

# The Innovation Ecosystem in Emilia-Romagna





# Emilia-Romagna: innovation in its DNA

1

Emilia-Romagna is home to ancient and prestigious universities, important national research institutes, large world-leading companies, specialized and competitive small and medium-sized enterprises, and innovative start-ups.

2

An ideal environment to promote the circulation of scientific and technological knowledge and the development of businesses, people, and territories. A region that competes with the most advanced regions in the world and attracts international investments and talents. A region of excellence.



**1<sup>st</sup> Region in Italy for innovation**

*Source: EC-RIS, 2021 and the Transatlantic Subnational Innovation Competitiveness Index 2022*

**Data Valley**

*with supercomputers among the most powerful in the world*

**Higher R&D expenditure per capita**

*compared to the national and EU27 average. Source: Eurostat, 2020*

**1<sup>st</sup> Region in Italy to adopt an innovation law**

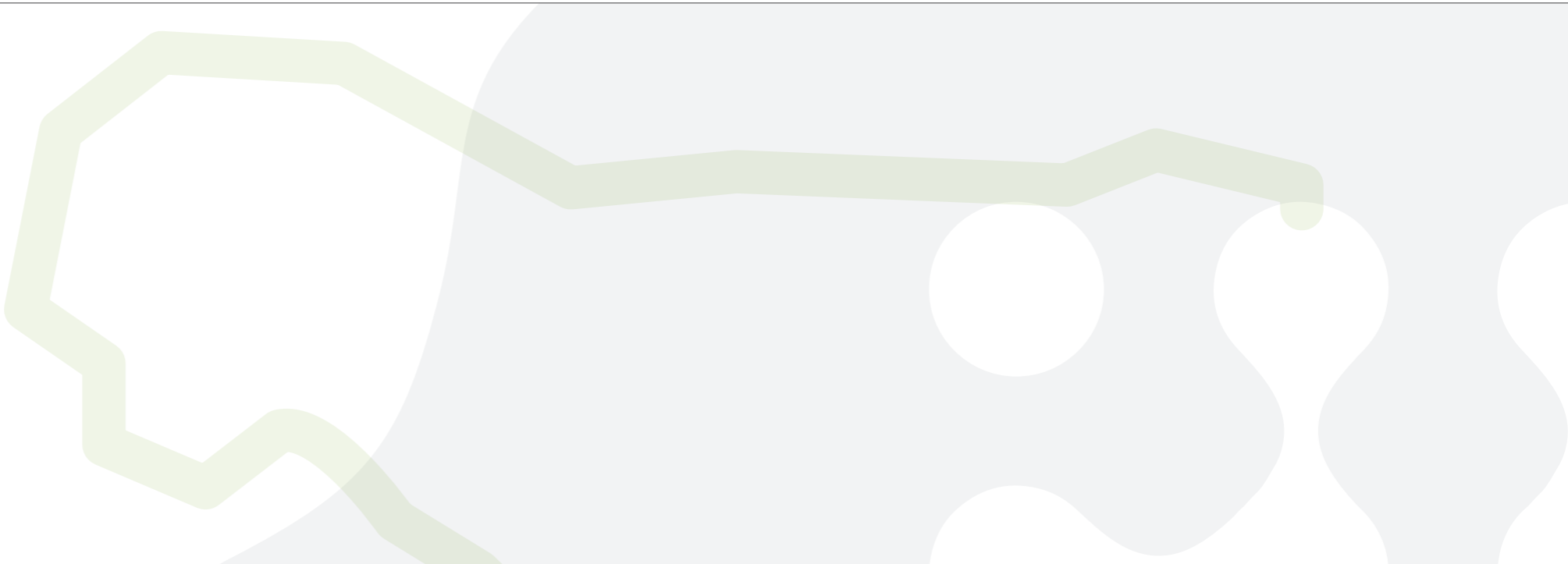
*Regional Law 7/2002*

**1<sup>st</sup> Region in Italy to adopt a law on talent attraction**

*Regional Law 2/2023*



## Emilia-Romagna: innovation in its DNA



<p><b>12,217</b> <b>Financed R&amp;D projects</b></p>	<p><b>3.621,75 M€</b> <b>Total investment</b></p>	<p><b>1.883,86 M€</b> <b>Public funds</b> <a href="#">Source: Monitoring of ER S3 (Smart Specialisation Strategy)</a></p>
<p>1<sup>st</sup> in Italy for R&amp;D personnel per 1,000 inhabitants <i>Source: ISTAT, 2020</i></p>	<p>1<sup>st</sup> in Italy for patent applications per capita filed with the EPO (European Patent Office, and among the top twenty in Europe). 2<sup>nd</sup> in Italy for the number of patents filed in 2021 <i>Source: EPO, 2021</i></p>	<p>2<sup>nd</sup> in Italy for the incidence of R&amp;D expenditure on GDP. <i>Source: ISTAT, 2020</i></p>
<p>2<sup>nd</sup> in Italy for the incidence of business expenditure on R&amp;D on GDP <i>Source: ISTAT, 2020</i></p>	<p>2<sup>nd</sup> in Italy for the number of researchers employed in companies as a percentage of total employees <i>Source: ISTAT, 2020</i></p>	<p>2<sup>nd</sup> in Italy for employees in high-tech and medium/high-tech manufacturing sectors <i>Source: Eurostat, 2021</i></p>

# The knowledge system in Emilia-Romagna





## The regional university system

The university system is spread throughout the territory, prepares highly qualified human resources, and attracts international talents.

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Emilia-Romagna is the first region in Italy for the attractiveness index of universities.

*Source: ISTAT, 2020*



## The regional university system

### 7 Universities

- University of Bologna, "Alma Mater Studiorum", with campuses in Bologna, Forlì, Cesena, Ravenna, and Rimini. It is the oldest in the Western world and the first in Italy according to the World University Rankings 2023  
*Source: THE - Times Higher Education*
- University of Modena and Reggio Emilia
- University of Ferrara
- University of Parma
- Catholic University of Piacenza
- Piacenza Campus of Politecnico di Milano
- Johns Hopkins University - SAIS Europe

### the numbers

+160,000



students (including 12,810 international students)

*Source: MIUR 2020/21*

+490



degree courses (first and second cycle)

+240



master's courses (first and second level)

*Source: Almalaurea - University of Bologna, Ferrara, Modena and Reggio Emilia, Parma*

+100



PhD programs

*Source: websites of the University of Bologna, Ferrara, Modena and Reggio Emilia, Parma*



## The higher education system

The region hosts numerous postgraduate schools and advanced training courses, such as:

- Bologna Business School (Master/MBA)
- International PhD in Data Science
- Advanced School in Food Safety
- MUNER - Motor vehicle University
- FoodER, the first international university in the agri-food sector
- Corporate Academy
- New headquarters of the United Nations University focused on Big Data and climate change
- Polytechnic Network



## The Polytechnic Network

The Network is one of the segments of **ER Education and Research Emilia-Romagna**, the regional infrastructure that offers individuals and businesses opportunities to acquire knowledge and skills oriented towards specialization, internationalization, and innovation, in order to strengthen the competitiveness of the territories and provide educational offerings to meet the needs of businesses.

**34 courses are delivered by 7 Higher Technical Institutes (ITS) managed by foundations:**



Innovative Technologies for Cultural Heritage and Tourism



Sustainable Mobility, Logistics, and Transport of People and Goods



New Technologies for Made in Italy - Mechanical Engineering



New Technologies for Made in Italy - Agri-food



Information and Communication Technologies



New Technologies for Life



Energy Efficiency

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## National and international research entities and infrastructures

In Emilia-Romagna, important national and international research entities are located, such as:

- CINECA
- CNR - National Research Council
- INFN - National Institute for Nuclear Physics
- INAF - National Institute for Astrophysics
- ENEA - National Agency for New Technologies, Energy and Sustainable Economic Development
- CMCC - Euro-Mediterranean Centre on Climate Change
- INGV - National Institute of Geophysics and Volcanology

There are **65 Research and Innovation Infrastructures** in the region, covering all ESFRI - European Strategy Forum on Research Infrastructures - areas, in particular

**13** on Digital,  
**2** on Energy,  
**14** on Environment,  
**12** on Health and Food,

**18** on Physical Sciences and Engineering, and  
**6** on Social and Cultural Innovations.  
**24** of these are local **nodes of European research infrastructures.**



## International authorities and agencies

### **EFSA**

In Parma, the European Food Safety Authority (EFSA) is headquartered. It provides scientific opinions and information on existing and emerging risks related to the food chain.

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### **ECMWF**

The Data Centre of the European Centre for Medium-Range Weather Forecasts (ECMWF) is located in Bologna, at the Tecnopolo Manifattura. It is the world's first Data Centre to obtain the LEED Platinum international certification for high environmental and energy standards in the redevelopment of a disused building. The Data Centre will significantly improve the capacity to process data related to temperature and wind forecasts, with significant impacts on the prevention of extreme events.

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**Innovation: a shared  
strategy**





## Innovation: a shared strategy

The Emilia-Romagna Region, in collaboration with universities, research centres, the chamber of commerce system, social partners, and local administrations, has promoted the creation and development of an innovation ecosystem to focus on research and high education as a driver for economic and sustainable development.

2002

FIRST REGIONAL  
LAW FOR  
INNOVATION  
R.L. 7/2002

2005

1<sup>ST</sup> EDITION OF  
R2B - RESEARCH  
TO BUSINESS

2007- 2013

HIGH TECHNOLOGY  
NETWORK,  
TECHNOPOLES,  
EMILIA  
ROMAGNASTARTUP,  
POLYTECHNIC  
NETWORK

2014

S3 - SMART  
SPECIALISATION  
STARTEGY  
2014-2020  
LAW FOR THE  
PROMOTION OF  
INVESTMENTS  
R.L. 14/2014

2017

AREA S3  
Spaces,  
Clust-ER  
Associations

2021

S3 - SMART  
SPECIALISATION  
STARTEGY  
2021-2027

2022

2 NEW CLUST-ERS:  
URBAN ECONOMY  
AND TOURISM

2023

LAW FOR  
ATTRACTING  
TALENTS  
R.L. 2/2023

**ART-ER at the center of  
the innovation ecosystem**





## ART-ER at the center of the innovation ecosystem

**ART-ER plays a central role in the innovation ecosystem created by Emilia-Romagna, which involves a network of actors and organizations committed to research and innovation in strategic development areas.**

ART-ER is a Consortia Society between the Emilia-Romagna Region, universities, research centres, the Union of Chambers of Commerce, and other public entities in the region, with the aim of promoting sustainable growth through the development of innovation and knowledge, attractiveness, and internationalization.

It coordinates the regional innovation ecosystem of Emilia-Romagna, which includes the High Technology Network, Technopoles, Clust-ERs, and Incubators, promoting the valorization and attraction of highly specialized skills and the attractiveness of the territory.

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## ART-ER at the center of the innovation ecosystem

### Among the main activities:

- 1 Coordinates and promotes the development of the ecosystem.
- 2 Facilitates dialogue between public and private actors and the territory.
- 3 Supports startups and innovative companies.
- 4 Conducts research on territorial, economic, and social assets of the territory.
- 5 Supports the Emilia-Romagna Region in managing Structural Funds.
- 6 Participates in national, European, and international networks.
- 7 Has extensive experience in European project planning.

### Members

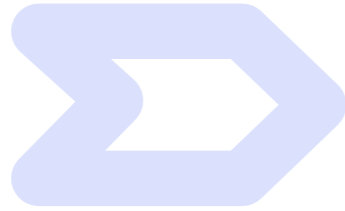
- Emilia-Romagna Region
- Regional Universities
- National Research Centres based in the region (CNR, ENEA, INFN)
- Regional Union of Chambers of Commerce
- Other Local Entities

**The regional innovation ecosystem: networks, places, and opportunities**





## The High Technology Network



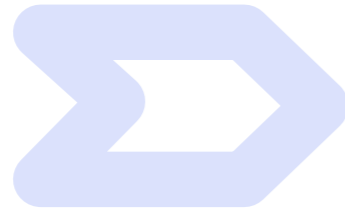
### what is it?

It is the tool promoted by the Emilia-Romagna Region to organize the regional industrial research offer.

It is composed of Industrial Research Laboratories and Innovation Centres.



## The High Technology Network



### activities

It provides expertise, technologies, solutions, and equipment for business innovation.

#### Areas of specialization:

- Mechatronics
- Materials
- Agri-food
- Health
- Well-being
- Building and Construction
- Culture
- Digital
- Energy
- Sustainability

### the numbers

+80



Industrial research laboratories, public and private

+15



Innovation Centres

1600



Researchers

over 400M€

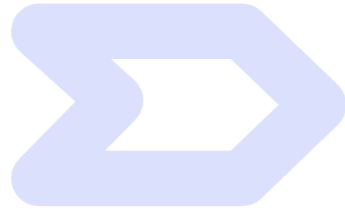
from more than 5800 contracts and 1300 projects since 2009

[Watch the video](#)

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**The High  
Technology  
Network**



**online offer**

**+1050**



Research competencies,  
tests, and analyses

**+1850**



Equipment

**+360**



Technology Reports

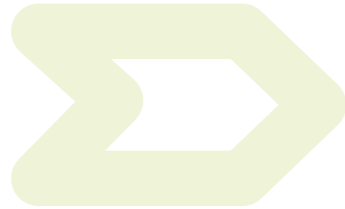
**+100**



Regional Projects



**The  
Technopoles  
Network**



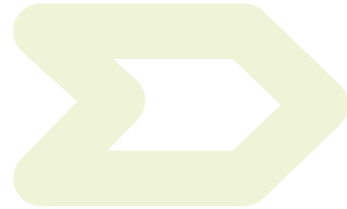
**what is it?**



Promoted by the Emilia-Romagna Region in collaboration with regional Universities, Research Centres, and local Institutions, the Technopoles host and organize activities and services for industrial research, experimental development, and technology transfer to support innovation of companies, individuals, and the territory.



## The Technopoles Network



### activities

- Promotes the High Technology Network system to businesses and facilitate connections between the innovation system and the territory.
- Analyzes needs and facilitate connections between research, business, and education.
- Offers specialized services (such as support for financial instruments to support innovation, mentoring of innovative startups, support for the valorization of intellectual and contractual property).
- Organizes events for technical-scientific dissemination.
- Provides access to the activities of research laboratories located in the Technoparks.
- Organizes company visits.
- Organizes collaborative design actions.



## The Technopoles Network



### the numbers

11



infrastructures based in 20 locations in the Emilia-Romagna region

+7,300



activities carried out involving +6,000 organizations and +3,300 people

+3,500



companies involved in +1,900 co-design workshops

+1,950



project activities carried out, including 228 training activities involving +3,600 students

+1,000



events organized

+700



events participated in



## Data Valley Emilia-Romagna



Emilia-Romagna qualifies as an international **Data Valley**, boasting state-of-the-art supercomputers and data centres, unique organizations in the field of big data, policies to support new investments, and a dynamic entrepreneurial environment that aims to put Europe on par with giants such as the USA and China.

<p><b>TOP INFRASTRUCTURE</b></p>	<p><b>COMPUTING POWER</b></p>	<p><b>SYNERGIES AMONG TOP ACTORS</b></p>	
<p><b>FOCUS</b></p> <ul style="list-style-type: none"> <li>INDUSTRY 4.0</li> <li>CLIMATE, WEATHER AND SUSTAINABILITY</li> <li>LIFE SCIENCE AND HEALTHCARE</li> <li>SMART CITIES, SMART MOBILITIES</li> </ul> <p><b>EDUCATION AND TRAINING</b></p> <ul style="list-style-type: none"> <li>MASTER DEGREES / AI ACADEMY</li> <li>MUNER / PHD COURSES</li> <li>RESEARCH FELLOWSHIPS BD&amp;AI</li> <li>DATA LAB</li> </ul>			<p><b>INTERNATIONAL ORGANIZATION</b></p>
			<p><b>ARTIFICIAL INTELLIGENCE</b></p>
			<p><b>ACCELERATING PROGRAMS</b></p> <ul style="list-style-type: none"> <li>ER STARTUPS INCUBATOR PROGRAMME</li> <li>MOTOR VALLEY ACCELERATOR</li> <li>LAUNCHPAD ACCELERATOR</li> </ul>
			<p><b>ECOLOGICAL TRANSITION</b></p> <p>THE TECHNOLOGY TRANSFER INNOVATION PROGRAMME (TTIP) OF</p>



## The Tecnopolo Manifattura - Data Valley Hub: an international excellence

The Tecnopolo Manifattura, based in Bologna, is the Data Valley Hub. It hosts some of the most powerful **HPC - High Performance Computers** in the world and is the international reference for supercomputing, Big Data and Artificial Intelligence, with applications in meteorology, climatology, health, earth sciences and industry.

### LEONARDO

Inside the technopole - **is the 4<sup>th</sup> most powerful and fastest supercomputer in the world** (Top500, November 2022) and will develop new applications in: Artificial Intelligence, personalized medicine, renewable energy, drug and material design, weather forecasting, and combating climate change.

#### POR FESR 2014-2020

##### POWERED BY:

REGIONE EMILIA-ROMAGNA, ART-ER, CINECA, INFN - CNAF

##### INSIDE THE HUB:

ART-ER, BI-REX, CINECA, CMCC, ECMWF, ENEA, IFAB, INFN-CNAF, IOR, ITALIAMETEO

##### PARTNERS:

CNR, INAF, LEPIDA, Municipality of Bologna, UNIBO, UNIFE, UNIMORE, UNIPR, XC ICSC

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[Watch the video](#)



## The Clust-ER Associations

### what are they?

They are legally recognized associations of public and private entities (research centres, companies, training institutions) that adopt the open innovation model, sharing ideas, skills, and results to grow.

They operate within the most relevant production systems in Emilia-Romagna.

**AGRI-FOOD**

**BUILDING AND CONSTRUCTION**

**CULTURE AND CREATIVITY**

**ENERGY AND SUSTAINABILITY**

**HEALTH AND WELL-BEING**

**INNOVATION IN SERVICES**

**MECHATRONICS AND MOTORSPORTS**

**TOURISM AND TERRITORY**

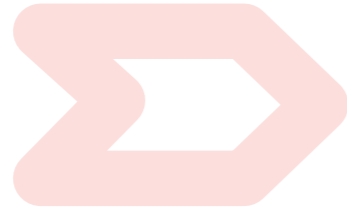
**URBAN ECONOMY**

[Visit the website](#)

[Watch the video](#)



## The Clust-ER Associations



### activities

- Promote a shared strategic vision on research and innovation (R&I) in the fields of the S3 specialization.
- Develop collaborative projects and initiatives with a supply chain impact at the regional level.
- Provide the Region with guidance on policies related to research and innovation.
- Support the participation of regional entities in European R&I programs and establish international connections.
- Foster the creation of initiatives in higher education for the development of new profiles matching with the companies needs.

### the numbers

11



9 Clust-ER + Big Data Association and MUNER

+750



members (of which +400 are companies)

32



Value Chains



## Open Labs

10 places open to local communities to promote digital inclusion, designed to qualify and revitalize historic centers, encourage the participation of citizens, businesses, public administration, the research world, and the third sector on the issues of access to public services, mobility, and training.

**Open Labs are equipped with technological solutions and are based in Bologna, Cesena, Ferrara, Forlì, Modena, Parma, Piacenza, Ravenna, Reggio Emilia, and Rimini.**

[Visit the website](#)



## EmiliaRomagnaSTARTUP

### what is it?

It is a network for aspiring entrepreneurs with innovative business ideas. Launched in 2011, coordinated by ART-ER, EmiliaRomagnaSTARTUP has created a community of 450 innovative startups and 80 organizations supporting business creation.

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[Visit the website](#)



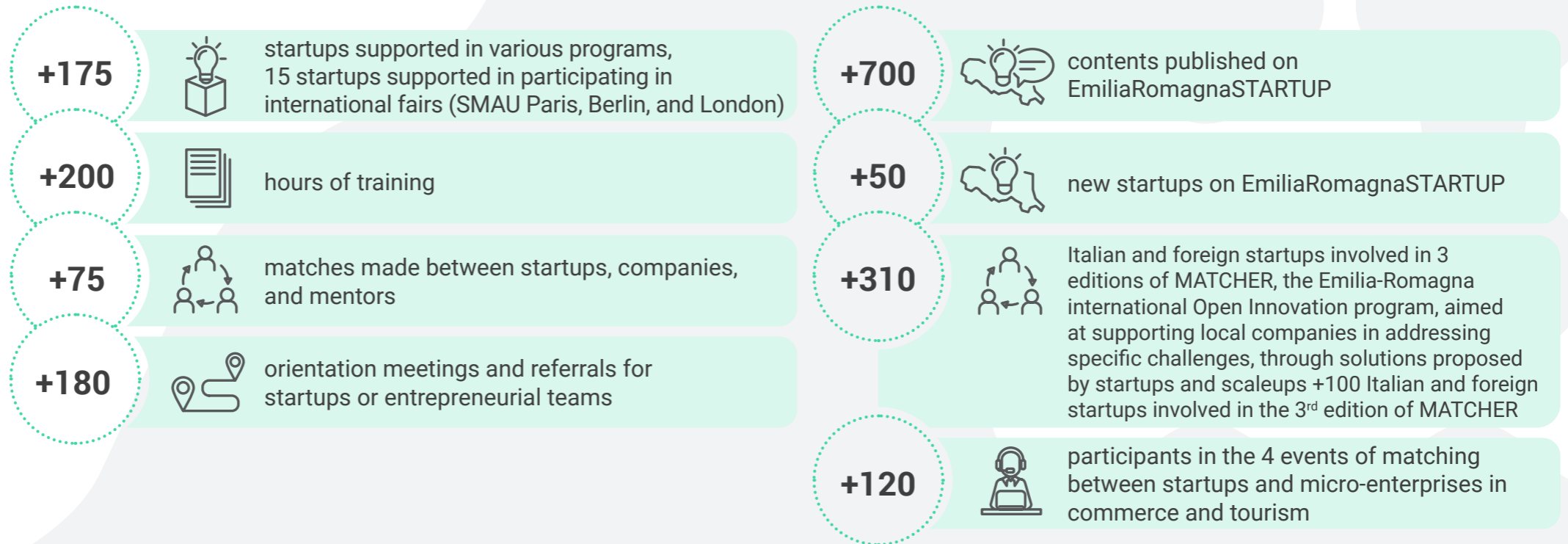
## EmiliaRomagnaSTARTUP

### activities

It offers high value-added services dedicated to startups:

- Information on tenders, incentives and initiatives
- Pool of experts
- Incubation at ART-ER's Le Serre
- Training and internationalization paths
- Participation in national and international fairs

### the numbers





## in-ER, the Incubators Network

### what is it?

It is the network of the Emilia-Romagna Region born to improve the services offered to startups, and to dialogue with other national and international ecosystems. It operates with large companies, business angel networks, venture capital funds and international partners between the European Union and the Silicon Valley.

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[Visit the website](#)

The Network is supported by ART-ER and the Emilia-Romagna Region



## in-ER, the Incubators Network

### activities

In-ER provides the following services:

- Support for the growth of startups (acceleration programs).
- Networking and activation of open innovation processes with SMEs and large companies.
- Spaces for incubation, co-working and making.
- Support for fund raising.
- Access to the regional network of Mentors, experts from large companies with high-level know-how, who provide their time and skills for the benefit of startups.

### the numbers

+100



companies

+30



members

+20



national and international partners

+70



investors/angels/banks involved in the 2022 Investor Day

+1166



annual incubation requests

+400



incubated entities

+200



innovative startups



## EROI, the Open Innovation Platform of the Emilia-Romagna Region



**Users: 4,300**  
(companies, research, freelance)



**Innovation challenges: 74**  
**Solutions: 250**



**Men: 58%**  
**Women: 42%**



**Professional profiles active:**  
56 % Company  
25% Freelance  
19% Research

It is a free and open digital space managed by ART-ER, where innovators participating in the community can find solutions for their innovation projects. It serves as a gateway to the Emilia-Romagna innovation ecosystem to facilitate the meeting of demand and supply for innovation and promote the culture of open innovation.

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[Watch the playlist](#)

[Listen to the podcasts](#)



## R2B Research to Business

Since 2005, R2B has been a reference point for the regional and national innovation system, as well as a meeting point for institutions, businesses, universities, experts, and innovators. The format, which is renewed every year, includes conferences, workshops, international B2Bs, and laboratories and is aimed at organizations, businesses, and partners on the topics of research and development and innovation.

R2B is an initiative promoted by the Emilia-Romagna Region and Bologna Fiere, organized by ART-ER.

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# Strategic Projects for the Ecosystem



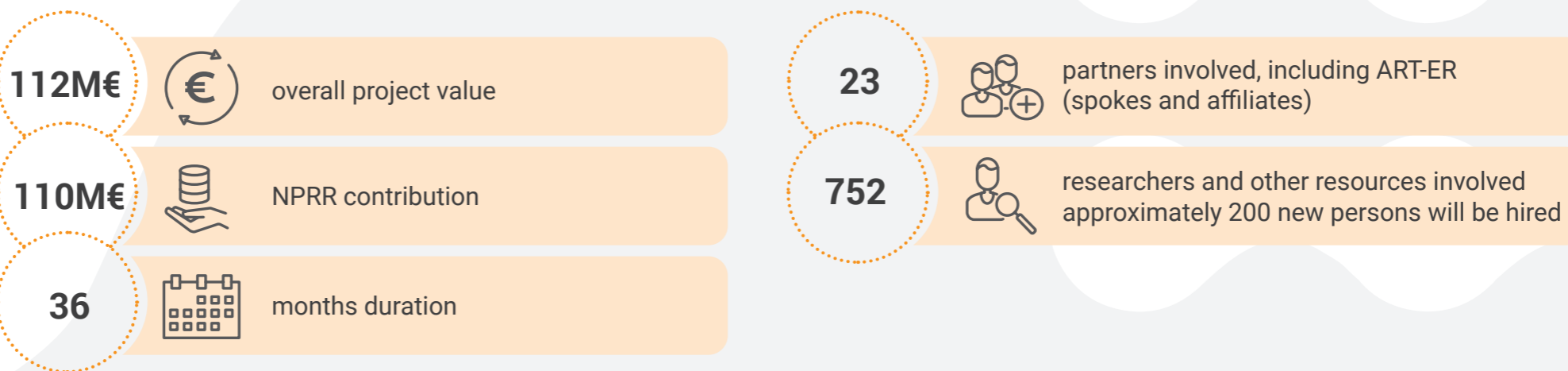


## ECOSISTER: a metaproject

ECOSISTER integrates the skills of the High Technology Network, the services of the Incubator Network, and the relationships with the territories of the Technopoles Network. Its objective is to support the ecological transition of the regional economic and social system by involving all sectors, technologies, and skills, and combining digital transition and sustainability with the work and well-being of people and the defense of the environment, in line with the strategy envisaged by the Pact for Work and Climate, and integrating with regional, national, and European programming.

It ranked first among the 11 proposals admitted to national funding under the Italian NPRR, National Plan for Recovery and Resilience.

### the numbers





# ECOSISTER: Organization and Partnership

ECOSISTER boasts a broad and inclusive partnership, which includes ART-ER, all universities, and research institutions based in Emilia-Romagna.

Proposer: University of Bologna			
Hub members	Spoke leader	Affiliates	
UNIBO	UNIBO	UCSC	DEMOCENTER-TPM
UNIFE	UNIFE	POLIMI	FONDAZIONE REI
UNMORE	UNIMORE	ENEA	LEAP
UNIPR	UNIPR	INFN	MIST-ER
CNR	CNR	CINECA	MUSP
UCSC		BIREX	PROAMBIENTE
POLIMI		CENTRO CERAMICO	ROMAGNA TECH
ENEA		CERTIMAC	T3LAB
INFN		CRPA	ALMACUBE
ART-ER			

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The management of the implementation phase of the project is entrusted to the ECOSISTER Foundation.



## ER2Digit, the European Digital Innovation Hub of Emilia-Romagna

ER2Digit is the European Digital Innovation Hub of the Emilia-Romagna Region, created to promote the improvement of public services by encouraging the adoption of innovative digital solutions in the public administration and businesses.

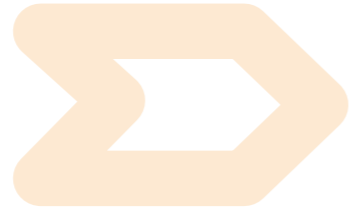
ER2Digit is part of the European Digital Innovation Hub Network and is coordinated by ART-ER in collaboration with Lepida and CINECA.

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[Visit the website](#)



## The Regional Programme for the Enhancement and Attraction of Highly Specialized Skills



### what is it?

The program builds on the experience of the Area S3 Spaces, established in 2016 to contribute to the analysis, valorization, and circulation of highly specialized skills capable of reducing the skill mismatch between the skills demanded by companies and those of workers.

The objective is to strengthen the innovation processes of the regional economic and social system and support the transformation of territories in coherence with the challenges identified by the new S3 - Regional Smart Specialization Strategy.



## The Regional Programme for the Enhancement and Attraction of Highly Specialized Skills



### activities

- Analysis and monitoring of the evolution of digital, green, entrepreneurial, and cross-cutting skills using advanced predictive analysis tools to anticipate the demand for new profiles and support their development through new intervention models and strategies to counter skill mismatch.
- Actions to support workers in acquiring the necessary skills to better respond to the innovation challenges of companies and the transformation of territories, through system actions and dedicated experiments.
- Involvement of companies, public administrations, and territories, so that they can contribute to the definition of new intervention models and shared system actions.
- Support for the strengthening of services to support highly specialized skills to promote dialogue between operators and the growth of their skills.

## **An attractive System**

**Attracting investments**  
**Attracting talent**





## Promotion of investments

Through the **Regional Law 14/2014** and European, and national Funds, the Emilia-Romagna Region supports new investments in its territory.

The main instrument provided for by Law 14/2014 is the Agreement for the Establishment and Development of companies.

## the numbers

6



regional calls to access Agreements for the Establishment and Development of companies

85



investment programs for a value of approx. 372 million euros

136M€



of regional funding

3,238



new jobs created



## Invest in Emilia-Romagna

**Invest in Emilia-Romagna** is the **Contact Point** for foreign investors who want to operate and invest in the region.

It is promoted by the Region and managed by ART-ER.

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## Regional Strategy for the Attraction and Retention of International Talents

The attraction of talents contributes to the competitiveness of the system and stimulates and strengthens professional and educational development. It represents one of the priorities of regional policies and has led to the recent approval of a dedicated law, the **Regional Law 2/2023**.



## it-ER - International Talents in Emilia-Romagna

It is an initiative by ART-ER aimed at attracting and supporting international talent in the region. It serves as a guide to help individuals access services available in the area, and facilitate their integration into the local and regional ecosystem.

### the numbers



[Visit the website](#)

[Watch the playlist](#)

**A System connected  
with the world**





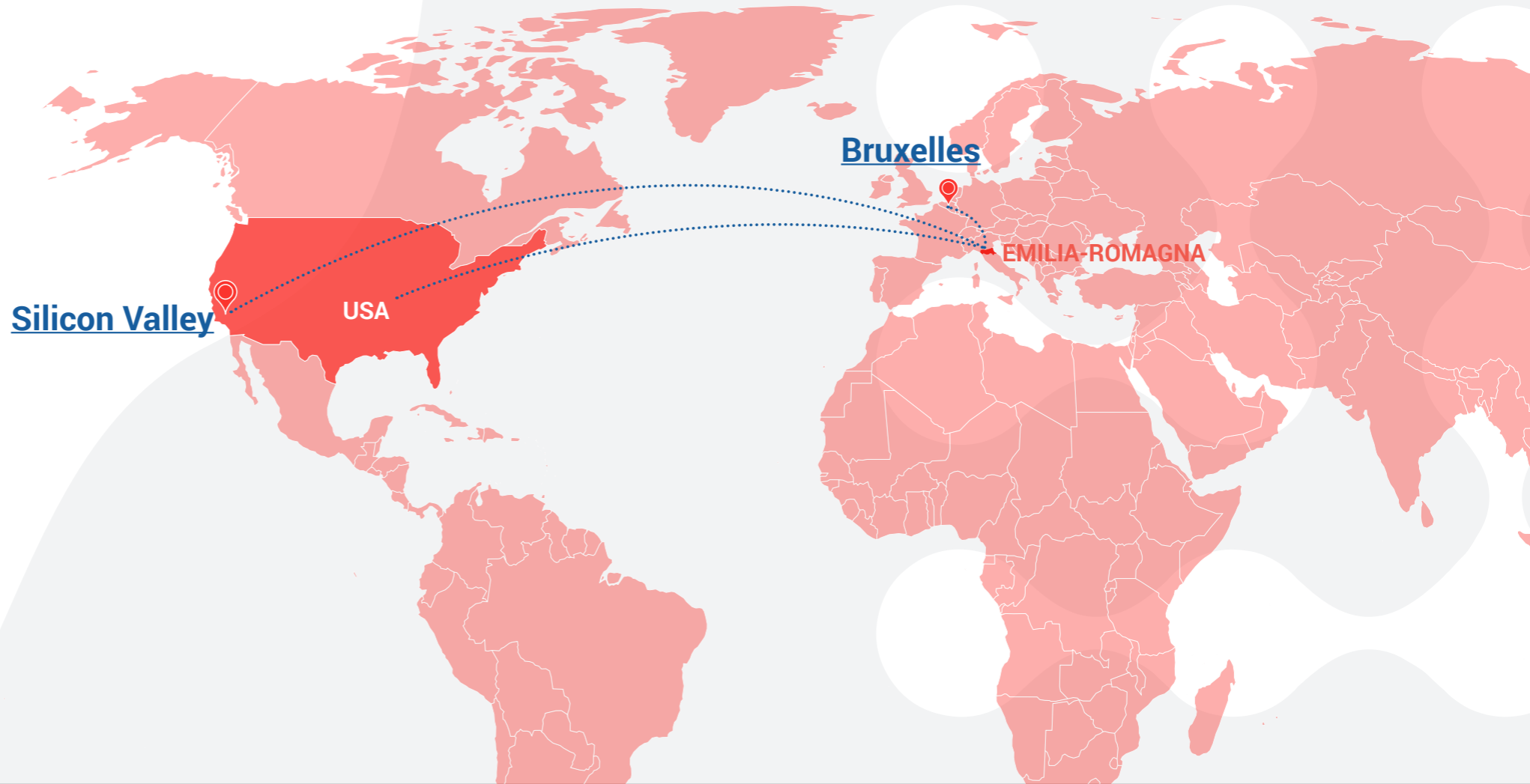
## A System connected with the world

The Emilia-Romagna Region promotes the growth of companies and their aggregation in international markets, facilitating promotional activities, creating opportunities and contacts with potential foreign partners, and organizing or participating in events for the overall promotion of the regional production system and innovation.

Through ART-ER, it participates in European and international networks, and in the development of collaborative projects, to promote the exchange of knowledge, and enhance skills and experiences of the territory.



**A System  
connected with  
the world**



Silicon Valley

USA

Bruxelles

EMILIA-ROMAGNA

Networks and associations

**Thanks for  
the attention**



The activities and networks of the Innovation Ecosystem are financed or co-financed by the European Funds of the Emilia-Romagna Region.



[info@art-er.it](mailto:info@art-er.it) | [www.art-er.it](http://www.art-er.it)

