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

OIS-AIR



OIS-AIR

ESTABLISHMENT OF
THE OPEN INNOVATION SYSTEM
OF THE ADRIATIC-IONIAN REGION



OIS-AIR PROJECT OVERVIEW

The OIS-AIR project establishes and develops the Open Innovation System of the Adriatic-Ionian Region, a single marketplace for technology and innovation competitive and attractive at macro-regional level.

Low investments in R&D, poor Intellectual property protection and weak technology transfer activities are still the main features of the innovation system of the Adriatic-Ionian Region. Against this, OIS-AIR creates an Open Innovation System by establishing a transnational Open Innovation Hub connecting locally established Innovation Centres. The project has developed a wide set of activities, consolidating and strengthening the development of industrial and entrepreneurial activities in order to:

- Improve skills and competencies of R&D centres in stimulating the creation of innovation networks beyond borders.
- Stimulate SMEs access to research infrastructures and facilities and increase business investments in R&I, with a specific focus on those sectors characterizing the competitive advantage of the region.
- Valorise research results and establish durable links and synergies between enterprises, R&D centres and research infrastructures of the Adriatic-Ionian area.



PARTNERS:

IT - Area Science Park (LP)
 Università della Basilicata
 HR - Hrvatska Gospodarska komora
 RS - Naučno tehnološki park Beograd
 SI - TEHNOLOŠKI PARK LJUBLJANA D.O.O.
 AL - Ministria e Financave dhe Ekonomise
 GR - Εθνικό Κέντρο Έρευνας και
 Τεχνολογικής Ανάπτυξης

ASSOCIATE PARTNERS:

IT - Friuli Venezia Giulia Region
 Ministry of Foreign Affairs
 Central European Initiative
 ME - Ministry of Science
 HR - Ministry of Economy
 RS - Ministry of Education, Science and
 Technological Development

OIS-AIR addresses not simply local innovation projects or research-driven innovation but transnational innovation!

Started in 2018, with the main aim to strength the development of industrial and entrepreneurial activities in Adriatic-Ionian Region, the Project involved many relevant stakeholders from different sectors -from research institutions to SMEs and public administration.

The project has established the OIS-AIR Network currently composed by 7 Innovation Centres and open to new adhesions. It is supported by the OIS-AIR INNOVAIR Platform, a virtual innovation marketplace aimed at improving the innovation capacity that offers free-of-charge innovation services to businesses and promotes the establishment of R2B collaborations between innovation players of the Adriatic-Ionian area.

PROJECT KEY FIGURES



6 countries



150+ free-of-charge innovation services to businesses



10 innovation vouchers delivered:

- 6 agro bioeconomy
- 3 energy & environment
- 1 transport & mobility



7 innovation centers



30+ events and workshops organized



100+ research results were collected for PoC Call and 65 projects proposals were applied



4500+ stakeholders involved:

- 500+ SMEs
- 3800+ researchers
- 100+ BSOs
- 100+ national and regional authority

OIS-AIR

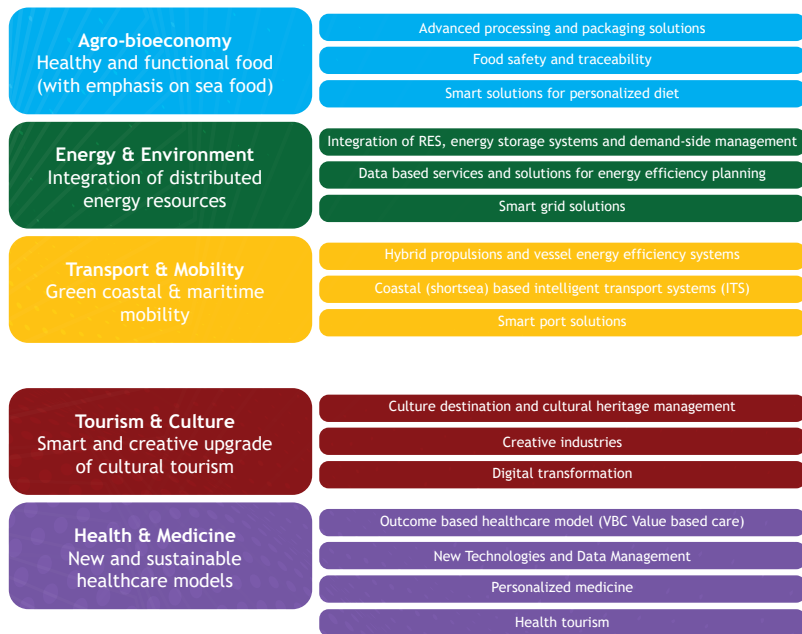
SUMMARY OF RESULTS

By means of a Network of transnational Innovation players, OISAIR achieved several key benefits for the whole Adriatic Ionian innovation ecosystem:

- Set up of unique OIS-AIR Network and the Innovair Platform: www.oisair.net, for the exchange knowledge, technologies and innovation opportunities
- Definition of the first Pilot Macro Regional S3 for Adriatic Ionian Region- defining key macro-regional development trajectories in most promising sectors
- Action plan for Macro Regional S3
- Establishment of Local Innovation centres
- Organization of Open innovation workshops with different stakeholders
- Organization of a transnational Proof of Concept Call (POC Call)
- Provision of 10 innovation vouchers to support the best trans-regional R2B innovation projects
- Delivery of over 150 free-of-charge innovation services to businesses

The first Pilot Macro Regional S3

Macro-Regional Smart Specialisation Strategy of Adriatic-Ionian Region (MRS3 AIR) is a pilot document that sets a framework for supporting and strengthening the innovation system of the Adriatic-Ionian region. The MRS3 AIR is defined by resources of partner countries and regions, outlined in their respective Smart Specialisation Strategies and by challenges that are recognized in EU Strategy for the Adriatic and Ionian Region (EUSAIR). The MRS3 AIR is focused on five thematic priority areas and its sub-thematic topics that have emerged as strategic areas based on identified commonalities in S3 documents and are also interrelated with EUSAIR's pillars and identified challenges:



Added value of the Pilot Macroregional S3:

- Exploration of how S3 priorities envisaged in national/regional strategies differentiate or are complementary
- Creation of linkages based on the complementarity with neighbouring territories
- Valorising the Macroregional innovation potential
- Connecting innovation ecosystems, skills, infrastructure and markets
- Provision of a wider combination of expertise for transnational R&I partnerships



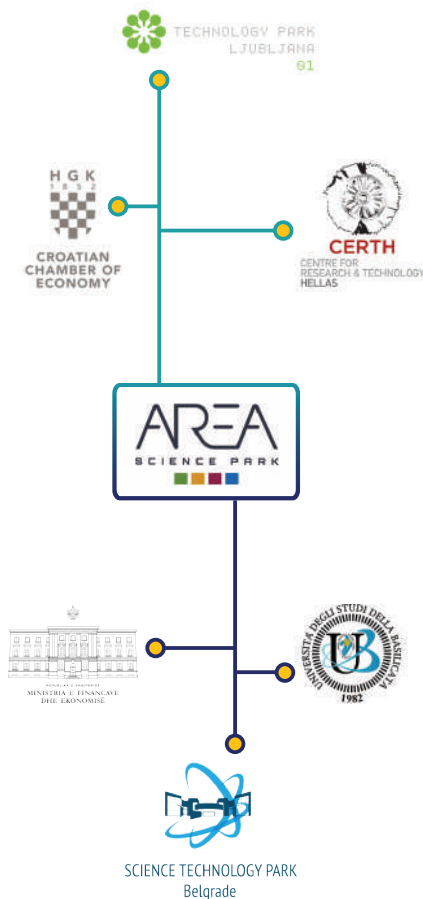
Currently composed by 7 Innovation Centres and institutional partners placed in the Adriatic-Ionian Region, the OISAIR Network is a powerful knowledge and infrastructure sharing system that operates locally and transregionally:

- ✓ Developing the Open Innovation System of the Adriatic Ionian Region by connecting stakeholders and enabling translational flow of knowledge, innovators and technologies,
- ✓ Unlocking the innovation potential of the Adriatic Ionian Region
- ✓ Increasing transregional competitiveness by exploiting the macro region's own innovation capacities
- ✓ Coordinating transregional innovation strategies and promoting investments in innovation
- ✓ Tackling Macro-Regional challenges defined in the OIS-AIR Pilot Macro Regional S3

The OISAIR Network has a flexible design and it's open to new stakeholders of the innovation ecosystem in the Adriatic - Ionian Region.



Representatives of partners of the project OISAIR: Establishment of the Open Innovation System of the Adriatic Ionian Region signed on June 7th 2019 in Ljubljana a Collaboration Agreement that formalize the establishment of the OIS-AIR Network.



OIS-AIR

NETWORK

Based on a Hub&Spoke scheme the OIS-AIR Network is integrating two operational levels (local & transnational) and is based on a detailed 5 years long action plan. Locally established Innovation Centers scout research results, gather SMEs needs, promote opportunities. At transnational level the Hub coordinates Centers' activities and acts as a gate matching demand and offer of services and research results, offering specialized services and infrastructures.

The Network is supported by the INNOVAIR Platform, a virtual innovation marketplace that discloses a wide set of research facilities and opportunities to SMEs and R&D centres in order to valorise research results and enhance the open innovation process within the Adriatic-Ionian area.

INNOVAIR
EXPLOIT
A SEA OF SMART IDEAS

Join the www.oisair.net
Exploit a sea of smart ideas!

Proof of Concept Call

Supporting cooperation among research infrastructures and businesses, the Project provided financing support to the 10 best innovative projects to be jointly developed by research institutes and SMEs in Adriatic Ionian Region. In Spring 2019, the project launched a Proof of Concept Call (PoC Call), transregional initiative addressed to public universities, research institutes and SMEs based in Adriatic-Ionian region.

POC CALL OBJECTIVES:

- Encourage technology transfer activities by financing innovation vouchers
- Accelerate the transformation of early stage technologies into commercial solutions as well as the exploitation of patents
- Facilitate the commercialization of technologies



10 innovation vouchers worth 18.500 EUR were delivered to support experimental activities in the fields of Transport & Mobility, Energy & Environment and Agro-Bioeconomy

PoC Call phases

1 Call for Ideas

Public universities and research Institutions were invited to disclose their research results, patents and technologies

100 research results were collected from research institutions of the Adriatic-Ionian area

2 Call for Projects

Submission of R2B innovation projects proposals

65 joint R2B projects proposals were applied to get financial support for their experimental activities

3 Innovation Vouchers

10 beneficiaries were selected and awarded with an innovation voucher to make experimental activities in collaboration with the supporting company

Confirming the international scope of the initiative, 5/10 awarded projects were submitted by transnational partners

Awarded Projects



Beneficiary: SISSA, ITALY
Industrial partner: LBABio, SLOVENIA
Sector: Agro Bioeconomy
Project: IN SILICO DESIGN OF PEPTIDE-BASED BIOSENSORS

The objective of project was to further enhance the reliability of the design protocol, embedding in the possibility to predict chemical and physical properties of the peptides not directly related with its affinity to the target, but of great relevance for technological applications, for example the solubility and the aggregation propensity. Indeed, these properties are essential for a scale up of the technology: if one aims at producing sensors on a large scale, they should be based on peptides that can be easily synthesized, and easily embedded in a sensor. The goal was to develop a predictor of these properties based on machine learning and deep neural networks.

In order to make the code more user friendly they first Identified the computational bottlenecks. The pipeline in a python package repository format (PyPI) was implemented to improve code accessibility, modifying also some of the C++ functions which are called by the python script. The resulting code complies with the state of the art of python packages, and is therefore much more user friendly. In collaboration with our industrial partner, SISSA also started developing an algorithm for predicting the aggregation propensity specifically designed for cyclic peptides. In order to train neural network they first had to build a curated database containing physicochemical properties of short peptides. Using this database as input they trained the network to identify different physicochemical properties, mainly the aggregation propensity. The prediction is done using automatically generated features plus computationally estimated features.



Beneficiary: University of Maribor, Faculty of Agriculture and Life Sciences, Chair of Biosystems Engineering SLOVENIA
Industrial partner: Az, Agricola Giorgio Pantano ITALY
Sector: Agro Bioeconomy
Project: SMART CANOPY MEASURING SYSTEM FOR THE REDUCTION OF PLANT PROTECTION AGENTS USE

The goal of this pilot project was to build a smart canopy monitoring system that enables the farmer to lower the usage of plant-protection agents (PPA) but preserve the same protective effect on the plants. PPA's lower use means lower costs when treating the plants, less fuel consumed on recharge returns, and a possibility for unmanned operation resulting in less labour-intensive operations. Initial tests proved that this solution could represent a significant economic advantage for food producers and reduce the negative impact that PPAs have on the environment.

The system relays on the use of two perpendicularly placed LIDAR sensors, where the horizontally placed LIDAR is used to accurately determine the location of the system and the vertically placed LIDAR to inspect the properties of the plant canopies. This is made possible by the state-of-the-art SLAM algorithm that was developed and integrated as part of this solution. In the evaluation phase, the system was tested to determine its performance and accuracy. With the first, the level of used PPAs measured based on the amount of time the valves were open or closed. And with the second, the localization system's accuracy is determined based on the cumulative error at the end of each row. The plant protection agents' savings proved to be in the range of 22% for our test case, with the location accuracy of 0.08m.



Beneficiary: Faculty of Biology University of Belgrade, SERBIA
Industrial partner: Gibob S.R.L., Milano, ITALY
Sector: Agro Bioeconomy
Project: DEVELOPMENT OF NEW GENERATION OF BIOLOGICAL CONTROL AGENTS AND BIOFERTILIZERS FOR SUSTAINABLE AGRICULTURE

The development of new eco-friendly alternative biological control products, as agents to contrast plant disease with simultaneously increment of yield through the mechanisms of plant growth promoting effects was the main idea of the project. Together with industrial partner, Faculty of Biology - University of Belgrade have developed appropriate formulations for optimal performances on plants in vivo, including improved seed coating technology with a longer shelf life and strategies for crop treatments during the most sensitive growth phases for pathogens attack. Efficiency and sustainability of these technologies were scored using the metabarcoding approaches in microorganism diversity analysis, as well as through increased yield obtained either by their stable metabolites or by increased plant growth stimulation. Project partners believe that the results represent a good starting point for developing a product that would be utilized for plant protection on the large scale production as a replacement to the extensive use of chemical pesticides.

Awarded Projects



Beneficiary: University of Padua, Department of Industrial Engineering, ITALY
Industrial partner: RPG Katika Rajkovic, SERBIA
Sector: Agro Bioeconomy
Project: IMPROVING THE FOOD SAFETY AND SHELF LIFE BY THE HIGH PRESSURE CO2

The project aimed to develop new mild and minimal cold pasteurization technologies to improve safety and preservation of fresh/raw local food products, the market potential and the sustainability of local-supply food enterprises. The technology achieves microbial inactivation applying mild pressure (<20MPa) and temperature (<45°C) to the product in Modified Atmosphere Packaging (MAP) enriched with CO2.

Thanks to the OIS-AIR innovation voucher, it was possible to demonstrate the feasibility of the technology on fresh cut carrots. Process parameters were optimized through a proper Design of Experiment to minimize the product's modification after the treatment and maintain fresh like characteristics. After the process mesophilic bacteria, yeasts and molds and coliform were reduced of up to 6 log. Processed carrots maintained a microbiological count under the spoilage limit up to 14 days of conservation at 4°C.



Beneficiary: University of Padova, Department of Comparative Biomedical and Food Science (BCA), ITALY
Industrial partner: Blupesca SRL, Venezia
ITALY & ITPhonics srl, Vicenza ITALY
Sector: Agro Bioeconomy
Project: DEVICE FOR THE ONLINE EVALUATION OF SHELF LIFE, AUTHENTICITY AND QUALITY OF SEAFOOD PRODUCTS - SeaQual

In the seafood sector, authenticity, storage conditions and product traceability are among the most relevant traits. Thus, a rapid survey of such features is a key to support enterprises and competent authorities in food control, besides offering trade transparency. This project aims to address this issue. In detail, an on-line product evaluation of cuttlefish traceability (T), authenticity (A) and shelf life (SL) was performed using Near Infra-Red spectroscopy (NIRs). The NIRs are an eco-friendly and fast analysis suitable for a non-destructive evaluation in food chains. Large datasets for T and A (n=727) and SL (n=348) were collected to perform calibration models using VIS-NIR and NIR portable tools. It was found that the NIR tech is highly discriminant for T and A traits (accuracy=0.91 and 0.96, respectively) while the VIS-NIR tool showed a high discrimination accuracy only in fresh cuttlefish SL study (0.85). Projects data prove the value and applicability of NIRs tech in a real environment.



Beneficiary: University of Udine, Polytechnic Department of Engineering and Architecture, ITALY
Industrial partner: Bio-based Energy Technologies P.C. Thessaloniki, GREECE
Sector: Agro Bioeconomy
Project: SUPERCRITICAL FLUID EXTRACTION AND FRACTIONATION OF BIOACTIVE COMPOUNDS FROM WINEMAKING BY-PRODUCTS FOR HEALTHY AND FUNCTIONAL FOOD

The main idea of the project was the recovery of bioactive compounds from grape marc, the main solid by-product of winemaking, using supercritical fluid extraction (SFE). SFE is suitable for thermally sensitive substance, production of cleaner extracts and environment friendly. Among various supercritical fluids used for extraction, supercritical CO2 (SC-CO2) is the most widely used. SC-CO2 is an excellent solvent for extraction of nonpolar compounds. If the target compound is polar the addition of small amounts of a polar cosolvent can enhance the solvation power of SC-CO2. Impact of OIS-AIR innovation voucher on research provided insights to support the SME in knowing emerging extraction technique like SFE is. Despite the emergency situation due to COVID-19, the experimental activities were carried out.



Beneficiary: TECOS Slovenian Tool and Die Development Centre, SLOVENIA
Industrial partner: FLEXIDO, fleksibilne robotske celice, d.o.o., SLOVENIA
Sector: Energy and environment
Project: INCREASING THE ENERGY EFFICIENCY OF INJECTION MOLDING PROCESS

Within experiment partners on the project assured an innovative solution according to Industry 4.0 requirements for increasing the energy efficiency in injection molding process and thus optimization of energy and material consumption inside the injection molding production cycle, when producing complex metal-plastic parts. Partners prepared a robot cell setup with direct communication between robot and machine, developed appropriate grippers for manipulation of metal inserts, provided precise positioning and insertion of metal inserts into the mold. Temperature level of metal inserts is controlled via IR sensor system and AI algorithms to assure adequate processing conditions and prevent the production of bad parts. In this way production optimization and quality check of produced metal-plastic parts is assured along with increased energy efficiency during the production cycle. Innovative solution was further tested and improved in real production environment in order to assure the TRL 6 level.

Awarded Projects



Beneficiary: University of Parma, ITALY
Industrial partner: 4e consulting s.r.l, ITALY
Sector: Transport and mobility
Project: HEATER-IN-CONVERTER (HiC): BRINGING HEATING CAPABILITY TO POWER CONVERTERS WITHOUT DENSITY PENALTIES - PSEUDO-COGENERATION FOR BATTERY HEATING ON ELECTRIC AND HYBRID BOATS (PSECOB2)

The main idea of HiC/PSECOB2 is to downsize, or remove, resistive heaters used in electric boats (or other EVs) to preheat batteries during cold start operation. This is achieved using the HiC technology to control the efficiency of power electronics converters already available on board. The impact ranges from system cost reduction to e-waste minimization.

The OIS-AIR innovation voucher allowed to set up a test bench to assess the requirements of the heat generation system, guaranteeing nominal operation in a predefined amount of time. This design is supported by model-based design to investigate environmental conditions, allowing exportation of the results beyond the ADRION area.

So far, the project provided: (i) an environmental model, from geographical location to boat temperature distribution over the year; (ii) a model for the thermal system design, validated on the test bench; (iii) a novel gate driver to control converter efficiency, now under test and increasing the TRL of the HiC technology.



Beneficiary: University of Maribor, Faculty of Electrical Engineering and Computer Science, SLOVENIA
Industrial partner: NEONART d.o.o, Maribor, SLOVENIA
Sector: Energy and Environment
Project: DEVELOPMENT OF A UNIVERSAL PV POWER SYSTEM AS A POWER SUPPLY FOR ILLUMINATED ADVERTISING PYLON

An alternative off-grid system for the efficient energy supply of electricity consumers has been developed through this project. The primary PV power source is supported by a battery power bank, while an efficient consumption of available energy is carried out using an advanced control system. The main advantages of the system are:

- a) green, renewable, environmentally friendly solution,
- b) that in combination with a battery bank represents an ideal, high-performance energy source,
- c) intelligent control ensures economical use of energy and optimal operation of the device,
- d) installation of the device is independent of electrical grid.

Within project, a prototype of a High-performance Battery Bank (5 kWh, 48 V), including the development of complete technology for automated spot welding of Li-ion battery cells, has been developed and produced. Also, DC/DC converter for power flow control in advertising board power supply and adaptable energy-saving algorithms have been developed and implemented, while for testing purposes, a PV power plant was built and installed on an illuminated advertising board.



Beneficiary: University of Ljubljana, SLOVENIA
Industrial partner: ComSensus, komunikacije in senzorika, d.o.o, SLOVENIA
Sector: Energy and Environment
Project: NOVEL UNDER-FREQUENCY RELAY SETTING FOR SECURING THE OPERATION OF ELECTRICAL GRIDS

Research group of project developed an algorithm for upgrading under-frequency load shedding protection in electrical power systems. The innovativeness was on the use of rate-of-change-of-frequency for obtaining a new variable in real time (frequency stability margin). The main idea behind project proposal was to implement the algorithm to an intelligent electronic device (IED) and guide it through extensive testing in an environment as similar as possible to real-life. The innovation voucher was the key element in making the project possible, since it helped to engage company ComSensus as an industrial partner providing IED and the knowledge that research group was missing.

After appropriately modifying and implementing the algorithm to IED, they ran a comprehensive set of tests with real-time digital simulator. Two achievements arose from this: i) increasing the TRL level of the innovation to value 4 and ii) publishing a joint scientific research article in the Energy journal.

OIS-AIR Innovation services for SMEs

Through OIS-AIR Innovation Centers, the Network offers free-of-charge transnational innovation audits to interested SMEs based in the Adriatic Ionian Region.

- Experienced Innovation Advisors will assess the innovation needs of SMEs and support the collaboration with local and transregional research institutions
- Following an initial audit, a targeted Innovation Path will be delivered providing businesses with a set of useful suggestions on the innovation management and assessment of innovation ideas, to improve the internal innovation capacity and to open up to international R&D collaborations with sector specific research centers.

If you are interested in:

- Getting a free-of-charge Innovation Audit and a targeted Innovation Path
- Sharing your collaboration interests with transnational partners
- Developing a technology project jointly with a research organization

Register to the INNOVAIR Platform! **www.oisair.net**

WILLING TO JOIN OIS-AIR NETWORK? NEW PARTNERS

- The OIS-AIR Network welcomes new valuable Partners based in the Adriatic Ionian Region, active in the fields of research and technology transfer
- Potential new Network members are represented by public administration, innovation agencies, technology parks, public and private research institutions, universities, institutions managing research infrastructures or testbeds, clusters, business support organizations, incubators and accelerators or similar
- Innovation actors willing to participate will sign the Collaboration Agreement under the same obligations as the founding Partners



HOW TO JOIN?

Contact your closest Innovation Centre!

Italy

Area Science Park

Elena Banci: elena.banci@areasciencepark.it

University of Basilicata

Giansalvatore Mecca: giansalvatore.mecca@gmail.com

Slovenia

Technology Park Ljubljana

Peter Medica: peter.medica@tp-lj.si

Croatia

Croatian Chamber of Economy

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Nataša Čirović: it@bitf.rs

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OIS-AIR

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