security and GDPR webinar, we followed the **"funnel system" approach**.*
We chose this approach, because the issues of Cyber Security, the GDPR laws and the threats they impose for a business are still really vague for the Greek companies of the nautical sector (dare say for the Greek companies in general actually).
Thus, in the first hour of the webinar we introduced all the aspects regarding the GDPR and the laws around it in Greece. The European perspective and the importance of the issue, for any company that is online or is dealing with customers' data through an online portal or server.

We then interconnected it with Cyber Security and the global threats it imposes. It is very important to realize that new technologies come with complications and sometimes irreversible errors, that we should prevent them from happening.

Lastly, we showcased examples and explained how GDPR and Cyber Security issues might affect a company and what specific and concrete actions can be taken in order to prevent these challengers.

Main results & evidences:

1. *The participating companies understood the power of the new technologies in the nautical sector;*
2. *They learned more about the advantages of using such technologies internally, in their daily operations, in order to protect their data, their intellectual property and their future plans;*
3. *They understood exactly how they can utilize and start using these technologies in order to optimize their procedures, take the first step towards scaling their businesses and prevent attacks or profit loss due to cyber security issues or GDPR non abidance;*
4. *They also went through the methodology we used and the extensive knowledge of our expert and understand in depth the endless possibilities that these technologies bring;*
5. *They now have a "map" of steps on how they can adopt such technologies and software through the case studies and the national laws that bide them for Greece;*
6. *The majority of them are ready to explore the first tools in order to optimize their internal procedures and also minimize the daily effort with automation within the month.*



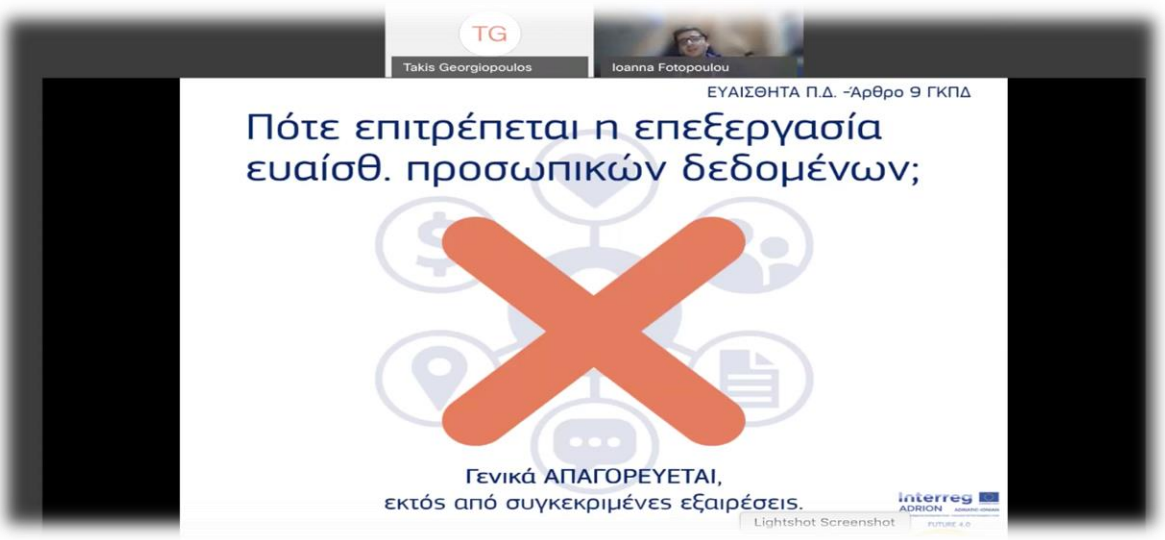
Feedbacks:

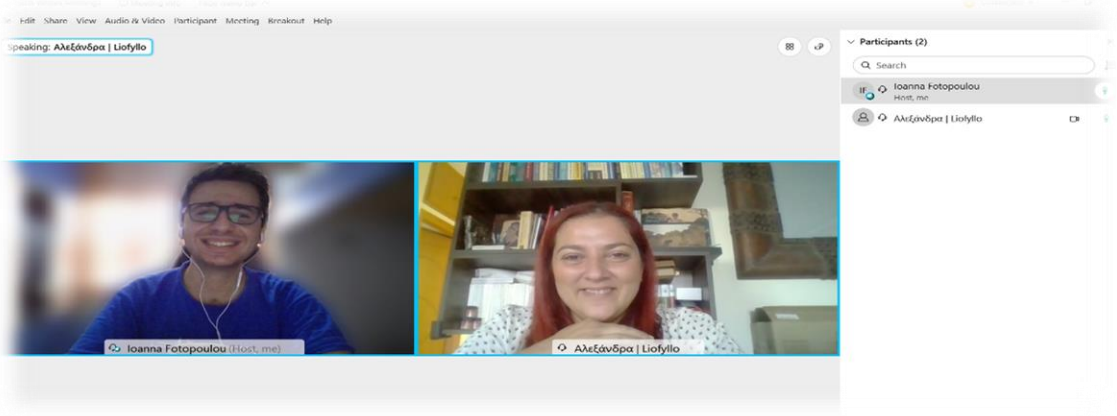
From the companies:

All three companies that participated mentioned that the webinar was a bit long. However, they completely understood the need for such a webinar to be that long. They told us that it was full of information that they could not easily find in the private sector so that it can be specific and tailor made for companies in the nautical sector. Also, the majority of them went over and above to thank our expert by recommending him on LinkedIn for a job really well done.

From the expert:

Mr. Derventlis was very satisfied with the level of the companies. He was impressed with the work they do and understood that this webinar was really important. Unfortunately, Cyber Security and GDPR are vague issues still in Greece, thus he congratulated the vigor and the eagerness of the participating companies to learn, to clarify and to understand the issues that arise in order to most effectively tackle them.





Albania Best Practice "Advanced Manufacturing & Quality Control in the industry"

Participants' companies: *5 SME-s that operate in the supply chain of the shipbuilding and naval industry each company was represented from 2 persons/each*

1. VIP SALOTI
2. SHEHAJ METAL
3. TEKNOPLASTIK
4. EUROPA SHPK
5. REGINA GROUP

In total the acquisition action was attended about 35 participants, including public institutions and government organisation representatives, intermediaries and R&D organisations

Companies' resources involved:

Human resources, project design engineers and technical process engineer

Expert profile:

- ***PhD. Mirela KOCI,*** *Universiteti Ismail Qemali Vlorë - Mechanical Engineering, Composite Advanced materials in marine industry*
- ***Eng. Lendi Nasto****, General Manager of Nasto Inxhiniering sh.p.k.*
- ***PhD. Blenard Xhaferaj,*** *Universiteti Ismail Qemali Vlorë - Head of Department of Engineering and Maritime Technologies, Faculty of Technical Science*

Focus of the in-company experimental intervention:

Main aim of the action: to harmonize the knowledge and competencies of professional in the industry as well as SME-s employees based on INDUSTRY 4.0 concept, so that they can support technology transfer activities addressed to SMEs operating in the mechanical and maritime transport sector, in onshore and offshore services

Main Contents:

- *Basic training in Profiling as an Industrial Quality Controller (QC), which is addressed to a group of people (students and young people employed in SMEs) to strengthen their knowledge in the field of quality controller, which will be indispensable later on increasing intellectual capacity and production quality, and enhancing the quality of SMEs in which these trained and qualified persons will work.*
- *Basic training in PROFILING AS AN INDUSTRIAL QUALITY CONTROLLER (QC). The Quality Controller in the industry is a key professional figure in ensuring the quality of industrial products or processes. It examines products and materials for defects or deviations from specifications. The quality controller reads and interprets drawings, designs and specifications, monitors work processes to ensure that the latter are compliant with production standards, recommends manufacturing or assembly process adjustments, and inspects and tests materials or products on production*

Methodologies:

Face-to-face knowledge transfer: *physical workshop held on 27 nd-28rd May 2020 at YOUTH CENTER VLORE", the Palace of Culture - Pallati Kultures "Laberia"*

The location where the workshop took place, has all the facilities required to carry out the presentations; it was also easily accessed from each participant

Main results & evidences:

- *Introduced to the importance of quality control, the methodology of its implementation as well as the real opportunities that this qualification offers in possible employments in SME's in the future, INDUSTRY 4.0, digitalization skills.*

- *Strengthened companies' human resources knowledge in the field of quality controller, part of which will be indispensable later in enhancing intellectual capacity, production quality and enhancing the quality of SMEs in which these trained and qualified persons will work.*

Feedbacks:

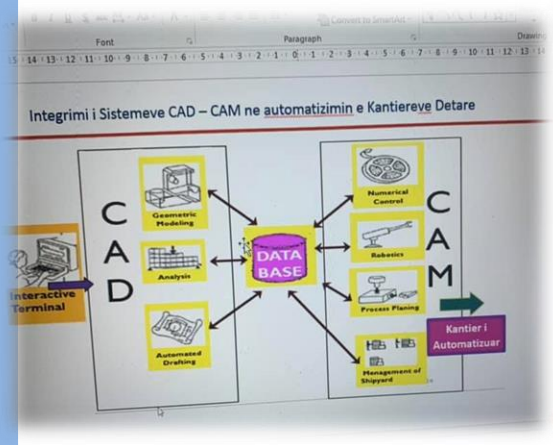
The experimental action was evaluated for the professional level and the methodology followed. Conducting non-destructive control tests with modern equipment was an added value.

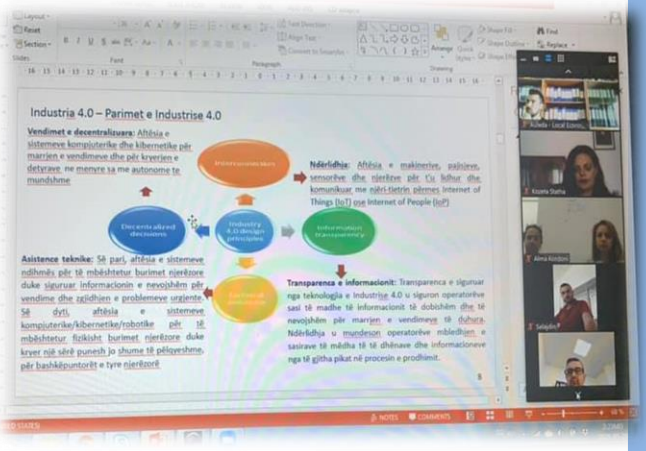
Testing the knowledge obtained in two days of training certified their knowledge.

The certificate obtained will serve professionals to increase their value in the labor market.

From the expert:

The participants in the training were interested and motivated to get the right knowledge about advanced technologies and quality control of products





3.4 Transformation Level

Veneto I Best Practice– "VENEZIA TERMINAL PASSEGGERI"

VENEZIA TERMINA PASSEGGERI SPA: *V.T.P. S.p.A. was founded in 1997 by the Venice Port Authority. It manages 10 multifunctional terminals, 1 provisions storehouse,6 parking lots and 7 quays across the areas of Marittima, St. Basilio and Riva dei Sette Martiri, providing high quality services to any ships (cruise, hydrophoils, catamarans) calling at the Port of Venice. Thanks to considerable investments (over 70M Euro) made by the Company between 1997 and 2018 for improving the efficiency of the port facilities, reducing the impact of the port activities on the environment and enhancing travellers' comfort and safety, the Port of Venice welcomed over the years over 31 million passengers, thus ensuring a prominent position among the best worldwide cruise ports and destinations. It is an Italian major player in the creation and upgrading of cruise facilities as well as in the implementation of innovative technological products for better managing passenger flows.*

Companies' resources involved: *it has been mainly involved the company' staff members operating in the IT area, in line with cybersecurity main focus of the intervention: Saro Paolo (Head of the IT Area Manager), Bullen Ryan (Area IT Manager - Infrastructure Engineer), Destro Andrea (Area IT Manager- Infrastructure Technician), Giovanni Campanale (Data Protection Manager).*

Experts' profiles: *four experts selected and belonging to the Informatic All Srl – an enterprise specialised in Cybersecurity and in providing IT assistance:*

- ***Pawel Zorzan Urban:*** *Security & Cyber Security Manager, Researcher and Consultant*
- ***Alvise Bacco:*** *Cybersecurity and Software Engineer*
- ***Massimo Licari:*** *Business Analyst at IBM – Security Advisory Specialist*
- ***Giulia Carnevali:*** *Junior Consultant on Information Security and Protection - Master's Degree at University of Bologna, Crimininological sciences for investigation and security*
- ***Elisa Balboni:*** *IT Technician & Specialist, Cyber Security and Privacy Consultant - IT Degree at University of Modena & Reggio Emilia*

Focus of the in-company experimental intervention: *t**he Cybersecurity applied to maritime sector** the main focus of the intervention. In detail the main issues dealt are the ones related to **Information Security Governance**, Standards and Frameworks, **Risk Assessment, Business Impact Analysis,** Business Impact Assessment, Business Continuity; **Disaster Recovery, GDPR – new European privacy regulation, System of Information Security Management, Personal Information Security** and the European Union for Cybersecurity.*

Methodologies:

- ***Digital learning*****:** *online meetings realized through the Zoom platform allowing both traceability of company participants and training efficacy. The recourse to digital learning resulted fundamental in order to ensure the knowledge transfer on Cybersecurity technology and a safe environment for participants as the intervention was realized during the Covid-19 emergency. The intervention was delivered through the support of presentation slides shared among companies' participants.*

Main results & evidences: *the main aim of the experimental intervention has been providing the participants the awareness of what **cyber-risks** a company, as well as any user, is subjected to. It was also meant to provide an overview and comparation of national, **European and international regulations, as well as certified standards, in the field of cyber-security** enabling therefore the company to adequate to them. In addition, during the intervention it was illustrated the importance of an **Information Security Governance** for a company, in order to understand how vital is to elaborate a Risk Assessment and to forecast the impact of any **informatic damage.***

*Finally, a deep analysis and focus was made on the **main risks related the marine environment and how to mitigate and control them**. In conclusion advance knowledge was provided to for supporting the **concrete application and implementation of the Cybersecurity technology** into VENEZIA TERMINAL PASSEGGERI services and systems for Venice Port.*

Feedbacks:

- ***From the company:*** *the participants have been very satisfied of the experimental intervention as they find it extremely **inherent to their work environment**. They have the opportunity to **understand the importance of being updated in matter of data protection and cybersecurity,** also in terms of required national and European standards. As the most of the companies' participants cover managerial and strategical roles in IT area, thanks to this experimental action of knowledge transfer on cybersecurity, **VPT will plan a better security strategy,** according especially to the main potential threats in the maritime environment field, **hypothesizing also a recovery plan from an eventual cyber-attack.***

- ***From the experts:*** *according to the experts the companies' participants responded well during the experimental intervention, even if realized in digital learning, as they were **vey interactive contributing with their personal experience and stimulating insights** that were not initially planned and agreed with the company within for the development of the intervention. Particularly relevant the roles of the participants, belonging to the IT area and covering managerial tasks inside the company, enabling an **interesting discussion and reflection on eventual implementations of some of the processes related to the protection of sensible data and cybersecurity**, illustrated and deepen within the intervention.*

Veneto II Best Practice – "CONEPO SERVIZI SCARL"

CONEPO SERVIZI SCARL: *Conepo Servizi is one the most important private company and operator of environmental services and transport, specialized in the field of special and non-special waste disposal activities, in Venice historical centre and mainland. Conepo Servizi is specialised in the management, take-away and transport for disposal and recycling of all types of waste produced by cruise ships and transport of goods parked in the port of Venice and Marghera (room and kitchen waste, cargo residues, similar to urban waste, recyclable, special, hazardous, oil, etc.), as the exclusive concessionaire for port environmental services.*
The very high qualification in the management of services to passenger and merchant ships makes it possible to intervene on a daily basis both by water and land to carry out the activities regulated by the Ordinances of the Venice Port Authority and the Venice Harbour Master's Office (Maritime Authority). It also has all the information on ships' arrival and departure in real time through the documental and authorisation workflow computer system provided by the port operators. It provides packaging, sacks, labels as well as advice and information for the most correct management of special waste, sending it to authorised and accredited collection centres. The management and disposal of waste in an area as fragile as the Venice Lagoon confronts the company with choices of responsibility and the urgency of environmental sustainability. With respect to this issue, CONEPO has launched a campaign - MAKE THE DIFFERECE - to raise awareness of environmental protection and responsible actions in terms of sustainability.

Companies' resources involved:
Marco Zancanaro: *Legal Representative and Amministrative & Finance Manager*
Michele Friselle: *Administrative Manager*
Marco Baiocco: *Operations Manager*
Silvia Baiocco: *Sales Manager*

Experts' profiles:

- **Prof. Andrea Payaro**: *Degree in Computer Engineering, PhD and Specialization Course in Management Engineering at the University of Padua.*

ELA (European Logistics Association) Certified Consultant and Management Consultant in the areas of strategies, business operations, logistics and warehouse organization.
Member of the Scientific Committee International Congress of Contemporary Marketing Issues and Vice President of Supply Chain Management, he collaborates with national magazines in the logistics sector. Teacher at the MBA Transilvania University in Brasov and at the MBA International Business School Americas (Brazil). Appointed Logistics of the Year 2019 by Assologistica.

- **Claudio Beltrame:** *Confindustria Veneto SIAV S.p.A., IT manager*

Methodologies:

- ***Face-to-face knowledge transfer:*** *physical meetings in company headquarter in Venice*
- ***Digital learning***: mainly *online meetings realized through the Zoom platform allowing both traceability of company participants and training efficacy*
- ***FUTURE 4.0 Platform***

Focus of the in-company experimental intervention:

The main objective of the intervention was the digitalisation of the data collection of the waste collection service. Operating in the transport and waste sector, the company interest is to deepen the automation of document management, from initial data to invoicing, linking it to the service and traceability of the goods transported and / or stored.
The company's activity consisted in recording on paper forms the quantities of waste taken from ships by Conepo vehicles in the performance of the normal service. In other words the operating personnel who, - by means of trucks, vans or boats - unload waste from ships, had to manually record on paper forms (called vouchers) the different types of waste, the cubic metres unloaded and other information relating to the ship, the agency, the charterer and the shipowner.
These vouchers were then collected and delivered daily to the administrative office, which must copy the same data into the software for management control and administrative activity.
The aim of the experimental in-company intervention has been therefore to develop an application that allows Conepo's staff to enter the information on waste services at the terminal and to use the information for all the company's needs without having to retype or import data.
A further objective is to re-elaborate some of the information collected (duration of services, efficiency of operating personnel, ...) in order to obtain information for the optimisation of the overall activity of this area of the company and, consequently, to identify further areas for improvement.
*Optimisation should also be seen from a **green perspective**, with objectives linked to fuel savings and reduction of emissions from waste recovery vehicles and also to the reduction of printed paper production.*

Main results & evidences:

The outcome of the experimental intervention and of the process analysis led firstly to a flow chart presenting the application of 4.0 to the process and, consequently, to the development of the new flow that a software house should replicate through application.

Secondly the experimental in-company intervention led to the development of a responsive web application that meets the identified company objectives.
The application is divided into two main sections: the first, for use by the planning office, allows operational managers to plan the routes that the Conepo vehicles must take in order to carry out the waste collection service in the best possible way. The second, optimised for mobile devices, is instead for use by field operatives who have the task of recording the types and quantities of waste released by each ship.
For the identification of the ships, cruise or merchant ships, present in the port, a procedure has been integrated that imports a data track from the Logis-PMIS system, the official environment of the port authorities and the Harbour Master's Office, containing all the information useful for planning and that previously was managed manually by the operational managers.
The data entered by the operators are then directly made available to the administrative software for the related activities.
The application has be also completed by the management of all the necessary master data (ships, berths, agencies, personnel, ...) and a section with reports and data analysis.

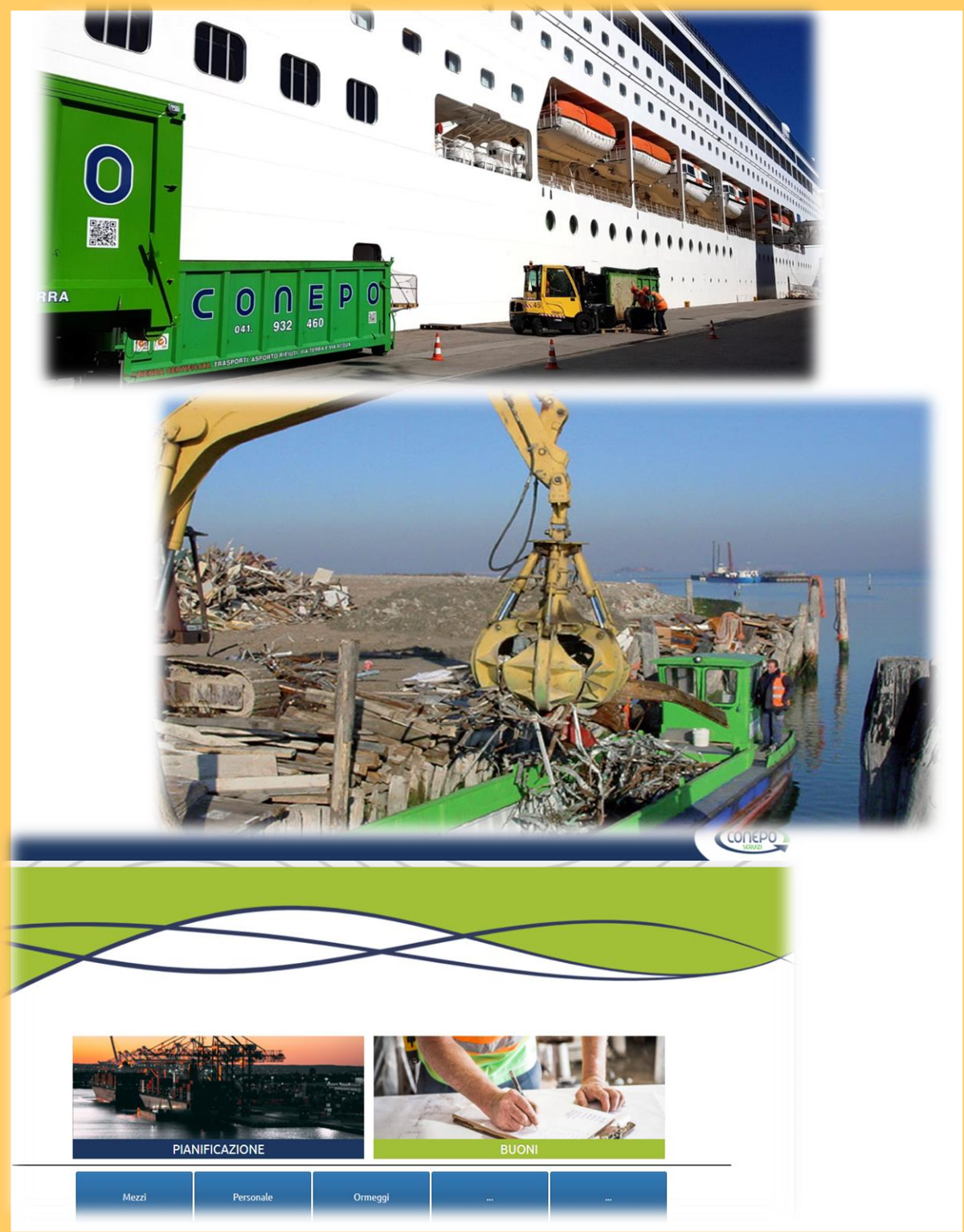
Feedbacks:

- ***From the company:***

The development of the data analysis has been carried out in constant collaboration with company staff, thanks to which some areas for improvement have been identified.
The most important is the one related to the signing of the voucher. This is currently carried out manually by the ship's contact person but the objective is to implement electronic or digital signature systems to avoid the paper printing of the receipt and to digitalise this activity as well.
The company is looking for funding opportunities to start further improvement projects in terms of Industry 4.0. An example of improvement area is the development of a real time localization system of the position of its vehicles on a map.

- ***From the expert:***

The company has shown a great propensity for developing knowledge for innovation, constantly and competently supporting the experts with internal resources.
Thanks also to the product treated by the company - the waste - has shown a particular sensitivity to energy saving, reduction of emissions and proper disposal of waste, including special ones.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Apulia Best Practice – "MARINA SPORT"

MARINA SPORT: *is a company that has been operating in the nautical sector for over 35 years, evolving with the times and dealing with all its segments, such as the sale of medium-large boats, inflatable boats, outboard motors, accessories and nautical spare parts with respective installations. MARINA SPORT covers an exhibition area of more than 4,500 square metres, and a 4,000 square metre operational headquarters in the port of Bari at the Pizzoli pier, where it offers garaging and repairs with assistance to CAT, VolvoPenta, Yamaha, Besenzoni, Veco, etc. It also has a spare parts and accessories warehouse and a large parking and boat storage area. Finally, MARINA SPORT offers a continuous assistance to all its customers: at its shipyard we carry out garaging operations and shipbuilding works.*

It already collaborates with other shipyards such as Ferretti, of which we are their service point.

Companies' resources involved:

Antonio Magistro: *Owner*
Other employees

Experts profiles:

- ***Paolo Ferrari:*** *Naval Architect, specialized in Interior Design, Yacht Design and Industrial Design and Adjunct Professor of Industrial Design at different Universities*
- ***Giuliana Rotunno:*** *Mechanical Engineer, Polytechnic of Bari*
- ***Alessandro Rinaldi:*** *Architect-building Engineer, Polytechnic of Bari*
- ***Beatrice Di Pierro:*** *Management Engineer, Polytechnic of Bari*

Focus of the in-company experimental intervention:

Digitalization and ICT tools for the process management of the company
Considering the existing situation and the needs of the company, the experimental intervention is mainly focused on the digitalization of the process management and on the application of the Cloud, Big Data and Augmented Reality technology. MARINA SPORT operates in the nautical sector for over 35 years, offering continuous assistance to all its customers: storage operations and shipbuilding work are carried out at its shipyard.

Methodologies:

- ***Digital learning*****:** *online meetings realized through the Zoom platform allowing both traceability of company participants and training efficacy.*
- ***Face-to-knowledge transfer****: physical meetings realized at Port Authority of Bari*
- ***FUTURE 4.0 Platform***

Main results & evidences:

The main effort deals with the digitalization of the business tools due to the lack of ICT systems that can manage data and activities. The collaboration among the experts of POLIBA and MARINA SPORT for the implementation of the abovementioned tools, will be functional for the growth of company. To these aims, the knowledge of POLIBA in the informatics and automation field is allowing the digitalization of the business; in particular, an App for the management of customers and employees is under development. By a proper QR code and also by means of Augmented Reality technology, this tool allows to obtain information of the boats, uploads pictures and monitors the progress of the works of employees. Cloud and Big Data technology are functional for the improvement of the level of the services to be offered to the customers.

Feedbacks:

- ***From the company:***

According to the company owner, the project can have positive impact since it can optimize and help the digitalization of the whole business process.

- ***From the expert:***

Currently, low digitalization resulted in business process of the company, but thanks to the know-how of POLIBA experts and by the FUTURE 4.0 tools, many opportunities of improvement can be offered to the company, also by the application of the above-mentioned technologies of Industry 4.0.

Dytiki Ellada Best Practice – "Cloud Automation Software Enhanced"

1. MORE YACHTING: *is among the biggest companies for Yacht renting in Greece, based in Patra. Apart from the agency branch, More Yachting also operates its own fleet of sailboats with exclusive bases in Lefkas & Zakynthos. Having a privilege to run an own fleet, More Yachting is very well acquainted with all the details of chartering operations in the field, which is gifting them better understanding of sailors' daily needs and wishes.*

2. AQUA TERRA: *the leading Greek company for coastal infrastructure and erosion prevention of ports*

3. KAREL BOATS: *a company that constructs boats and yachts*

4. NIREAS BOATS: *another company that constructs boats and yachts*

5. LIOFYLLO: *a leading company for providing with an eco-friendly material in the creation of the internal of high-end boats and ships. Also, the material to put on the floor or the deck.*

6. SAMMY YACHT: *a company that helps Yachters and ship owners to find the best port for their boats and yachts in Greece and Cyprus.*

Companies' resources involved:

More Yachting *was represented by Mr. Georgiopoulos, the onwer and Business Development Manager.*

Liofyllo *was represented by Ms. Alexandra Makrigeorgou, owner and Managing Director.*

Sammy Yacht *was represented by Mr. Alexadnros Patsias, engineer and Customer Care Manager.*

Aqua terra *was represented by Mr. Kapopoulos, owner and Business Development executive.*

NIREAS *boats was represented by owner Mr. Liberis Kranitis*

Karel Boats *was represented by their internal project manager, Ms. Dimitra Kaimaka*

Expert profile:

For the Cloud Automation Software's enhanced webinar, the expert was belonging to the team of ***COMIDOR****. Comidor is an English company with many credentials on the cloud automation sector that also has a Greek Chapter. They are experts on ERPs, cloud software and automations. Their team of business development experts and engineers led the various workshops, depending of development experts and engineers led the various workshops, according to the needs of each company participating. The company works with many leading companies in Greece, in the UK, in USA and Europe.*

Focus of the in-company experimental intervention:

During the workshop the experts showcased through specific case studies, based on each company's needs, how these companies can use such systems in order to automate their procedures. They made it clear on what are the steps in order for the companies to identify where there are repetitive tasks that could be automated and laid out a step-by-step guide on how to start incorporating such technologies in their companies.

Methodologies:

- ***Digital learning:*** 20 online training sessions *realized through the Webex platform allowing both traceability of company participants and training efficacy.*
- ***FUTURE 4.0 Platform***

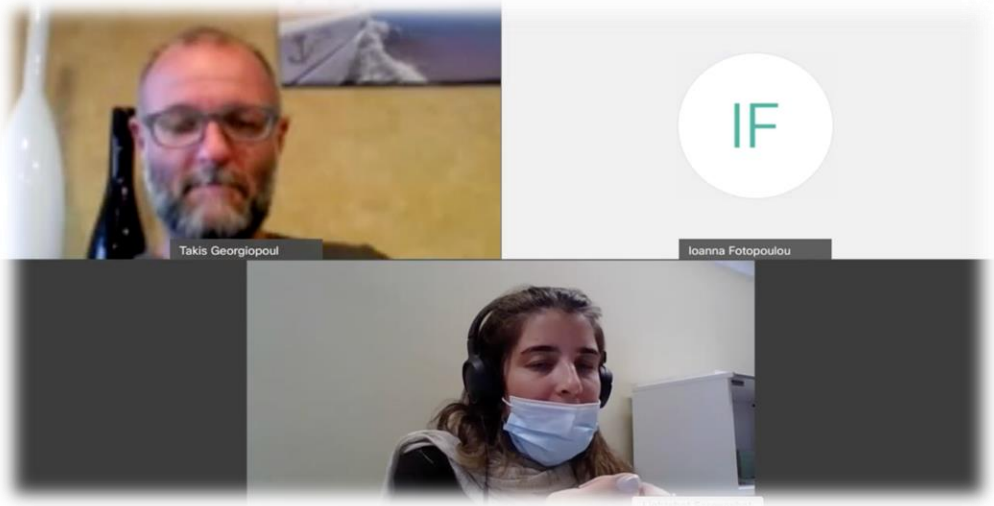
For these webinars we followed the Case Study approach. The experts on Cloud Automation Systems studied beforehand each company. They then found and analyzed specific case studies that were close to the companies' needs. During the webinar, they presented these case studies and tried to navigate the participating companies through them towards the cloud needs each of them had.
The case study approach is the most accurate and result-oriented approach when it comes to new technologies. Especially when we take into consideration that these companies had little knowledge on what such technologies can offer and also little expertise on how to best utilize them.

Main results & evidences:

1. *The companies, through the methodologies we used and the extensive knowledge of our experts, were able to deeply understand the power and the potential of these new technologies and the power of automation in the nautical sector. They were also really eager to explore even more and start using them immediately.*

Moreover, they clarified internally how much stronger their daily operations and also their results will be if they start to use cloud in order to maximize transparency, efficiency and team collaboration.

2. *The companies that participated in this enhanced webinar, is safe to say that they now have a "map" on all the aspects they were educated on. A "map" of how to handle, prevent or recover data and analytics as well as a "map" on where to start with Cloud Automation Software and which areas will be the easiest or the most important to change and will bring the highest benefit in the short future.*
3. *The majority of the companies that participated in this workshop are ready for the next step. And this is why this workshop was the best practice on this level. While going through the mentoring from our experts, they found the specific areas they could reform and enhance. And they are looking into the available solutions to start implementing these changes and incorporating the new technologies.*



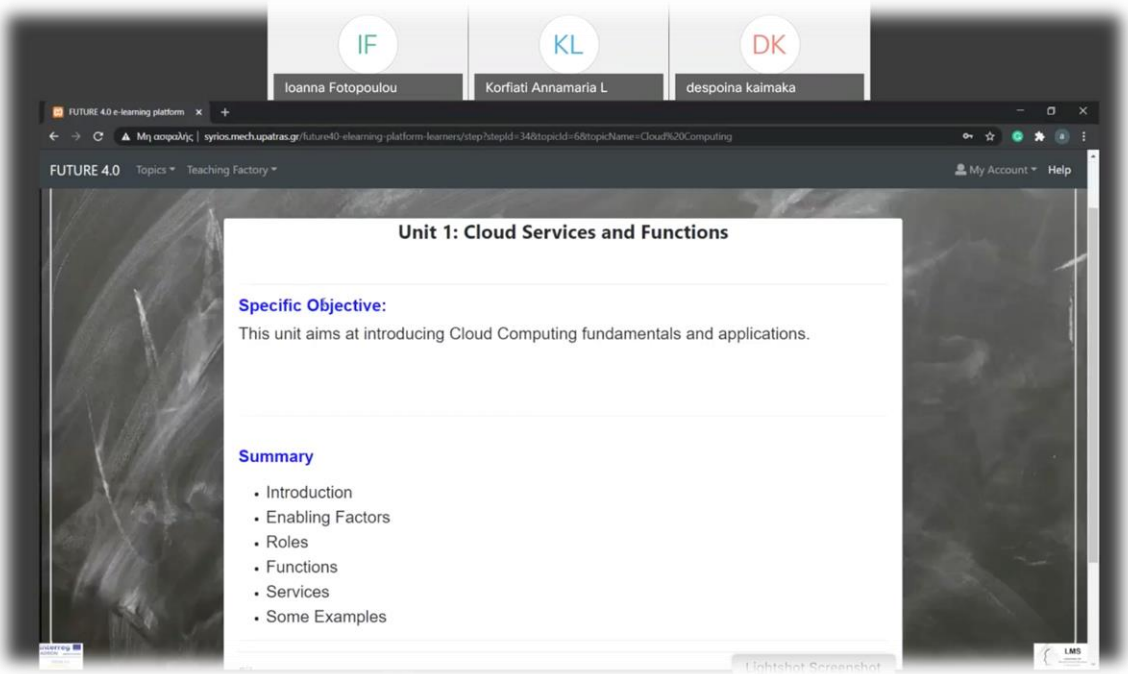
Feedbacks:

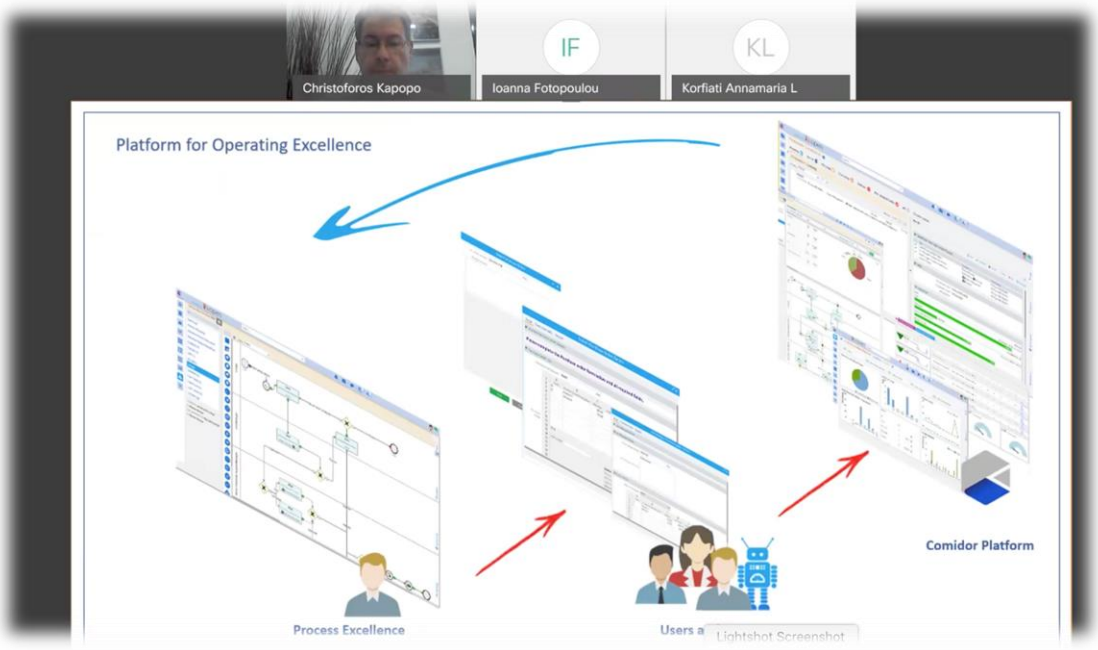
From the companies:

The feedback on behalf of the companies was overall very positive. The majority of them in the end of the webinar were requesting even more info and they were asking lots of questions, which means they showed real interest. Also, they told us that during the session they were able with the guidance they were getting, to identify specific areas for improvement in their companies and they were pretty excited to put this new knowledge in use and to start watching their companies getting stronger and have faster growth. Some of the companies told us that the information was rich and really helpful but they will need to address other issues such as the GDPR and cyber security before they commit to cloud automation. However, they were very pleased to have been introduced to this world and now they have a map on what to do when they are ready for this next big step for their companies.

From the expert:

COMIDOR's team analysed the situation of each company separately.
The overall feedback was that the majority of these companies are mature enough now in order to start enhancing their daily operations and insert automation. The majority of these companies are ready to scale to their next level, thus automation is a crucial aspect for the scaling to be successful. COMIDOR's team believes that after the Cloud Automation Software enhanced webinar, the participating companies are now able to identify internally in which procedures they can use automation. Within the next semester these companies could automate and bring their daily operations in a new technological level.

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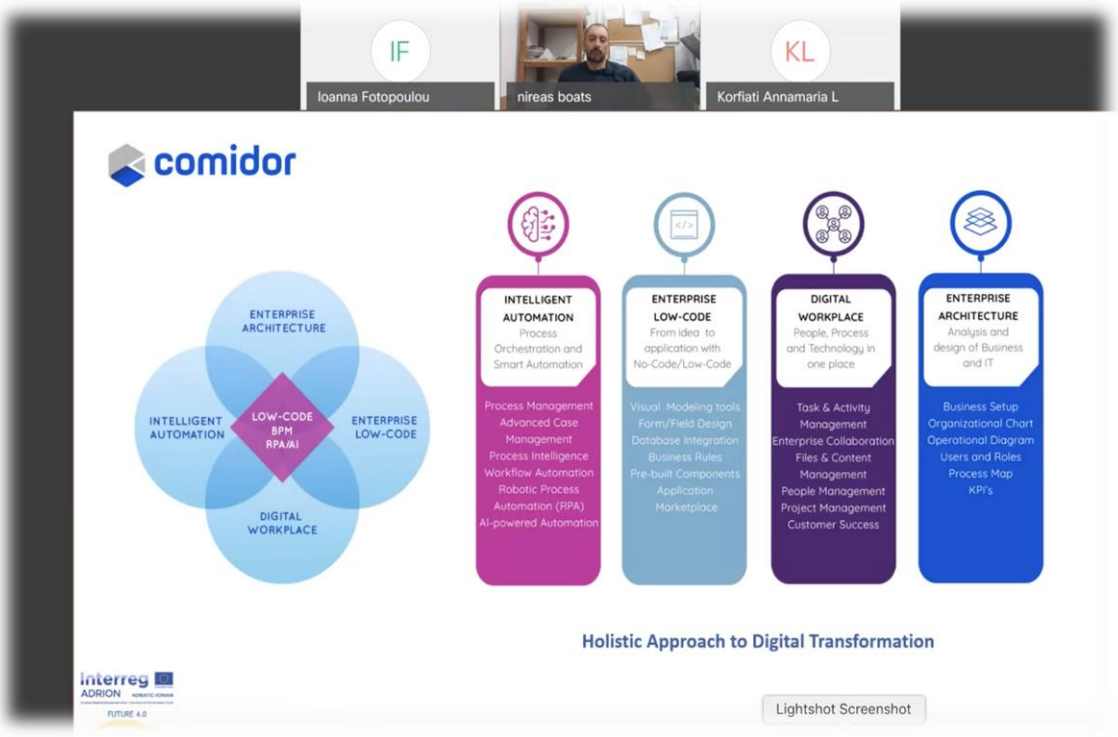
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Process Orchestration and Smart Automation
Process Management
Advanced Case Management
Process Intelligence
Workflow Automation
Robotic Process Automation (RPA)
AI-powered Automation
ENTERPRISE LOW-CODE
From idea to application with No-Code/Low-Code
Visual Modeling tools
Form/Field Design
Database Integration
Business Rules
Pre-built Components
Application Marketplace
DIGITAL WORKPLACE
People, Process and Technology in one place
Task & Activity Management
Enterprise Collaboration
Files & Content Management
People Management
Project Management
Customer Success
ENTERPRISE ARCHITECTURE
Analysis and design of Business and IT
Business Setup
Organizational Chart
Operational Diagram
Users and Roles
Process Map
KPI's
Holistic Approach to Digital Transformation
Lightshot Screenshot

Veneto III Best Practice – "CANTIERE NAVALE VITTORIA"

CANTIERE NAVALE VITTORIA: *Vittoria Shipyard was created in 1927 through the initiative of the family Duò, the soul of the Vittoria Shipyard. All the three generations, who have run until today, have worked continuously toward product innovation. The workspace, set in Via Leonardo Da Vinci in Adria, extends across a 22.000 meters surface, 8.000 of which are covered by mobile hangars that allow production to continue on different projects simultaneously, without restraint from the external climate. Vittoria Shipyard's security boats are the flagships chosen by police and coast guards of many Mediterranean countries. In particular, the most requested ships are Search and Rescue boats (SAR boats), which are unsinkable and self-righting. In those recent years, more than a hundred of vessels have been built for the Coast Guards of Italy, Croatia, Libya, Malta, Cyprus and Tunisia, and they have been used against illegal immigration, smuggling, illegal drug trade, terrorism and also, for the protection of the environment and fishing areas. Concerning defence, Vittoria Shipyard has experienced crafting patrol boats, fast interceptors, and general-purpose guard ships.*

Companies' resources involved:

Paolo Duò: *President & Production Manager*
Antonio Duò: *CEO & Production Manager*
Roberto Duò: *CEO & Production Manager*
Francesco Zanotto: *HSE & IT Manager*
Carlo Brero: *Quality System Manager & Sales*
Massimo Bonandini: *Technical IT Manager*
Riccardo Masiero: *Purchasing Manager*

Expert profile:

- **Prof. Andrea Payaro**: *Degree in Computer Engineering, PhD and Specialization Course in Management Engineering at the University of Padua.*
  ELA (European Logistics Association) Certified Consultant and Management Consultant in the areas of strategies, business operations, logistics and warehouse organization.
  Member of the Scientific Committee International Congress of Contemporary Marketing Issues and Vice President of Supply Chain Management, he collaborates with national magazines in the logistics sector. Teacher at the MBA Transilvania University in Brasov and at the MBA International Business School Americas (Brazil). Appointed Logistics of the Year 2019 by Assologistica.
- **Francesco Palmarini:** *Information Technology Security Expert*

Focus of the in-company experimental intervention: *the experimental intervention focused on the analysis of internal processes in order to proceed with their progressive digitalization in view of what is foreseen by Industry 4.0.*

In particular, within the intervention were analysed some internal procedures such as:

- Purchase request
- Purchase of materials
- Storage flows of incoming materials
- Withdrawal operations for production.

The analysis allowed to highlight some activities with no added value and suggest a series of improvements to be made.

Methodologies:

- **Action Learning for Innovation**
- **Face-to-face Knowledge transfer:** *physical meetings in shipyard headquarter in Adria*
- **Applications of the learning by doing model** realized on site and through the application of analysis tools such as **the value stream map and makigami.**

Main results & evidences:

The company has identified a number of redundant procedures during the purchase phase.
In particular, through the study of orders, a very high fragmentation emerged, many orders of low value. The improvement implementation foresees a Web platform where some suppliers can see the stock available at CNV and restore the materials.
The work carried out directly on site, in shipyard headquarter, also brought to light the difficulty of tracking materials from the moment they were delivered by suppliers. The improvements suggested consist of greater traceability using barcode identification systems and radio frequency readers.
Every activity carried out by the readers (loading, unloading and transfer) would then be reported and recorded by the management.
Finally, the layout of the warehouse itself has been revised in order to improve operational performance and reduce some waste of time and space.

Feedbacks:

- ***From the company:***

The shipyard has quantified orders in greater detail in order to rationalise its activities
It has also implemented a plan to reorganise the warehouse by developing a new layout.
At the moment the shipyard is collecting offers to adapt its management to the adoption of a communication platform with its suppliers.

- ***From the expert:***

The companies' human resources involve in the experimental intervention showed proactivity in the applications explained as well as direct interest. In addition, company' profiles with different functions were involved to receive more information about the procedures analysed.

Albania Best Practice "Advanced Manufacturing & 3D modelling"

Participants' companies:

10 SME-s that operate in the supply chain of the shipbuilding and naval industry

1. VIP SALOTI
2. METAJ FROS
3. ALB ALBADRIATIKO
4. TEKNOPLASTIK
5. NASTO ING
6. HAG
7. ALMARINA
8. MCP LTD
9. ORIKU SHPK
10. SHEHAJ METAL

In total the acquisition action was attended about 25 participants, including intermediaries and project design companies

Companies' resources involved:

Human resources, project design engineers and technical process engineer

Expert profile:

- ***PhD. Mirela KOCI,*** *Universiteti Ismail Qemali Vlorë - Mechanical Engineering, Composite Advanced materials in marine industry.*
- ***PhD. Blenard Xhaferaj,*** *Universiteti Ismail Qemali Vlorë - Head of Department of Engineering and Maritime Technologies, Faculty of Technical Science*

Being that all the lecturers were academically or professionally related to the topics presented, presentations were of a great level.

Focus of the in-company experimental intervention:

Main aim of the action: to provide a real opportunity for all trainees (professional of mechanical and maritime industry) to improve their professional background based on the new digital skills of advanced manufacturing and 3D modelling

Main Contents:

- *Transfer of knowledge about the advanced materials used in mechanical and naval industry including the friendly environment materials like composite materials*
- *Transfer of knowledge about the link between the use of composite materials for ship production, engine propulsiory and CO2 emissions reduction*
- *3D modeling and its effects in shape, construction, engine power and CO2 emissions*
- *Solid work software introduction, projecting and simulation*

Methodologies:

- ***Face-to-face knowledge transfer:*** *physical workshop held on 24th June 2020 at YOUTH CENTER VLORE", the Palace of Culture - Pallati Kultures "Laberia"*

Main results & evidences:

- *Raised awareness of the use of advanced manufacturing technologies, 3D modeling and project design concept*
- *Understanding the importance of adapting the best international practices in advanced manufacturing and 3D modeling*

Feedbacks:

The transformation session was evaluated for the professional level and the methodology followed. Presentation of the new technologies and 3 D modeling advanced process, best applications in marine industry sector was very recently knowledge that will be applied in the future.

- ***From the expert:***

There was a high participation from both SME-s and freelance project designers
Presentations held during the workshop and other detailed information required from each participant, were sent to them via email.
The location where the first training session took place, has all the facilities required to carry out the presentations; it was also easily accessed from each participant.
The participants in the transformation session were interested and motivated to get the right knowledge about advanced technologies and 3 D modeling

4. Synthesis of Local Pilot Actions & Feedbacks

METHODOLOGIES

In the earlier phases of DISSEMINATION and AWARENESS of FUTURE 4.0 project, foreseen within the Local Pilot Actions, it has been mainly adopted a **Face-to-face knowledge transfer approach**.

The DISSEMINATION and AWARENESS actions implemented within the five Local Pilot Actions were traduced mainly in **Seminars, realized in physical way**.

As one of the main objectives of this phase was to understand the companies and stakeholders' perception on the Industry 4.0 revolution and related needs in terms of new requested skills and competences, in many AWARENESS interventions were implemented a **blended learning approach** which includes the recourse to **supporting materials as video and examples of concrete applications of 4.0 technologies as well as the combination of plenary and working groups sessions**.

In the AWARENESS actions foreseen in Veneto, Apulia and Dytiki Ellada Local Pilot Actions were also applied and tested the **Card Game Analysis** as effective methodology for catching companies' feedbacks, points of view, perceptions and priorities related to 4.0 technologies and related skills. **The FUTURE 4.0 Platform**, its contents and related functionalities for Learners were also showed and presented in almost all AWARENESS seminars.

In the in-company ACQUISITION and TRANSFORMATION interventions experimental and personalized interventions, the methodology initially implemented has been the **Action Learning for innovation**.

In the FUTURE 4.0 project the Action Learning has been applicated with the specific main aim of introducing 4.0 technologies and innovations. This methodology has been especially adopted in the Veneto and Apulia Local Pilot Actions.

In these phases the Action Learning has been combined with the Platform FUTURE 4.0, as supporting tool and collaborative e-learning in the technologies 4.0.

The FUTURE 4.0 platform was also particularly implemented and adopted within the Dytiki Ellada and Apulia Local Pilot Actions, but also in the **one-to-one mentoring activities** of University of Rijeka – EFRI on technologies 4.0.

Due to Covid-19, **e-learning** has become an essential and in the last months almost unique tool, given the impossibility to provide “face to face” training.

The project partners have been very flexible and agile to move from to **Digital Learning** in a fast way: in most of the experimental AWARENESS, ACQUISITION and TRANSFORMATION actions the digital learning was combined with face-to-face knowledge transfer and the action learning methodology, experimenting and fostering in this way the recourse to a **blended learning approach.**

Almost of Local Pilot Action activities have been partially and, in some cases, completely digitalized by the recourse to the digital or virtual learning formula and approaches such as webinars, web meetings, web conferencing and virtual training sessions. In detail the experimental **activities foreseen within the Jadranska Hrvatska and Dytiki Ellada Local Pilot Actions has been rescheduled completely in Digital Learning**.

The **webinars** in particular have been also the tool most adopted by partners and experts for implementing the Local Pilot Actions experimental interventions for the knowledge transfer on 4.0 technologies.

Therefore, in conclusion, the strategy adopted within the Local Pilot Actions by partners consisted in the reinforcement of the digital or virtual learning and of the blended learning approach by the recourse to a balanced mix among learning methodologies: face-to-face knowledge transfer, seminars structure in both plenary and interactive working group sessions, Card Game Analysis Action Learning for Innovation, FUTURE 4.0 platform, e-learning, digital learning and webinars

TECHNOLOGIES

As agreed by the partners since the earlier phase of project and, according to challenges of the manufacturing industry of the shipyard and nautical logistic supply chain brought by the **Industry 4.0 revolution, it was** decided to focus the knowledge transfer experimental actions foreseen in the Local Pilot Actions on six of the nine KETs enabling technologies brought by the Industry 4.0: 1) Additive Manufacturing 2) Advanced Manufacturing Solutions, 3) Augmented reality, 4) Cloud computing, 5) Big Data & Analytics 6) Cyber security.

In the AWARENESS interventions realized within the **Veneto region** was provided an overview and know how on the **Digital Technologies** for the Naval Industry, the Shipyard and the related Supply Chain. Focuses were made on **Cloud and Cyber Security** and potential applications for the innovation into companies providing logistics and maritime services. In detail two webinars were focused respectively on **Additive Manufacturing, Virtual Reality and New Materials** for innovative design of products and on **Robotics and Augmented Reality**. In the ACUISITION in-company interventions was activated a **roadshow on KETs technologies**.

Regarding the personalized TRANSFORMATION in-company interventions, in 3 companies were implemented processes aimed at the improvement of logistic flow and IT logistic management through the 4.0 technologies (mainly Cloud, Cyber Security and Big Data and Analytics).

In 2 companies – VECON SPA and VENEZIA TERMINAL PASSEGGERI SRL - strongly connected with the Venice Port Authority, operating in the maritime and environmental transports and touristic sector as well, the personalized TRANSFORMATION in-company interventions were focused respectively on **Big Data and Cyber Security.**

In **Apulia Local Pilot Action**, the AWARENESS interventions were provided a wide dissemination about I4.0 technologies and possible methodologies.

In 2 ACQUISITION in-company interventions, the focused was on **Cloud and Big Data**; in the other 2 on **Cyber Security and Augmented Reality**.

Deeper knowledge on **Cloud, Big Data and Augmented Reality** technologies were also provided in the 3 personalized TRANSFORMATION in-company interventions, according the companies expressed needs.

Regarding the Dytiki Ellada Local Pilot Action, in the AWARENESS webinar was provided a panoramic of new revolutionary Technologies emerging in the shipping sector as well as for Human Resources management. The ACQUISITION intercompany webinar focused instead on Cloud Computing and related automation software.

In the TRANSFORMATION intercompany webinar, ACCORDING to identified companies' needs, was deepen once more Cloud, but also Big Data and Cyber Security technologies and related potential applications.

In all the AWARENESS, ACQUISITION and TRANSFORMATION experimental intervention implemented in the Jadranska Hrvatska Local Pilot Action, the technologies deepen were **Big Data, Cyber Security and Cloud** with the provision of basic, intermediate and advance knowledge transfer and application on processes and products.

Finally, differently from the other Local Pilot Actions, the Albania one focused its experimental actions mainly on Advanced manufacturing, materials and **Additive Manufacturing.** An analysis on Green manufacturing and Logistics megatrends were also realized by the Mediterranean University of Albania at ACQUISITION level.

In conclusion, according to companies identified and expressed needs, it resulted that the transversal and most relevant and impacting technologies in terms of innovation and improvement of products and processes are the following 4 ones, on which were focused mostly the experimental Knowledge transfer Local Pilot Actions interventions,

1) Cloud

2) Cyber Security

3) Big Data

4) Augmented Reality

TARGET COMPANIES

In total, within the five Local Pilots Actions, were reached and actively involved through the experimental knowledge transfer actions **132 companies – mostly SMEs, belonging to the Naval Industry, the Shipbuilding and the related supply chain** (39 in Veneto Region, 30 in Apulia, 23 in Dytiki Ellada, 20 in Jadranska Hrvatska and 20 in Albania).

In detail **in the Veneto region Local Pilot Action** were involved 6 local shipyards, with consolidated experience and history, in addition to other 3 companies specialized in the naval construction. Other 5 relevant Venice companies, strongly connected with the Port Authority and operating in the maritime and environmental transports of raw materials and waste, as well as in the touristic sectors, benefited from the experimental actions. It should be pointed out that in the AWARENESS interventions were reached mostly companies belonging to the supply chain of the shipyards and naval industry.

In the **Apulia Local Pilot Action** were also involved companies, especially SMEs, belonging to manufacturing and supply chain sector. In detail 7 SMEs strictly linked to the shipyard and shipbuilding sector benefited from ACQUISITION and TRANSFORMATION in-company interventions; 2 of these companies operate in tight connection with the Port Authority.

In **Dytiki Ellada Local Pilot Action** participated mostly companies active in the nautical sector and the blue economy, including some freelancers. In particular, with regard to ACQUISITION and TRANSFORMATION intercompany interventions, were involved 2 shipbuilding companies and about 3 naval, maritime and touristic service providers.

Regarding the **Jadranska Hrvatska Local Pilot Action**, the target reached refers mostly to companies active in the fields of IT – software development, IT - Cyber Security, Nautical and shipbuilding consultant, Energy Consulting, IT – Industrial Software development.

Finally, in the **Albania Local Pilot Action**, the companies involved - mainly SMEs - operate in the naval and logistic sectors; project design companies also participated.

In conclusion, as added value, it has been revealed that many companies attending to the awareness interventions resulted particularly interested into deepen some 4.0 technologies asking and benefiting also from the interventions foreseen in the other two phases of ACQUISITION and TRANSFORMATION.

Regarding the **profiles of the companies' human resources** actively involved in the experimental actions, it has been noted the partially **attendance of entrepreneur/CEO in almost all the interventions** as evidence of their concrete interest. The commitment of the company top management which clear objectives, shared with the other companies' human resources, represented an added value as is key for an effective knowledge transfer for innovation.

Along with CEOs and the entrepreneurs, in the experimental actions – especially at ACQUISITION and TRANSFORMATION levels – were involved a wide and significative range of companies' profiles with different and relevant task:

- IT Area Managers;
- Data Protection Managers;
- HR & Managers;
- R&D Managers;
- Innovation Managers;
- Financial & Administrative Managers;
- Software Sales Managers
- Business Development Managers;
- HSE Managers;
- Operations & Production Managers.

In total at least 250 companies' human resources – operating in the Naval Industry, the Shipbuilding and the related supply chain - were involved and participated to the experimental knowledge transfer actions foreseen in all the five Local Pilot Actions.

EXPERTS

For the implementation and realizations of the experimental interventions foreseen with the Local Pilot Actions, in terms of knowledge providers, were involved:

a) partners staff members mainly with a role of presentation of FUTURE 4.0 project, goals and FUTURE 4.0 platform: Project Manager, Innovation Manager, ICT Managers, Research Engineers, Financial Managers, Management and Mechanical Engineers

b) academics with high expertise on 4.0 technologies applied to business realities, such as:

- Prof. Alessandro Beghi: Prof at University of Padova,

Department of Information Engineering & Scientific Director of the Regional Innovation Network IMPROVENET-ICT;

- Prof. Gianluca Toschi: Prof. at University of Padua - Department of Economics and Management and Fondazione Nord Est think tank;

- Prof. Andrea Payaro: Degree in Computer Engineering, PhD and Specialization Course in Management Engineering at the University of Padua. ELA Certified Consultant and Management Consultant in the areas of strategies, business operations, logistics and warehouse organization. Member of the Scientific Committee International Congress of Contemporary Marketing Issues and Vice President of Supply Chain Management;

- Paolo Ferrari: Adjunct Professor of Industrial Design at different Universities and Naval Architect, specialized in Interior Design, Yacht Design and Industrial Design;
- Professors and PhDs of the University of Rijeka - Faculty of Economics;
- Prof. of the Faculty of Technical Sciences of the University of Vlora;

c) External experts, also belonging to same IT companies providing service and consultancy assistance to business realities, especially on Cybersecurity and IT innovative solution, software and applications such as:

- Informatic All Srl Cybersecurity experts: a company operating since 2004 in the ICT sector and specialised n management applications, software development and cybersecurity
- MAPS SPA Experts: ICT company that designs and implements innovative solutions to support companies' decision-making processes
- COMIDOR experts on Cloud Automation Software's: an English company that has a Greek Chapter. They are experts on ERPs, cloud software and automations.
- Pirate Scale experts: a company working with many multinational companies in Greece, the UK and the USA and with an international dimension in the field of educating executives and companies on sales and the new accelerated technologies

- Cyber Security and Big Data & Analytics experts: Mr. Christos Derventlis, Mr. Stefanos Nastos, Mr. Tomaso Santi, Mr. Elias Tsaldaris

Furthermore, it should be pointed out that only in the AWARENESS interventions implemented within Veneto Region Local Pilot Action were also involved:

- representatives of the Galieo Technological and Scientific Park (located in Padova): R&D Division

- **representatives of 2 innovative start-ups in fields respectively of Augmented & Virtual Reality and Robotics** who provided their experience and approach with regard to 4.0 technologies;

- the test**imony and experience of a CEO of relevant company – ASTRA YACHTS - operating in the yachting sector**, developing high-tech innovative systems to improve the navigation experience: ASTRA YACTHS. The CEO by telling his experience and approach to 4.0, presents his own company which is an **innovative business reality in which technology 4.0 is serving marine by developing innovative solutions.**

In conclusion, by the analysis and overview of the expertise of the knowledge providers who led the experimental interventions, it resulted an interesting and **fruitful University – Industry collaboration** which represented an added value for the project as is key for implementing an effective knowledge transfer approach for innovation as pointed out in section “1.1. Strategical & Theoretical Approach for the Model”

FUTURE 4.0 PLATFORM

The FUTURE 4.0 Platform, its contents and related functionalities for Learners were showed and presented in almost all AWARENESS seminars within the experimental actions foreseen in the five Local Pilot Actions. Focused has been on some specific modules according to the specific technology/ies deepen into the seminars.

In particular the FUTURE 4.0 platform contents were also particularly implemented and adopted within the Dytiki Ellada and Apulia Local Pilot Actions at ACQUISITION and TRANSFORMATION levels, but also in the one-to-one mentoring activities of University of Rijeka – EFRI on technologies 4.0.

The representatives of the participating companies, afterwards having saw and understand the basic functionalities and main contents of the FUTURE 4.0 online platform, believed that it is a very useful tool that can potentially contribute to the acquisition of technologies 4.0 encouraging the related knowledge transfer. However, the companies' participants attending to the AWARENESS level expressed the need to go in deep with the testing of the FUTURE 4.0 platform in order to analyse the potential advantages in the daily work activities.

The companies' learners and human resources who instead tested the Platform also within the at ACQUISITION and TRANSFORMATION interventions expressed positive feedbacks.

In detail, according to the received feedbacks, the learning contents resulted well explained, in line and coherent respect to the specific module objectives. The modules covered indeed the topics related to 4.0 technologies at appropriate depth level. Also, the rate of content/delivery duration of each module resulted proportionate and balanced. Among the methods proposed by the Platform for the acquisition of knowledge, know-how and competences on 4.0 technologies, according to companies' learners the most useful is the interaction with the expert/tutor followed by individual work. The Platform resulted therefore a Tool able to activate also a **self-learning process.**

In addition, most of the companies' learners, who tested the Platform, affirmed that the FUTURE 4.0 contents had and will have effects on the daily work.
As added value all companies' learners considered the modules on 4.0 technologies inspiring and motivating.
As evidence all the companies' learners approached the contents with a high level of personal interest respect to the propose 4.0 contents.
In conclusion the use and adoption of FUTURE 4.0 Platform and Training Model proposes are considered valuable and most of companies' learners expresses the willingness to deeply test the Platform as effective e-learning tool.

LOCATIONS

Despite the Covid-19 emergency and the recourse to digital learning in most actions, some of the DISSEMINATION and AWARENESS face-to-face knowledge transfer seminars took place in some attractive locations and within relevant regional/national such as:

- **MECSPE' fair** realized in Bari on 28- 29 November 2011 on “Technologies for Innovation - Industries 4.0”
- **the 6th Technology Transfer Exhibition- Patras Innovation Quest (Patras IQ)** aimed interconnecting know-how and innovation with entrepreneurship, maintaining the fruitful research and entrepreneurial human capital of Greece and on the overall development of the local, regional and national economy.
- **Pallati i Kulturës Labëria**, in Albania: a multipurpose entertainment venue in Vlorë, in the immediate vicinity of the Universiteti i Vlorës (University of Vlora)
- **the FabLab Bitonto** which is responsible for the co-management service of the FabLab Poliba laboratory at the Technological Centre for Digital Manufacturing located in the artisan area of the municipality of Bitonto;
- **Spin-off companies** as BRED Srls which is one of the Politecnico di Bari, established with the aim of transferring research and innovation developed in the university context in the field of the recovery of existing built heritage into an entrepreneurial context.

Some ACQUISITION and TRANSFORMATION personalized in-company interventions, especially in APULIA and Veneto region Local Pilot Actions, took place directly in the companies' headquarters – most of them having their offices located in the port authority as shipyards - which allowed experts to touch and experiment the real context in which companies operate, their operational management and their processes as well as their strengths and weaknesses points.

5. Conclusion

The findings and evidences resulting from the Local Pilot Actions experimental interventions on the knowledge transfer on 4.0 technologies, as well the underground strategical and methodological approach adopted, will be object of a transversal peer review by partners and selected experts/academic in each region who will validate the FUTURE 4.0 Smart Learning Model and provide suggestions for its improvement.

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