

## ASTER:

Make the Emilia-Romagna Region  
innovative and competitive,  
inclusive and sustainable, creative  
and open to the world

Bologna, Italy





# General Information

<b>Title</b>	ASTER										
<b>Pitch</b>	Make the Emilia-Romagna Region innovative and competitive, inclusive and sustainable, creative and open to the world										
<b>Organisation</b>	ASTER										
<b>Country</b>	Italy										
<b>Author</b>	Dr. Richard Woolley (Ingenio CSIC-UPV Universitat Politècnica de València)										
<b>Nature of interaction</b>	<table><tr><td><input checked="" type="checkbox"/> Collaboration in R&amp;D</td><td><input type="checkbox"/> Lifelong learning</td></tr><tr><td><input checked="" type="checkbox"/> Commercialisation of R&amp;D results</td><td><input type="checkbox"/> Joint curriculum design and delivery</td></tr><tr><td><input type="checkbox"/> Mobility of staff</td><td><input type="checkbox"/> Mobility of students</td></tr><tr><td><input type="checkbox"/> Academic entrepreneurship</td><td><input type="checkbox"/> Student entrepreneurship</td></tr><tr><td><input type="checkbox"/> Governance</td><td><input type="checkbox"/> Shared resources</td></tr></table>	<input checked="" type="checkbox"/> Collaboration in R&D	<input type="checkbox"/> Lifelong learning	<input checked="" type="checkbox"/> Commercialisation of R&D results	<input type="checkbox"/> Joint curriculum design and delivery	<input type="checkbox"/> Mobility of staff	<input type="checkbox"/> Mobility of students	<input type="checkbox"/> Academic entrepreneurship	<input type="checkbox"/> Student entrepreneurship	<input type="checkbox"/> Governance	<input type="checkbox"/> Shared resources
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<b>Supporting mechanism</b>	<table><tr><td><input checked="" type="checkbox"/> Strategic</td></tr><tr><td><input checked="" type="checkbox"/> Structural</td></tr><tr><td><input type="checkbox"/> Operational</td></tr><tr><td><input type="checkbox"/> Policy</td></tr></table>	<input checked="" type="checkbox"/> Strategic	<input checked="" type="checkbox"/> Structural	<input type="checkbox"/> Operational	<input type="checkbox"/> Policy						
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<b>Summary</b>	ASTER is the consortium for innovation and technology transfer of the Emilia-Romagna region of Italy. Its partners are the Emilia-Romagna Regional Government, the six regional universities, the National Research Centres located in the region, and the Regional Union of Chambers of Commerce, working in collaboration with regional Business Associations and Innovation Centres. ASTER coordinates activities and works in collaboration with members to develop the industrial research capacity of the region. ASTER manages the Emilia-Romagna High Technology Network, consisting of industrial research laboratories and Innovation Centres, providing research, expertise, tools and resources to business and to help drive innovation in companies.										



# Introduction & Overview

## 1. BACKGROUND

**ASTER** is the Consortium for innovation and technology transfer of the Emilia-Romagna region of Italy. It was created to meet the regional government's perceived need for a coordinating body for the regional innovation system, as the opening up of global markets reconfigured the competitive advantages of regions worldwide and impacted on the economic activities and performance of Emilia Romagna. ASTER works in collaboration with business, universities, research centres and institutions for the development of the innovation ecosystem of the region. The initiative began as a different organisation in 1985, and at this time was 100% owned by the regional government. In 2002, ASTER was founded as a consortium, accompanied by a new regional law for research, innovation and technology transfer. The ASTER consortium includes all the important research organisations in the Emilia Romagna region. The regional government is a 30% shareholder, whilst the majority is owned by the research centres involved. This is an unusual model in Italy, where such regional organisations are normally 100% owned and managed by the regional government. Whilst ASTER is entirely publicly owned, its governance includes representatives of not just the universities and the regional government, but business associations and other stakeholders as well.

The 2002 law was designed to set up a system of industrial research that had buy-in from all the relevant actors in research and innovation. The ASTER consortium and a budget for research and innovation were the key elements. These elements were designed to improve the capacity of the companies in the region to invest in R&D and profit from innovation. The elements were also designed to improve the efficiency of the public research sector in collaborating with companies.

ASTER is responsible for managing the **Emilia Romagna High Technology Network**, consisting of industrial research laboratories and innovation centres located in the region. The High Technology Network brings academic institutions and public and private research centres together, to provide expertise, infrastructure and resources to the production system and business. The functioning of the High Technology Network is an outcome of the involvement of all relevant actors in the region, and their agreement to the coordinating role played by ASTER.



## 2. OBJECTIVES AND MOTIVATIONS

The ASTER mission is to build the Regional Innovation System by launching shared actions, projects and collaborations for integrated innovation in industry, human capital, society and territory, contributing to growth and competitiveness, talent and entrepreneurship, cohesion and participation.

The vision is to make the Emilia Romagna region innovative and competitive, inclusive and sustainable, creative and open to the world, by promoting innovation for the development of the territory and its businesses, enhancing its excellent research resources, the qualified employment of its talents, and the well-being of its residents.

The current motivation for ASTER is to look for different ways of supporting collaboration between research and enterprises in the region, with the main goals of:

- ▶ focusing more on technological priorities;
- ▶ strengthening the role of companies;
- ▶ increasing the integration and effective links between regional policies and national and European policies;
- ▶ including and activating the biggest regional Research Infrastructures; and
- ▶ improving the effectiveness of the role of Innovation Centres, particularly in channelling SMEs' requests.

## 3. STAKEHOLDERS

The partners in the ASTER consortium include:

- ▶ The Emilia Romagna Regional Government;
- ▶ The six regional universities (Università degli Studi di Bologna, Università degli Studi di Ferrara, Università degli Studi di Modena e Reggio, Università degli Studi di Parma, Università Cattolica del Sacro Cuore, [Politecnico di Milano](#));
- ▶ The three National Research Centres located in the region (the National Research Council (CNR), the Italian National Agency for New Technologies, Energy and Sustainable Economic Development (ENEA), the National Institute for Nuclear Physics (INFN)); and
- ▶ The regional Chambers of Commerce (Unione Regionale delle Camere di Commercio dell'Emilia Romagna, Camera di Commercio Industria Artigianato e Agricoltura di Reggio Emilia) .

ASTER works in collaboration with other stakeholders such as regional Business Associations and Innovation Centres.

The High Technology Network currently involves:

- ▶ 82 laboratories
- ▶ 14 Innovation Centres
- ▶ 10 Technopoles

All 82 laboratories are certified by the regional authorities. There is a procedure for labs to apply to a professional body that verifies if the lab has sufficient skills, instruments and organisational capacity to enable it to work with companies. The certification is focused more on efficiency and methodology to work as a partner with business than on purely scientific criteria. Laboratories that want to work with companies need to be organised to give professional and timely answers to company requests – to be able to work according to market logics and to communicate proficiently. Accreditation is compulsory to be part of the High Tech Network and confers the right to use the Network logo. Since 2005, the Network has been organised into six thematic platforms: Agri-food, Construction, Energy & Environment, ICT & Design, Mechanics & Materials and Life Sciences.

Innovation Centres are facilities sponsored and managed by businesses, universities, research establishments, local authorities and other organisations. The mission of Innovation Centres is to promote innovation and the transfer of know-how and technological skills to businesses and the economic system in general. Among the 14 Innovation Centres, two are managed by entrepreneurial associations, one by big companies and one by an artisanal association. The diversity of the Network stakeholder community is important, particularly in relation to building an inclusive consensus regarding the promotion of industrial research and innovation.

The ten Technopoles are high technology intensive sites distributed across 20 locations throughout the region, with their own management structures.





# Implementation

## 4. INPUTS

The Emilia Romagna Regional Government has dedicated considerable resources toward two main goals: creating capacity for the investment of companies in R&D, and supporting the network to offer research competences, instruments and skills to industry.

In 2008, when the system of laboratories dedicated to industrial research commenced, 35 labs the received direct funding. The goal was for these industrial laboratories to grow and become self-financing and autonomous from university management. Later, 47 more labs joined the High Tech Network, but without regional funding. However, being accredited as part of the Network allows labs to apply for the regional calls for proposals for research that are dedicated to the labs of the network.

Around €140 million has been invested by the Emilia Romagna Regional Government through calls for projects in which the High Technology Network laboratories conduct research projects in collaboration with companies. This accounts for around half of the research budgets of the labs in the Network.

Around €160 million in funding for the projects conducted in the Network laboratories has been contributed by companies from the region and beyond.

The regional government also invested in trying to create research professionals who are not so interested in having an academic career, but are more focused on employment in industry. The idea was to create a new type of researcher, who was not the classic PhD, but an industrial researcher who understands company needs. The first phase investment created 600 researcher positions between 2008-2011. These were funded by the Emilia Romagna Government for laboratories to employ researchers dedicated to work on company problems. These positions were targeted at holders of 3+2-years degrees, and paid for three-year research contracts.

The six regional universities have eleven campus locations across the region and a student population of more than 140,000. The universities provide the education and training that contributes to the supply of talent to the research training pool and contributes to the development of entrepreneurs in the region. The universities also host important National Research Centres that are present in Emilia Romagna.

A total of 44 of the High Tech Network's 82 laboratories are facilities sponsored by regional universities and research institutes – with most hosted at regional universities. Usually these are organised as interdepartmental centres or in-house facilities. In some other cases, the laboratories have formed a consortium whose members also include local businesses.

There are 38 laboratories that are privately run, their main object being research and development for business. Several of these laboratories are the result of academic spin-offs.

ASTER is positioned at the core of the industrial research and innovation eco-system being developed in Emilia Romagna. ASTER provides impetus to this development through the design and administering of joint activities and open innovation actions involving relevant stakeholders. ASTER designs and develops strategic projects and coordinates the High Tech Network. Other innovation initiatives coordinated through ASTER include:

- ▶ S3 AREAS – a series of spaces designed for promoting entrepreneurship and education pathways;
- ▶ Mak-ER – a total of 19 *fablabs* and *makerspaces* for creative interactions and high tech digital fabrication activities; and
- ▶ Business Incubators - a total of more than 60 incubators in both public and private spaces.

The Innovation Centres offer technology-transfer and innovative-business start-up services. Innovation Centres do not undertake research but help companies to find contacts and develop solutions to problems. In most cases, Innovation Centres are mainly focused on providing support services within their local area.

The ten Technopoles host and organise activities and services for industrial research, experimental development and technology transfer. They provide facilities for dissemination activities, as well as space for private tenants in the form of high tech companies or start-ups. In 2016, ASTER consolidated a unified system of management for the network of Technopoles.

## 5. ACTIVITIES

The core activities of ASTER are focused on encouraging and supporting continuous collaboration within the industrial research community.

A number of governance activities form key elements in the execution of ASTER's management responsibilities. The general assembly of ASTER shareholders meets once per year and the Board meets at least 4 times per year. An important instrument for ASTER governance is the *Comitato di Consultazione Industriale e Scientifico* (Industrial and Scientific Consultation Committee, CCIS). The CCIS includes representatives from all the shareholders but also representatives from entrepreneurial Associations. The CCIS usually meets four times per year.

In the area of project design and development, ASTER helps enterprises in accessing EU funds and other financial resources for innovation. Since its inception, ASTER has managed more than 100 European Commission funded projects, including around 30% as lead partner

ASTER offers a key contact and coordination point for the regional research system as whole in seeking active partners. This also includes fostering participation in international collaborative programmes and European funded projects. A particular set of activities– missions, hackathon, expo, international visits – were undertaken in 2016 to promote the internationalisation of the High Technology Network.

Promoting and supporting industrial innovation pursued through collaboration with research centres is the core business of ASTER. This includes supporting companies in the Emilia Romagna region in the area of protecting and exploiting intellectual property rights, providing support and information on accessing financial resources for innovation, and consulting support on industrial contracts. ASTER manages R&D project funding calls, provides online web resources, conducts training sessions in companies, and offers tailored specialised face-to-face consulting services to support these efforts.

ASTER is now also strongly focused on trying to build strategic projects. Whereas in earlier years' attention was centred on how to answer specific needs of a company, the High Technology Network is now well organised for these activities. Organising activities where the focus is on strategic types of projects with perceived longer term beneficial impacts for the region has become a priority. These activities favour a more open innovation model, as distinct from organising an instrumental response to specific requests from companies. This is the main reason for a new model of organisation of the regional system of innovation, that ASTER is coordinating, based on the establishment of seven regional Associations (Clust-ER) focused on the main S3 priorities. They are permanent working groups where laboratories and enterprises share project ideas. Clust-ER projects can be supported in part through regional programmes, but the objective is to secure alternative sources for additional funding. In 2016, seven strategic projects were developed that map on to the areas of specialisation in the Emilia Romagna smart specialisation strategy: Smart Swap Building, Micronet; Green Lab Valley; ERMES-Veicoli elettrici, Fabbrica di batterie LI-ION; Casa Mediterranea; and Manutenzione del Territorio.

ASTER also fosters activities designed to promote high level skills and expertise for industrial research and innovation. Quality human capital is viewed as a key element required to attract investment and other talented researchers and technicians. ASTER promotes the development of career pathways for PhDs and creates opportunities for international mobility.

Since 2000, ASTER has been involved in activities to provide services to support startup companies in Emilia-Romagna. These activities include managing EmiliaRomagnaStartUp, a portal for accessing information, offers, mentors and for partner searches across Europe and worldwide. Other activities support the creation of crowd-funding campaigns and consultancy regarding intellectual property rights.

In 2016, online access to searchable databases, accessed via the High Technology Network website, was developed for the benefit for registered users. These databases provide:

- ▶ Access to professional contacts, searchable by areas of expertise;
- ▶ Description and specification of modes of collaboration and forms of contracting relevant to multi-partner agreements;
- ▶ A searchable database of past and current projects; and
- ▶ A searchable database for retrieving Technology Reports, which summarise research project results and outcomes in a concise format suitable for dissemination.

Also in 2016, ASTER coordinated activities around the theme of the regional Big Data Community, bringing together public and private actors and identifying competences. The second edition of the Big Data Community report 'From Volume to Value' was released, highlighting a regional capacity that includes more than 60 higher education institution initiatives.

The High Technology Network has its own governance structure. The key management activity is a general assembly of labs and innovation centres belonging to the High Tech Network, which takes place three times per year.

## 6. OUTPUTS

ASTER's mission is not to produce outputs from the eco-system of industrial research that it promotes and coordinates across the region. Rather it's activities provide inputs and support to this eco-system. Nevertheless, the high number of members of the High Technology Network (82) and the large number of Technology Reports (140) that disseminate outputs from member laboratories can be considered as proxy indicators for the impact of ASTER's suite of activities.

In 2016, ASTER joined 10 INTERREG project applications, including three as coordinator, and participated as a partner in seven H2020 applications.

## 7. IMPACTS

The outcome of the initial regional government investment in 600 industrial researchers that ended in 2011 is not precisely known, (largely for privacy reasons). However, it is estimated that 50% of this cohort found employment in companies. This programme and this outcome had an interesting impact on the regional universities, as it was the first time they had trained people to a very high level whose priority was to perform activities for companies.

A major impact of ASTER and of the High Technology Network is the large number of companies that are now used to having productive relationships with universities and university labs. On the other side, there are now many university based researchers and university labs which have high level capabilities for structured collaborations with companies. Over time, the regional calls coordinated by ASTER have seen more than 1000 companies work with universities, creating a significant culture shift in industrial research in the region.

Of the original 35 laboratories funded for the High Technology Network, 10 have now evolved into private legal entities with autonomous management as intended. These entities help to diversify the options for furthering industrial research through collaborative arrangements.



# Support & Influencing factors

## 8. SUPPORTING MECHANISMS

ASTER has a Management Committee that includes all the Consortium members, from government, higher education and business associations. The Committee oversees ASTER's efforts to promote and develop industrial research in the region, by improving companies' capacities to demand and use knowledge from universities and other public research organisations, on the one hand, and by developing universities and public research organisations capacities to directly contribute to industrial research and the needs of companies, on the other hand.

## 9. BARRIERS AND DRIVERS

Familiarity and trust drive efficient project and service based relationships between universities and companies that are designed to apply knowledge, transfer technology or provide problem solutions. One of the goals of ASTER, including through its management of the High Technology Network, has been to progressively build awareness and trust between actors in the Emilia Romagna innovation system. It took some time for university labs and academic experts to become efficient in delivering advice to industry partners, both in terms of doing so in a timely way and a clear format, which meant companies needed to persevere in seeking help from university partners. It also required patience on the part of experts to deal with companies less capable of absorbing new knowledge and using information effectively. Overcoming this bi-directional barrier has been part of the same process of entrenching one of the current day strengths and drivers of the High Technology Network.

A lack of autonomy for some industrial research laboratories, particularly the capacity to incorporate and be financially sustainable, can be understood as a barrier to the development of more strategic industrial research cooperation. The focus on specific economic and societal challenges often involves the search for more interdisciplinary solutions and enlarged collaboration networks. Finding appropriate institutional vehicles and management approaches to facilitate enlarged collaborations involving heterogeneous mixes of partners with diverse capabilities can drive the development of shared medium-term goals to further industrial R&D in key technology areas.

## 10. FUTURE CHALLENGES

University departments and groups in other public research organisations sometimes lack the incentive and/or the experience to promote themselves to potential industrial partners, instead responding mainly to academic demand for their knowledge outputs. Laboratory researchers are often motivated by discovery and more likely to wait for companies than to go

to them. Further improving the outward looking culture of academics thus remains a management challenge for ASTER and an operational challenge for the High Tech Network.

The process initially imagined and set in train by the region foresaw each of the industrial labs that were initially funded becoming completely autonomous from the promoting university, and not being managed by academics. Some labs are now private companies, including some owned by partnerships of universities and business. However, the original process has not been fully or sufficiently completed.

Developing a strategic approach to industrial research cooperation that complements the gains made in instrumental forms of cooperation between universities and companies is a medium term challenge. The historical trajectory of UBC within the High Tech Network was initially focused on satisfying the needs of firms for advice and problem solutions to immediate challenges, followed by a period expanding partnerships for defined projects designed to develop new knowledge and applications. In the future, UBC should be structured also to build capability and competitive advantage aligned to medium-term strategic goals, particularly in the priority areas defined in the region's smart specialisation strategy.

## 11. CONTEXT

The Emilia Romagna region of Italy has a strong history of manufacturing, and is particularly famous for its automotive and motorcycle sectors. Sectors such as mechatronics are strong and were not overly affected by the recent financial crisis. Laboratories working most closely with the automotive sector were less badly affected by the crisis. There are also strong ceramics, machine tools, packaging, agricultural machinery, and nautical enterprise sectors. There are around 375,000 businesses in the region of which 40,000 are manufacturing enterprises. Major sectors of employment include construction (19%), mechatronics and transport (18%) and agri-food (17%). Emerging areas of employment include health, wellbeing and biomedicine (9%), and cultural and creative industries (7%). The main pillars of the regional education system are a strong vocational education and training system, a network of Polytechnic schools, and the six regional universities. The region has a population of approximately 4.5 million persons and GDP per capita of €32,487.

The Emilia-Romagna smart specialisation strategy (S3) aims to support research and innovation primarily by connecting the strengths of the production system more directly with the knowledge system. The S3 strategy focuses on driving innovation in traditional areas of strength – agri-food, building and construction, mechatronics and transport – and developing and fostering social innovation in emerging areas – health and wellbeing industries, cultural and creative industries. The S3 strategy also aims to steer change in areas of societal challenge – sustainable development, healthy and active living, the information society. Excellence in support services for the production system is also targeted – ICT, logistics, knowledge intensive services.

## 12. KEY SUCCESS FACTORS

The elaboration of a culture of collaboration between public and private actors in the interests of an expanded and innovative industrial research capacity is based on complementary capabilities and competences. Initially, the two key success factors were the presence and development of companies with the capacity to demand, absorb and transform knowledge, allied to the presence of universities and research institutes that have the capabilities and the responsiveness to address industrial research and innovation challenges in a timely and professional manner.

All stakeholders are represented in ASTER. A key success factor is the agreement and support among all parties for ASTER's role as the sole coordinating agency for the High Technology Network and innovation system more generally.

The current key success factor is agile coordination and development of appropriate activities and networks to multiply the forms, the quality and the scope of industrial research collaboration – with a strong emphasis on areas of regional strength and emerging specialisation.





# Further Information

## 13. MONITORING AND EVALUATION

ASTER uses a rolling triennium structure for its strategic plan, the most recent of which addresses the period 2017-19. Operational plans are contained in the Annual Activity Plan, the most recent of which relates to 2017. These plans are combined in a single detailed document which is publicly available and contains a summary of results for the previous year's activities.

A working group has been developing a set of indicators for monitoring ASTER activities. These indicators will monitor several sets of ASTER activities including: support activities provided by ASTER (assistance/information/consulting responses etc.); the generation of research activity (value/number contracts etc.); networking; strategic project development; communication and sustainability; and training and dissemination.

## 14. SUSTAINABILITY MEASURES

The sustainability of the High Technology Network depends in part on the capacity of network members to access research funding. The main sources of funding are the public project calls open to members of the network that are managed by ASTER, (although public money is itself managed entirely by the regional authorities), European project funds, and company funded R&D projects. The strategy for making individual laboratories in the network sustainable is also based on their capacity to attract sufficient funding. Couple with their evolution.

## 15. TRANSFERABILITY

The context of Emilia Romagna is highly distinctive; elements of the centralised coordination approach to the development of industrial research capacity undertaken may be relevant in some other cases, even where the productive and knowledge systems are more fragmented. Outside learning regarding industrial research development may also be enhanced by the linking of the regional strategy to the smart specialisation strategy platform.

## 16. PUBLICATIONS AND ARTICLES

Emilia Romagna Big Data Community(2016) *From Volume to Value*, available from <http://www.aster.it/en/publications/volume-value>

## 17. LINKS

ASTER <http://www.aster.it/en>

High Technology Network <http://www.retealtatecnologia.it/>

Emilia Romagna S3 strategy <http://www.regione.emilia-romagna.it/s3>

Area Space S3 <http://www.aster.it/AREA-S3>

Emilia Romagna Start Up <http://www.emiliaromagnastartup.it/>

Technopoles <http://www.retealtatecnologia.it/tecnopoli>

Maker Spaces network <http://www.mak-er.it/p/mak-er.html>

## 18. CONTACT PERSON



Giorgio Moretti,  
High Technology Network Manager,  
ASTER  
[giorgio.moretti@aster.it](mailto:giorgio.moretti@aster.it)