

# ECOS4IN EXISTING TOOLS AND BEST PRACTICES

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## Objectives of the document

The document provides a final analysis of the activities of scanning and systematization of the existing tools and best practices aimed at supporting the diffusion of industry 4.0 technologies among small and medium-sized firms in the participating regions.

## 1. Method

The analyses was based on the elaboration and the diffusion of a methodology to collect and categorize information related to initiatives developed at the regional level in the participating regions. The methodology, in particular, aimed at reviewing the heterogeneous set of actors and policies or initiatives involving the different actors (“species” as defined in the project) representing the ecosystems.

The project partners were required to fill in templates -distributed as excel files- that allowed then to nurture the knowledge base of the project (CE1393\_ECOS4IN\_DT1.3.1). The Knowledge Base is a categorized and searchable database that will be made available to the public and will allow to:

1. Identify the relevant initiatives, policies and actors in the participating regions, so to scout for possible collaboration opportunities;
2. Identify possible best practices to develop initiatives and policies in regions resembling those represented in the project.

## 2. An overview of main evidence

The regions represented in the project are diverse in terms of their structure, industrial specialization and economic development. This offers the opportunity to observe a wide variety of approaches to develop industry 4.0 among small and medium-sized enterprises.

A review of the actors involved in the development of local ecosystems for industry 4.0 reveals that a central role is played by actors spanning research and industry, with a particular focus on universities and research centers. For instance, when Veneto is considered, the alliance among universities that gave life to the local Competence Center was fundamental in making the National policy on Industry 4.0 concrete and deployed



in the region. Similarly, the Usti region sees an important role of local branches of university faculties being central in creating both awareness on industry 4.0 and occasions for collaborative projects. In other cases, such as in the case of Poland and the Krakow region, universities and research centers are obviously important actors in the local ecosystem (cf. for instance the role of the Krakos University of technology) but the main triggers and the most reviewed actors -an indication of their salience- appear to be local development agencies such as Marr and local technology and science parks, a very articulated presence in the Malopolska region. Private companies and local consultancies characterized, on the other hand, the North Croatia region: according to the collected data, these actors represent the main engines of initiatives, both research-related or development related, involving universities, the world of research and local development agencies. Being the more advanced and populated region in the partnership, Lombardy is the more heterogeneous region: as one can infer from the knowledge base, the number of different actors - research and development institutions, training and education organizations, private and public actors- the region is a valid template to appreciate -and be inspired by- the complexity of actors composing a well-functioning ecosystem to support industry 4.0 technologies. Upper Austria, on the other hand, is similarly a well-developed ecosystem in terms of the variety of actors composing it and the diversity of initiatives and funding/support schemes. One element that stands out from the Austrian case is the relative importance of technical and vocational institutions.

A synthetic look to the different actors composing the ecosystems might be structured as follows:

- Development agency. These actors represent the key intermediary actors in the ecosystems and are present in all the regions analyses. Their role is eminently that of translating national policies according to regional specificities and to actively broker among private and public actors;
- Public institution. Local institutions, in particular, play a relevant role, in that they are managing funds and calls for funds in the region and are responsible for the deployment of initiatives aimed at achieving the objectives each region has to achieve in the regional specialization strategy;
- Private/Public consortia. What was understood from the analysis is that the speed of the evolution of Industry 4.0 technologies requires public actors to be supported by private operators who might accelerate actions such as the setting up of local collaborative efforts, joint research and development facilities and, most of all, could connect regions with other areas on a global scale
- Research & Technology Organization - Research Centers and universities. The role of these actors is key in translating knowledge developed in global research on computer science in actionable results to be then exploited by the local economic fabric. Universities and post-secondary education institutions, in all the cases, have been progressing in closing the gap between basic research and the application of its results, in particular by reinforcing their technology transfer offices and initiatives. Moreover, these actors are continuously renewing their educational programs to provide local ecosystems with the needed human capital to support local firms;
- Technology/service provider - startup. Startups are a relevant actor in all the considered ecosystems. As it emerges from the collected data, their value in the local ecosystems consists not much in enabling the growth of high-tech organizations that might scale to compete against players coming from high-tech hubs such as the Silicon Valley or Israel; they are rather providers of solutions that, once validated, can be rapidly acquired and deployed by regional ecosystems. In general, the support to startups represents, in the regions of the project, an actor that enables open innovation systems;
- Technology/service provider - large company. Large companies, as in the case of Veneto or Usti, are “anchors” of transnational flows of knowledge and technology. The presence of large firms has a twofold benefit in the variety of regions that were analyzed: 1. They imbue the local industrial base with solutions and technologies coming from the different territories they have a presence in; 2. They lead the transformation of entire supply chains. Small and medium-sized enterprises, in fact, embrace industry 4.0 technologies based on the requests, and the lead, of their international clients that have a headquarter in the territory;



- Consulting company. These firms, similarly to what happens in the case of development agencies, are fundamental actors in easing the fine-tuning between technologies and the specificities of industrial processes of local firms. While the case for the adoption of industry 4.0 might be clear, small and medium-sized enterprises need to be guided to implement these technologies according to the specificities of their production processes, their available competences, the pressures they are facing given their position in value chains of the industry. Consulting firms, in all the regions considered, are key to covering these interfaces;
- Science Park/Hub and Fablabs. Physical are fundamental in allowing the contact and experimentation of novel technologies by local ecosystems. First, they represent spaces, such as in the case of Fablabs, where innovators, researchers and entrepreneurs might have productive encounters and might be contaminated by different experiences, ideas and expertise. Second, they have a fundamental role for regions like those represented in the project: being populated eminently by Small and medium-sized enterprises, these regions required shared facilities and “local public goods” (laboratories, conference rooms) that lower the cost of experimentation of novel technologies.

The methodology, then, required partners to review initiatives and policies aimed at favouring Industry 4.0 adoption by SMEs in the region. The logic behind the task was that of identifying the best practices as they are perceived by the project partners.

The analysis allowed to categorize the different initiatives and best practices in different items:

- Awareness tool. This first category is constituted by initiatives aimed at increasing the awareness of entrepreneurs and managers about the specificities and benefits of industry 4.0 technologies. As expected, one of the main challenges to the diffusion of technologies among firms who suffer from scarcity of resources and competences is a clear understanding of how technologies might be leveraged upon in their processes. Information and training, thus, is a frequent feature in the policies and initiatives reviewed by the partners;
- Collaborative experimental project. One of the main obstacles in the implementation of industry 4.0 technologies is often their end-to-end nature, that is the close integration they require among suppliers and clients in a supply chain. Collaborative projects among firms and those involving firms and providers of knowledge and technologies represent an important feature among the reviewed practices in the participating regions. They, on the one hand, promote collaboration among firms in a *filiere*; second, they allow firms to have access to the results of research and technological advancement generated by universities, research centers and consultancies. The increasing attention of universities in all the regions of the partnership towards “applied research” and the creation of specialized centers aimed at supporting firms and not only provide basic research measures how ecosystems are evolving;
- Firms’ digital strategy implementation. Several of the initiatives reviewed by the partners are initiatives within which the ecosystem supports the local firms in identifying the potential avenues and ways to implement industry 4.0 technologies. As the knowledge base reports, cases such as the ITS 4.0 in Veneto or the PID project in Italy, are ways in which a variety of actors in the ecosystems are assisting firms the “last mile” of innovation through workshops, dedicated consulting projects and the like;
- Infrastructure (e.g., connectivity). Infrastructure is a key component of industry 4.0 ecosystems, nonetheless only one case was reviewed of policies aimed at the development of up-to-date infrastructures: the FESR-POR 2014-2020 strategy of Veneto with its focus on the increase of the quality and diffusion of high-speed connectivity in the area.
- Monetary incentive. Tax credit and other types of monetary incentives, for instance vouchers for the acquisition of novel technologies and competences, are another important lever used by



governments in Europe to trigger the diffusion of industry 4.0. The analysis on the data provided by the partners, nonetheless, shows how the need to guide firms in the strategic transformation required by novel technologies through the collaboration of different actors trumps the sole effect of money to be invested in new technologies;

- Regional development strategy. All the partners reviewed and included initiatives aimed at strengthening the regional innovation strategy of their regions and identified the importance of well-oriented and orchestrated regional policies participated by all the actors in the ecosystems
- Training/skills development. Technical and vocational education, beyond tertiary education as expected, plays a fundamental role in a variety of represented regions. The use of industry 4.0 technologies in manufacturing processes, in fact, requires a general upgrade of the competences of workers along the whole value chain. While often training initiatives are aimed at providing local economic systems with novel types of figures (data analyst, experts in fields such as internet of things and algorithms) a fundamental challenge lies in the update of the existing labor force in the region. The cases of Veneto with the ITS 4.0 project and of Austria with the “Qualifizierungsverbund Digitale Kompetenz” initiative are two points of reference to be considered in the rest of the project and in the dissemination of the results of the project.