IMPROVE
Interreg Europe

European Union
European Regional
Development Fund

PGI05786 – IMPROVE

Improving Structural Funds for better delivery of R&D&i policies

Regional State of the Art Report

Puglia Region, Italy

22 May 2020

·a·r·t·i·
Agenzia regionale
per la tecnologia
e l'innovazione

Table of Contents

1. Introduction 3
2. Regional profile 4
2.1. The social and economic context 4
2.2. The Productive system 8
2.3. Manufacturing specialization 14
2.4. The regional innovative system 17
2.5. Research and Development 19
3. The policy instrument 25
3.1. Short description of Apulia RIS (priority areas, innovation fields, ….) 25
3.2. The Policy instrument: TO1 of Operative Programme of Puglia Region 27
3.3. Overall description of the policy instrument 29
3.4. Design or the policy instrument 45
3.5. Map of the policy mix 46
3.6. Implementation methods 47
3.7. Budget 48
3.8. Governance 50
3.9. Monitoring, assessment, evaluation 51
3.9.1. The use of indicators 52
3.9.2. The results 53
3.10. Designing the data collection system 56
4. SWOT analysis of the policy mix 58
5. Main conclusions and areas of improvement 59

1. Introduction

The State of the Art is the first activity to be performed by the IMPROVE project's partners within the Exchange of Experiences work package.

The objective of the State-of-the-Art report is to clarify the current situation in terms of management and implementation of Structural Funds, with a special focus on the policy instruments selected by each partner.

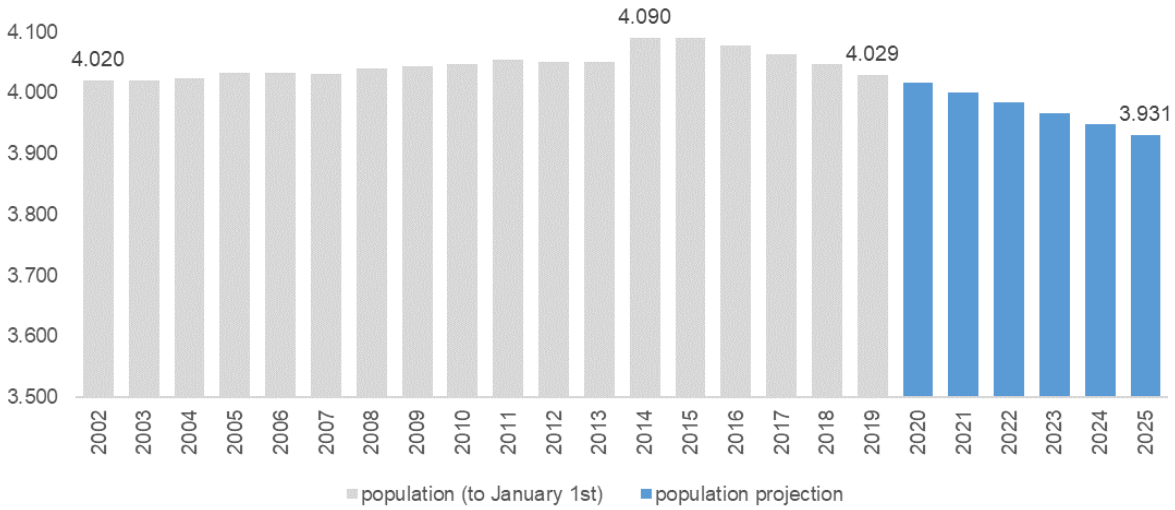
In that respect, ARTI, the Strategic agency for technology and innovation of Puglia region, decided, in accordance with the Managing Authority to focus on the OT1 of the ERDF-EF OP in strong connection with the RIS3 of the Puglia region.

2. Regional profile

2.1. The social and economic context

Puglia is an Italian region located in the South-East of the country, in the heel of the iconic boot. With a population of 4,029,053 inhabitants, Puglia is the eighth Italian region by number of inhabitants, and it is also one of the most densely populated regions with an average density of about 205 inhabitants per square kilometre. Similarly, to other southern regions is affected by a strong reduction of the population mainly due to migration of young people from the South to Northern regions and abroad. As shown in Figure 2.1, in the next years there will be a continuous reduction of the population.

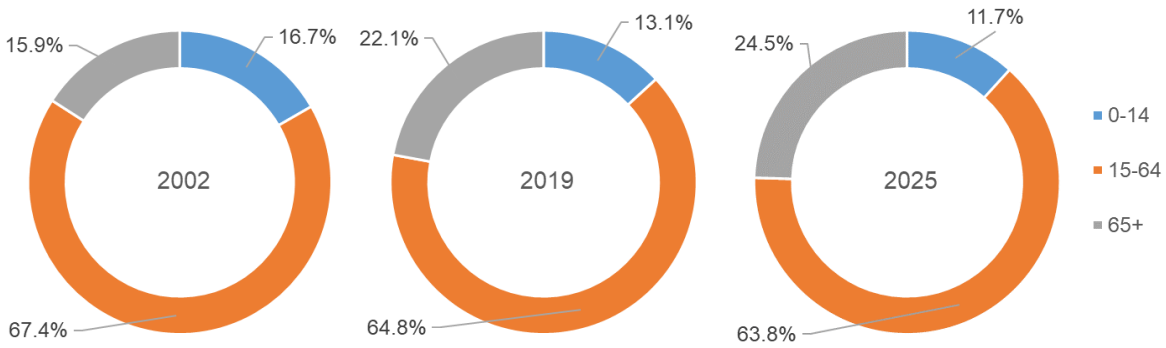
Figure 2. 1 - Population and projection trends



Source: ARTI elaboration on National Statistical Office (ISTAT) data

The reduction of total population will be accompanied by an increase of the mean population age: in 2025 is expected that about a quarter of population will be over 65 (Figure 2.2).

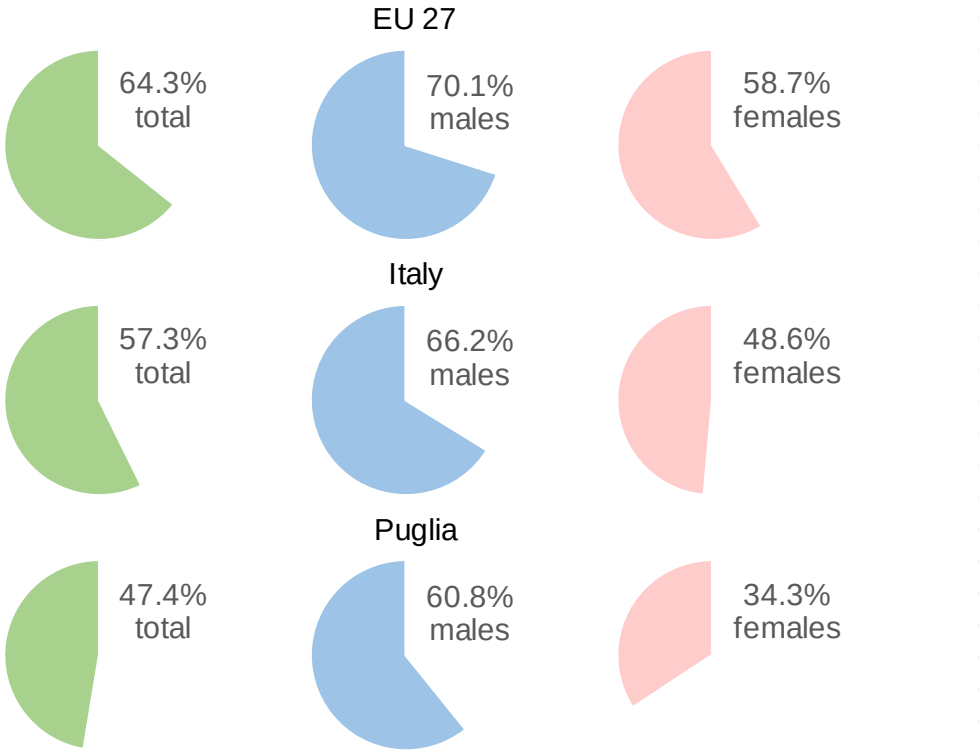
Figure 2. 2 - Population by age groups



Source: ARTI elaboration on National Statistical Office (ISTAT) data

The Puglia region suffers an important gap in terms of economic active population compared to the average of Italy and to a greater extent than the average of the EU-27 countries: in 2019, the economically active population in Puglia was equal to 47.4% of the total population aged between 15 and 78 against a rate of 57.3% for Italy and 64, 3% for the EU-27 (Figure 2.3). The gap is widening for females with the economically active female population in Puglia decreasing to just 34.3%.

Figure 2. 3 - Economic activity rate population aged 15-74 (percentage, 2019)



Source: ARTI elaboration on Eurostat data

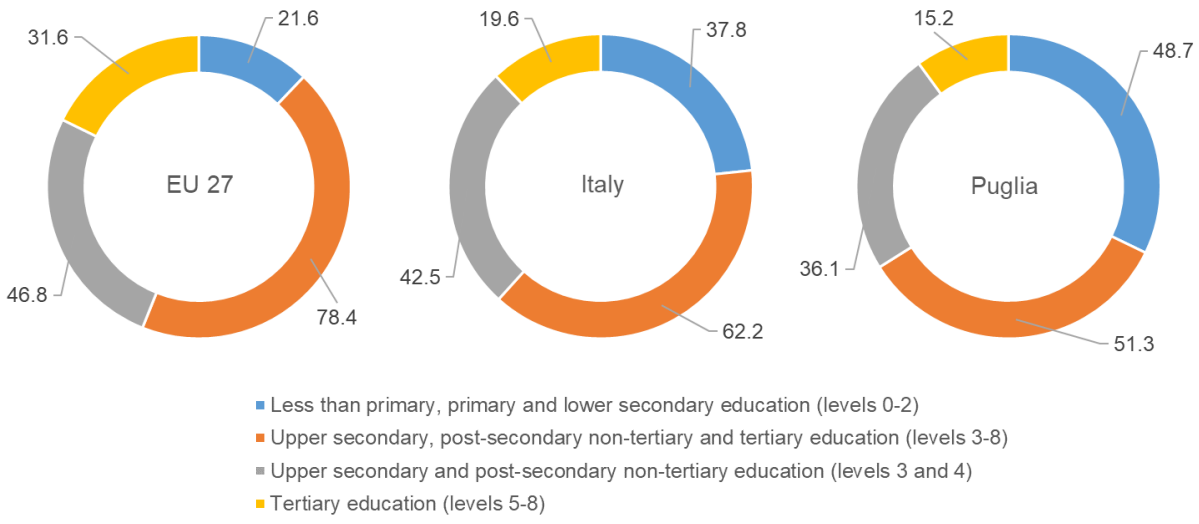
In 2019, the unemployment rate of people aged 15-74 in Puglia reached 14.9% (Figure 2.4), quite above the national average (10%) and the EU-27 countries average (6.7%). The differences widen even more if we only consider females with the unemployment rate rising to 17% for Puglia (11.1% for Italy and 7.1% for the EU-27 countries).

Figure 2. 4 - Unemployment rate population aged 15-74 (percentage, 2019)

Source: ARTI elaboration on Eurostat data

There are also considerable differences between the regional educational attainment level of population aged 25-64 (Figure 2.5). In 2019, only 15.2% of the population has a tertiary education against a percentage that rises to 19.6% in the national average already well below the average of the EU27 countries equal to 31.6%.

Figure 2. 5 - Population aged 25-64 by educational attainment level (percentage, 2019)

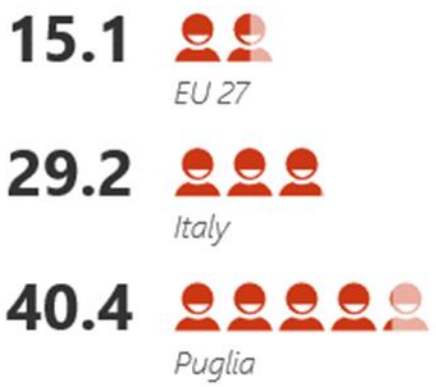


Source: ARTI elaboration on Eurostat data

The lower percentage inevitably reflects on the degree of employment of the youngest segment of the population (aged 15-24) with the relative unemployment rate rising to 40.4% in the Puglia region against an average of 29.2% for the Italy and an average of 15.1% for the EU27 countries (Figure 2.6).

Particularly worrying is the figure on NEETs (Neither in Employment nor in Education and Training) in Puglia region which represent about a quarter (23.6% in 2019) of the total population aged 15-24. The NEET ratio in Puglia is higher than the national average (18.1%) and more than double the value of the EU27 countries (10.1%).

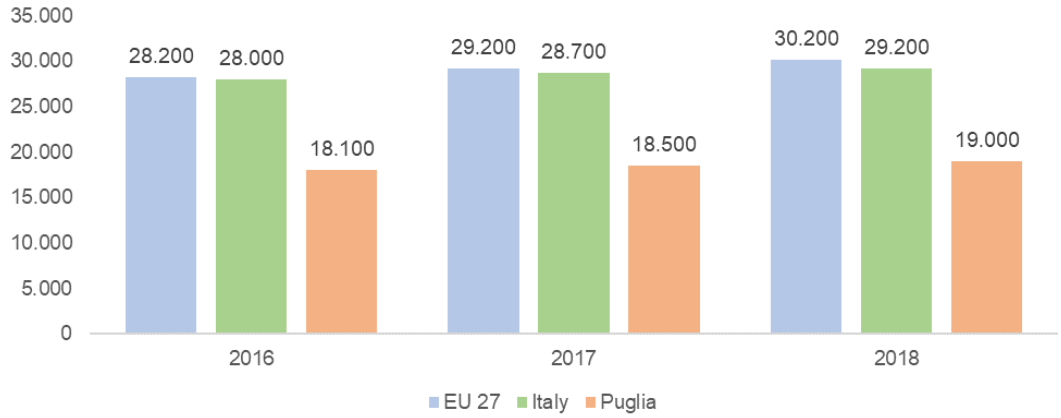
Figure 2. 6 - Unemployment rate population aged 15-24 (percentage, 2019)



Source: ARTI elaboration on Eurostat data

The differences highlighted so far reflect, and are contributing to, the different degree of economic development in the Puglia region. The regional per capita GDP is stably distant from the average per capita GDP of Italy and of the slightly higher per capita GDP of the EU27 countries (Figure 2.7). A positive aspect is that the regional per capita GDP from 2009 to 2018 increased more than the national average (+12.4% against +10.2%) even though the growth of EU27 countries was more than double over the whole period (+25.8%).

Figure 2. 7 - Per capita GDP (euro per inhabitant, current market prices)

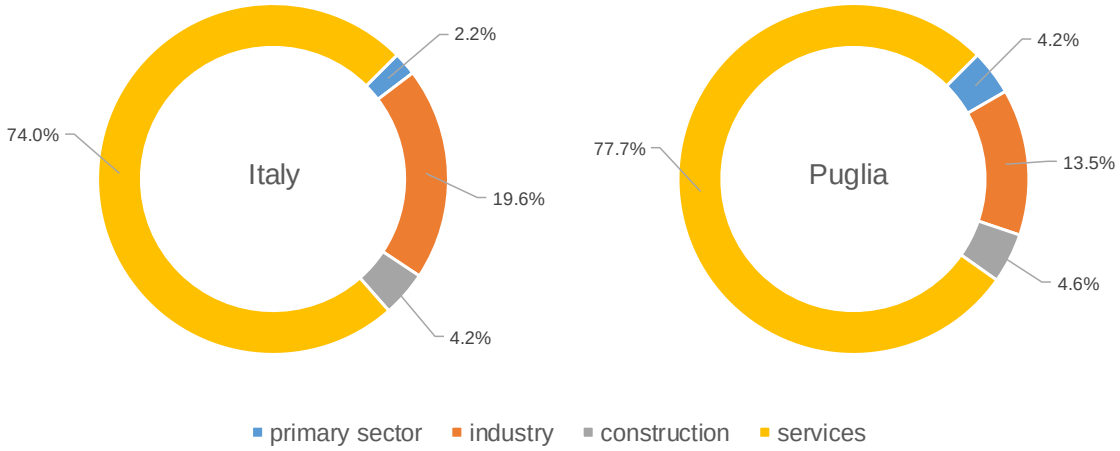


Source: ARTI elaboration on Eurostat data

The greatest growth is perhaps due to the differences in the composition of the regional economy compared to the national average (Figure 2.8). In 2018, at regional level, the added value deriving from the service sector has a greater weight than the average of the Italian regions (77.7% against 74%) as

well as greater is the weight of the primary sector (4.2% against 2.2%). On the opposite side, more limited is the contribution of the manufacturing sector (13.5% against 19.6%).

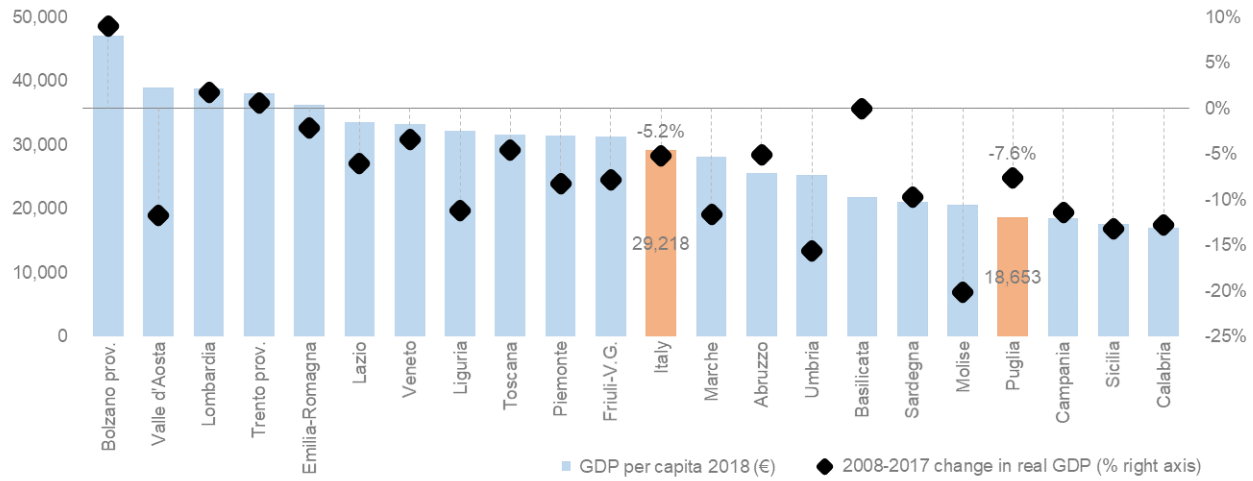
Figure 2. 8 - Value added by economic sectors, 2018 (percentage on total)



Source: ARTI elaboration on National Statistical Office (ISTAT) data

Considering also the crisis of 2009, in real terms the regional GDP decreased to a lesser extent than in most regions of the South Italy, showing a performance similar to that of some regions of Central and Northern Italy (Figure 2.9), even if the distances remain in terms of GDP level.

Figure 2. 9 - GDP per capita (€, current prices) and change in real GDP (2010, base year)



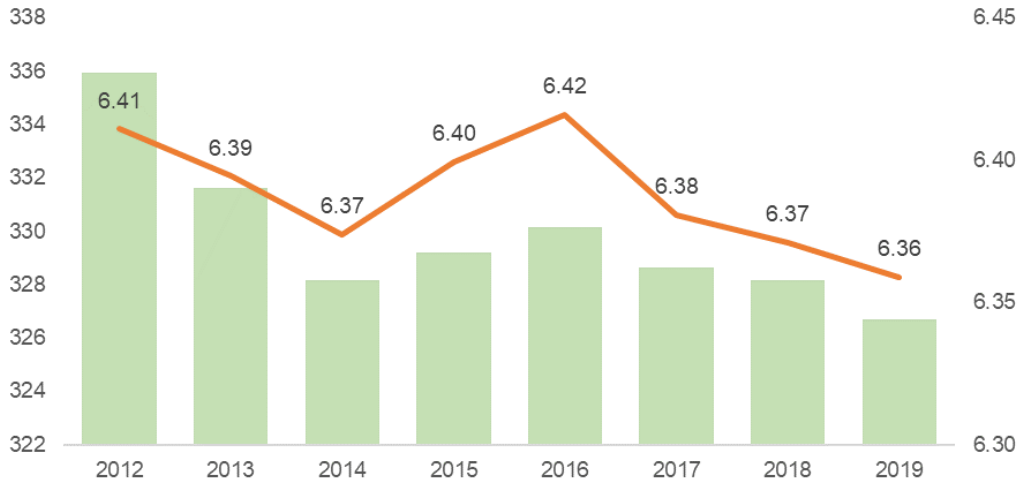
Source: ARTI elaboration on National Statistical Office (ISTAT) data

2.2. The Productive system

After the reduction following the 2012 crisis, the number of companies active in the Puglia region remained substantially stable, showing an initial growth phase (from 2014 to 2016) followed by a

reduction phase (from 2017 to 2019). The share of companies in the region in the national total, with some fluctuations, is confirmed at around 6.4% (Figure 2.10).

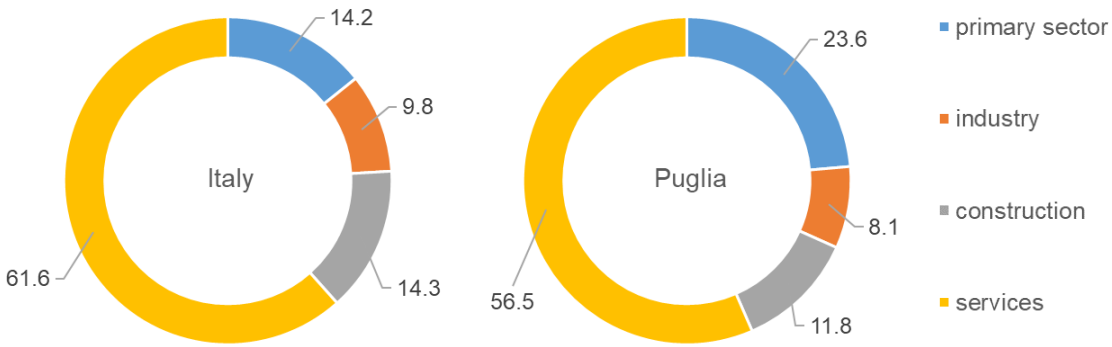
Figure 2. 10 - Numero di imprese attive (valori assoluti e quota % su Italia)



Source: ARTI elaboration on National Statistical Office (ISTAT) data

The primary sector is of greater importance in the Puglia region than the national average with a consequent lesser relevance of the share of the other sectors (Figure 2.11): in 2019, 23.6% of the region's active enterprises operate in the primary sector against a national average of 14.2%.

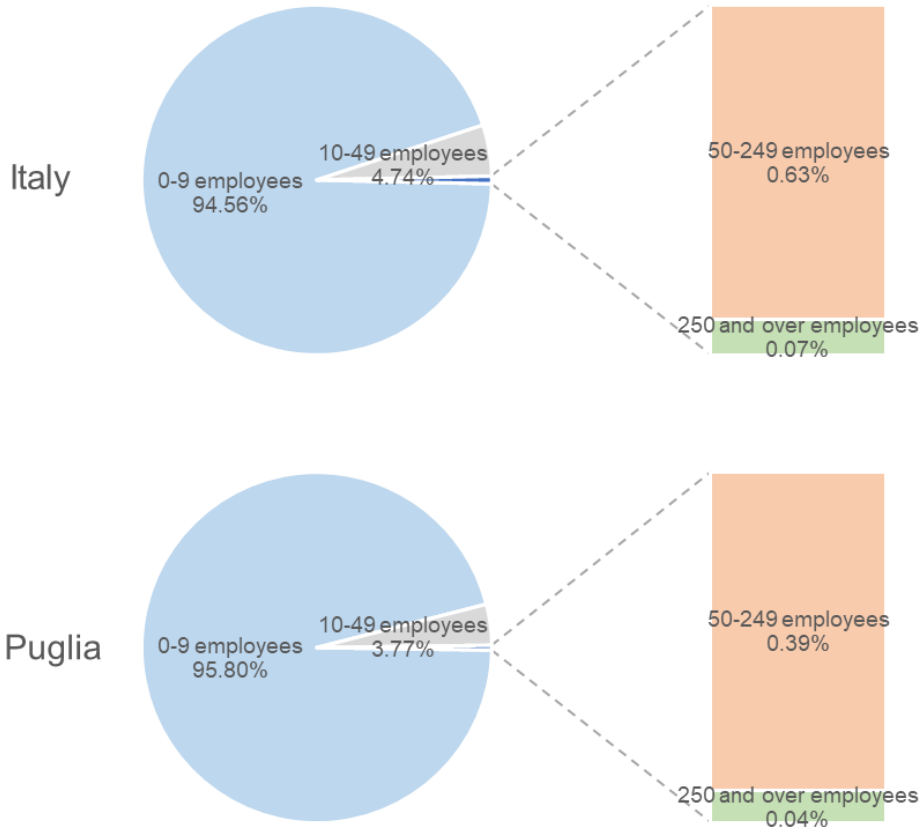
Figure 2. 11 - Enterprises by sector (2019, % share on total enterprises)



Source: ARTI elaboration on Commercial Register data

Another important difference lies in the average size of the companies (Figure 2.12). In the Puglia region, more than 95% of the enterprises have fewer than 10 employees and medium (with 50-249 employees) and large-sized (with 250 and over employees) enterprises account for about 0.4% of the total enterprises against a national average share of 0.7%.

Figure 2. 12 - Enterprises by size of employees (2017, % share on total enterprises)

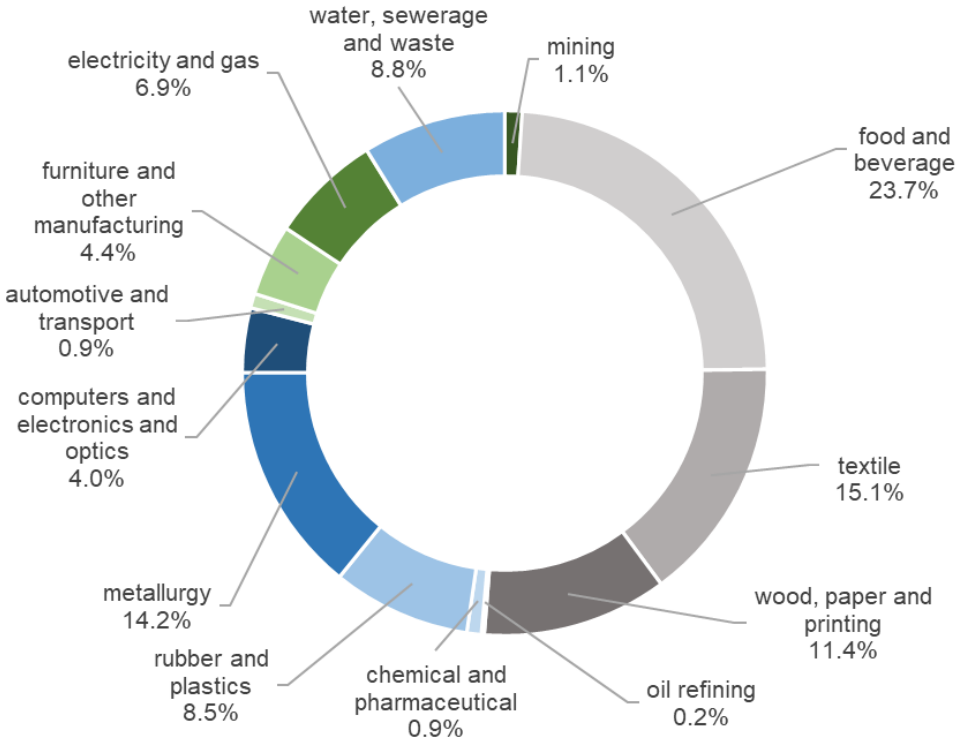


Source: ARTI elaboration on National Statistical Office (ISTAT) data

Food and beverage, textile and metallurgy enterprises play a key role in the regional production system accounting (in 2017) for over 50% both in terms of total number of active enterprises (Figure 2.13) and of total employees (Figure 2.14) of the industrial sector.

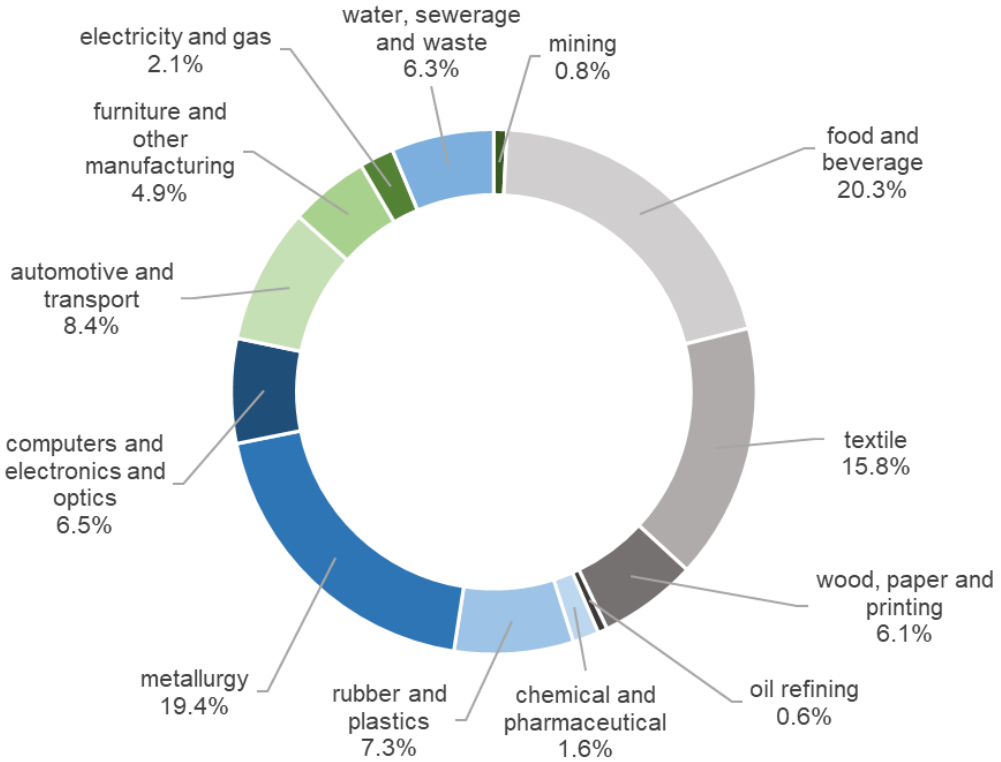
With reference to 2017, the service sector is largely composed of companies active in wholesale and retail trade (40.3%) and companies active in professional, scientific, and technical services (19.1%). In addition, one enterprise out of ten is active in accommodation and catering services, an important part of the tourism sector in the region (Figure 2.15). About half of the total number of employees is employed in wholesale and retail enterprises (35%) and in professional, scientific, and technical services (13.5%) with another 10% doing their job within accommodation and catering enterprises (Figure 2.16).

Figure 2. 13 - Enterprises in industry sector by sector (2017, number)



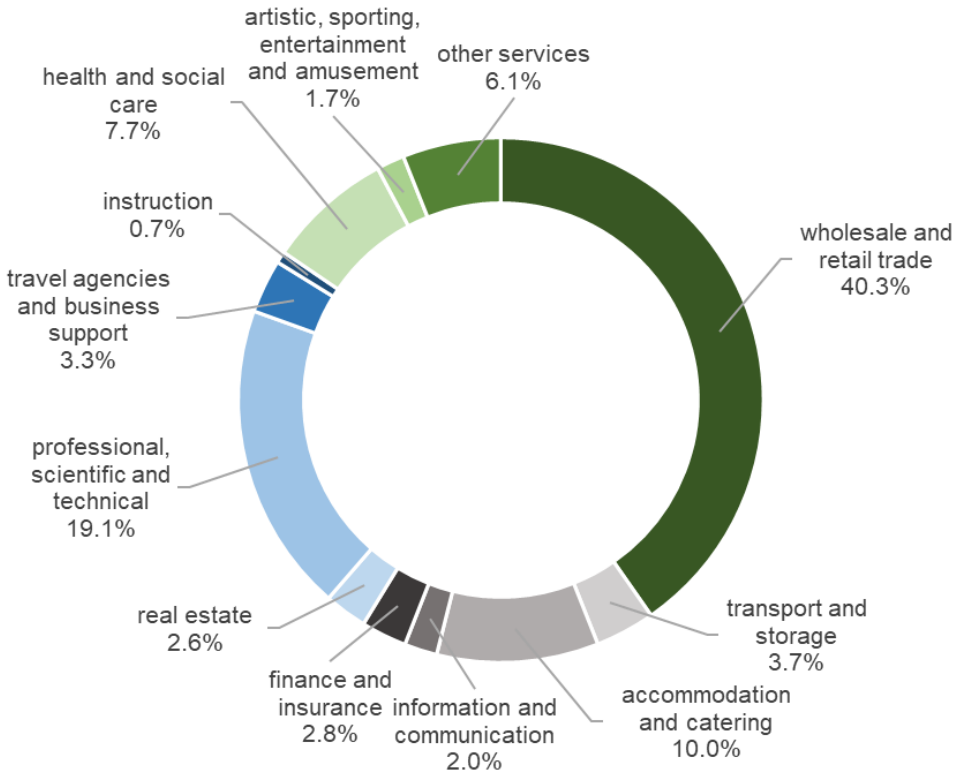
Source: ARTI elaboration on National Statistical Office (ISTAT) data

Figure 2. 14 - Employees in enterprises in industry sector by sector (2017, number)



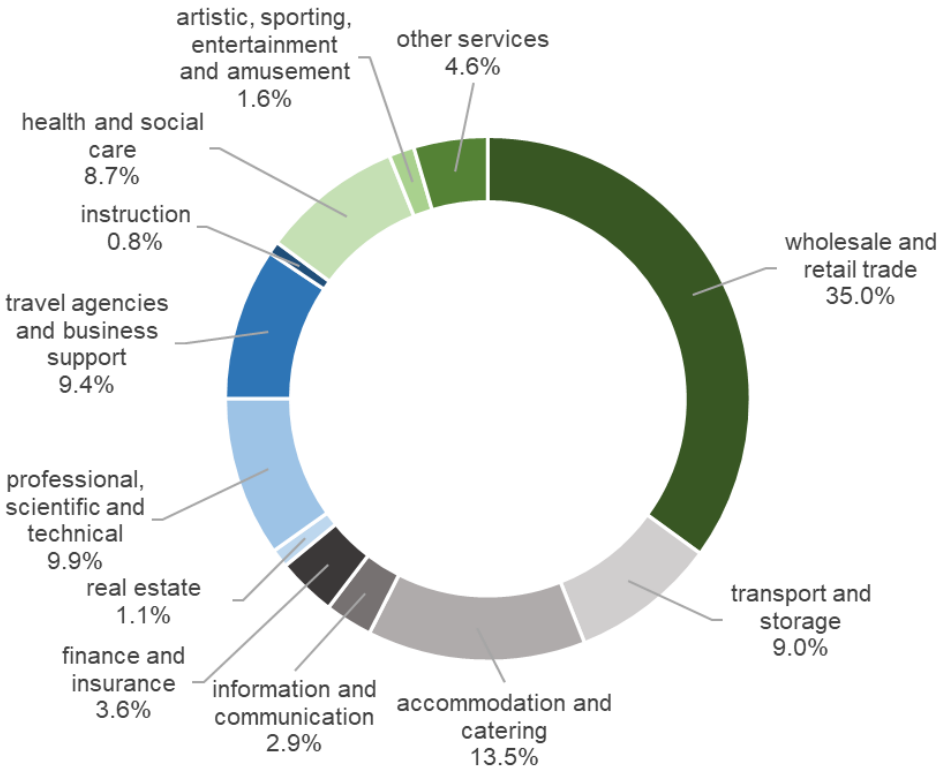
Source: ARTI elaboration on National Statistical Office (ISTAT) data

Figure 2. 15 - Enterprises in service sector by sector (2017, number)



Source: ARTI elaboration on National Statistical Office (ISTAT) data

Figure 2. 16 - Employees in enterprises in service sector by sector (2017, number)



Source: ARTI elaboration on National Statistical Office (ISTAT) data

Good news comes from enterprises with at least 10 employees who in the Puglia region, and in other regions of the South Italy, have experienced high growth[1] in terms of employees. With reference to 2017, the Puglia region has 929 high growth enterprises equal to 16.2% of the total active companies (Figure 2.17) against a national average of 12.8%.

Figure 2. 17 - High growth enterprises (2017)

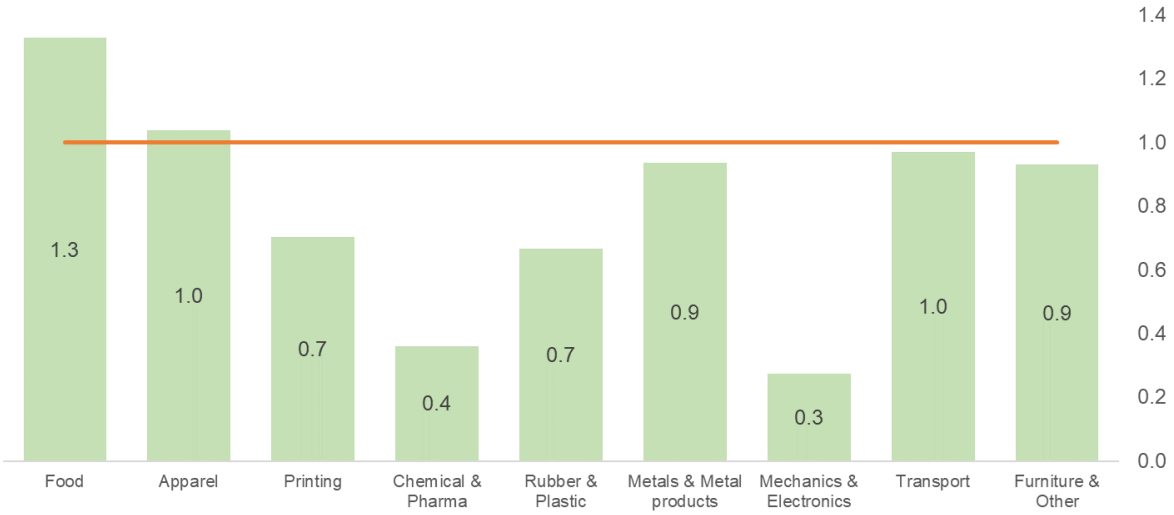
Source: ARTI elaboration on National Statistical Office (ISTAT) data

[1] An average annual growth in terms of employees of more than 10% over a period of three consecutive years.

2.3. Manufacturing specialization

The Puglia region has a manufacturing specialization in the food and beverage sector and, to a limited extent, in the apparel sector with a specialization index[2] equal to 1.3 for the first sector and slightly above 1 for the second sector (Figure 2.18).

Figure 2. 18 - Specialization index by manufacturing activity (2016)

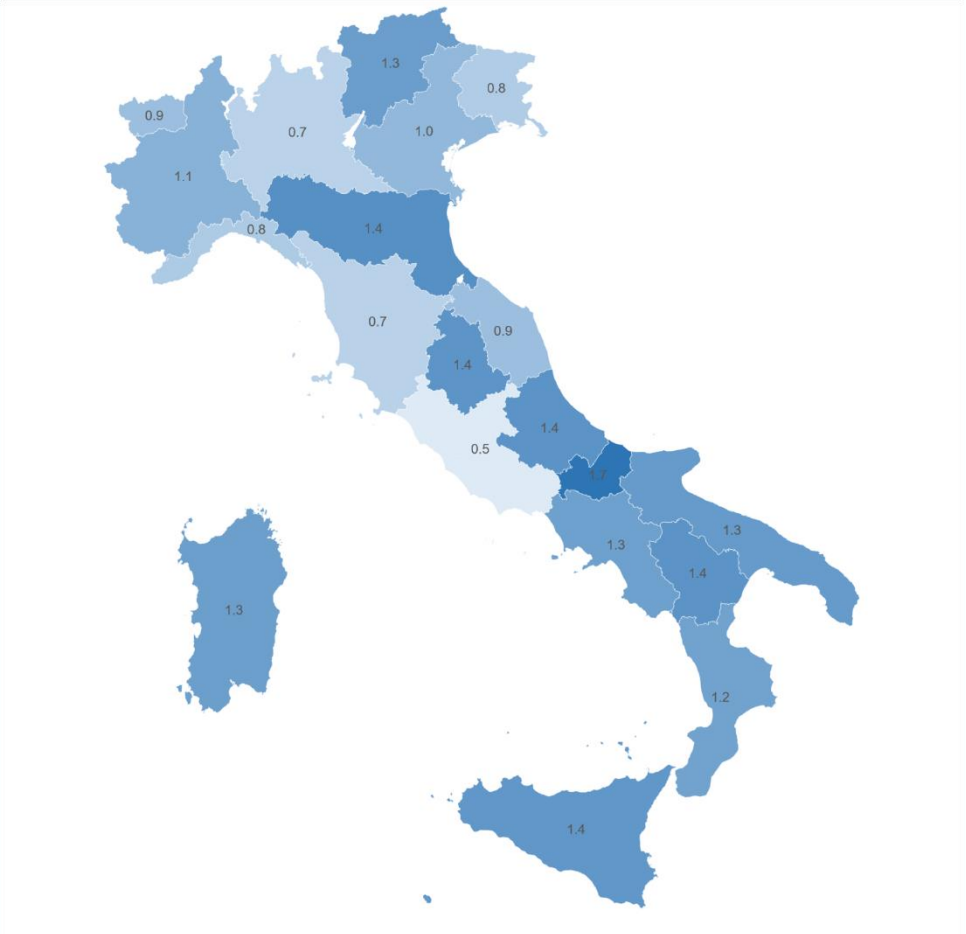


Source: ARTI elaboration on National Statistical Office (ISTAT) data

The regional specialization in the food sector is similar to the degree of specialization of most regions of Southern Italy (Figure 2.19) and higher than the value of almost all the other Italian regions.

[2] The regional specialization coefficient in an activity corresponds to the share of employment in that activity compared to the national average value.

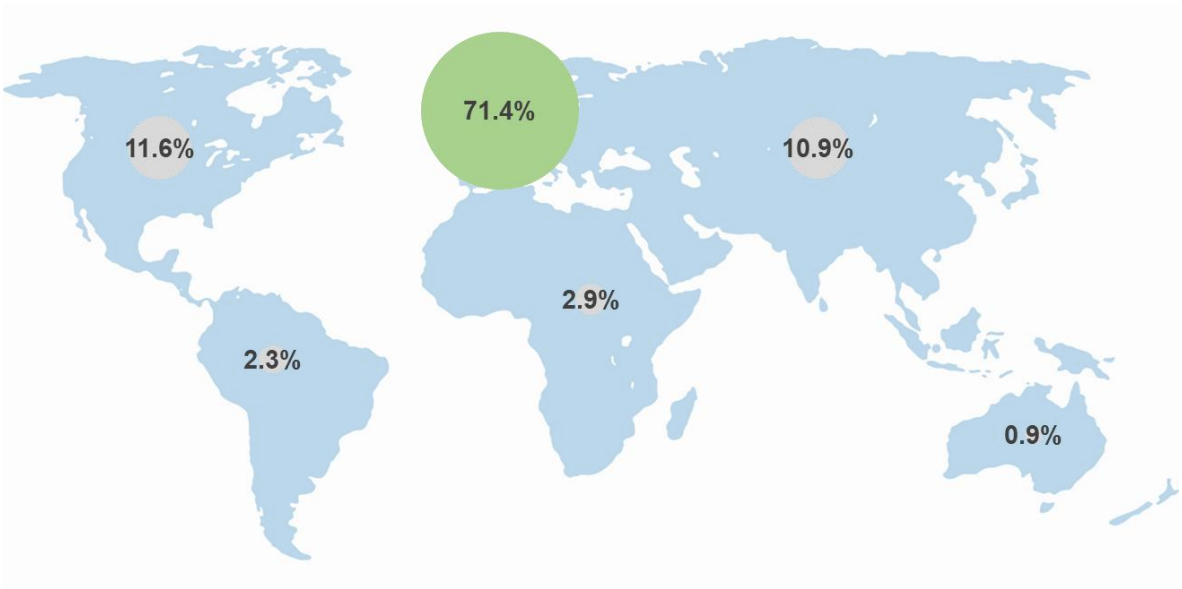
Figure 2. 19 - Specialization index in food sector (2016)



Source: ARTI elaboration on National Statistical Office (ISTAT) data

In 2019, exports of regional enterprises amounted to around 8.85 million euros (equal to 1.9% of Italian exports). Just under two-thirds of total regional exports went to European countries (Figure 2.20) with North America and Asia are the only areas with shares above 10% of total regional exports in 2019.

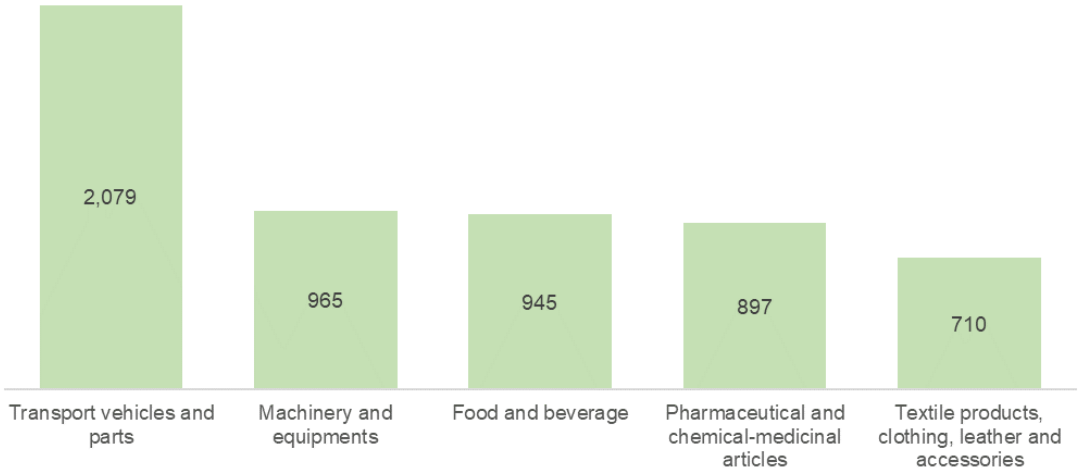
Figure 2. 20 - Puglia export share by area of destination (2019)



Source: ARTI elaboration on National Statistical Office (ISTAT) data

The top five sectors by amount of exports account for about 63% of the total exports of companies in the Puglia region. The leading sector is the transport vehicles and parts sector which in 2019 recorded approximately 2 billion exports equal to approximately 23.5% of total regional exports (Figure 2.21). With a share of about 10% for a value around 900 million euros we find the machinery and equipment sector, the food and beverage sector and the pharmaceutical and chemical-medicinal articles sector. Slightly further back is the textile products, clothing, leather, and accessories sector with an export value of around 700 million euros (8% of the regional total).

Figure 2. 21 - Main Puglia exports by sector (2019, millions of euros)



Source: ARTI elaboration on National Statistical Office (ISTAT) data

2.4. The regional innovative system

A positive aspect of the Puglia economy is the share of enterprises involved in innovative activities. In fact, although the percentage of enterprises involved in innovative activities is lower than the national average (42.5% vs. 48.7%) enterprises of the Puglia region are more likely to carry out innovative activity in other regions of Southern Italy (with the exception of Abruzzo) and not too far from the regions of Central and, in some cases, of Northern Italy (Figure 2.22).

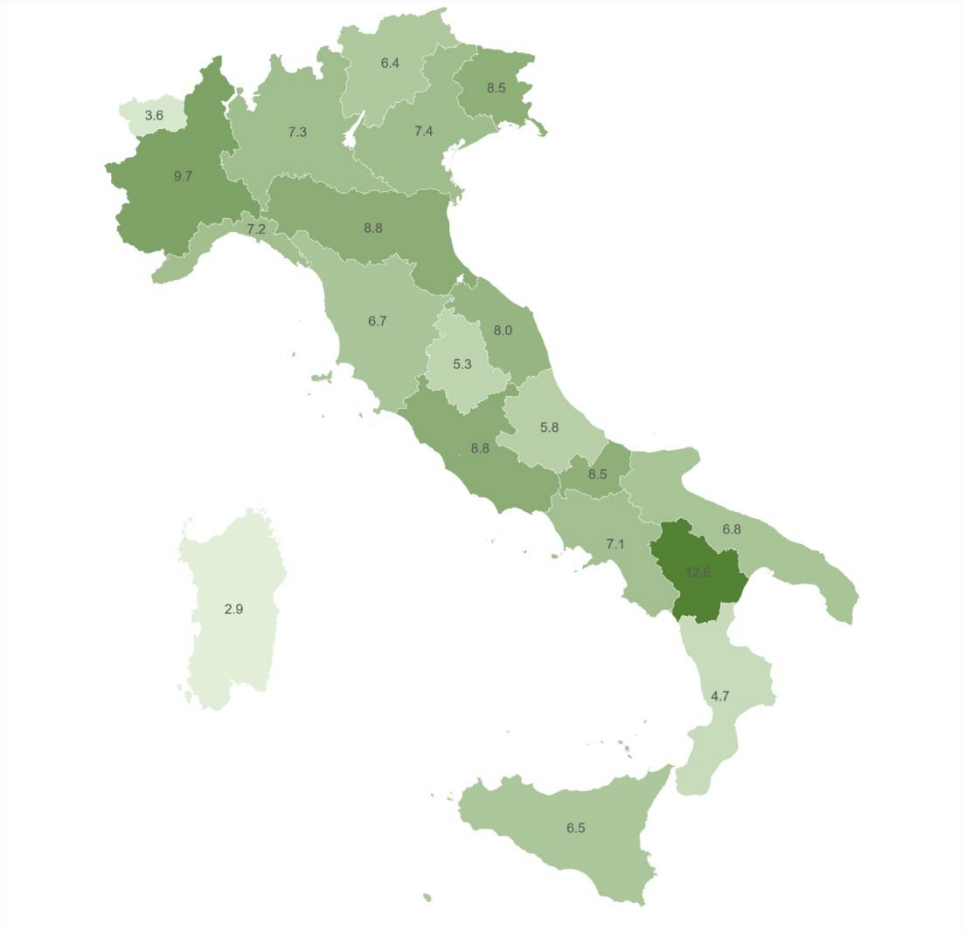
A similar picture emerges also with reference to the percentage of enterprises that have introduced innovative products and services equal to just under a third of enterprises with innovative activities in Puglia (30.6% against an average of 38.1% for the whole Italy).

Figure 2. 22 - Enterprises with innovative activities (percentage of total enterprises)

Source: ARTI elaboration National Statistical Office (ISTAT) data

The expenditure on innovation per employee in enterprises of the Puglia region in 2016 was equal to approximately 6,800 euros (Figure 2.23), a value slightly lower than the national average (equal to around 7,800 euros) but higher than the average value of enterprises in 8 regions, including some from the Central (Toscana and Umbria) and Northern Italy (Trentino-Alto Adige and Valle d'Aosta).

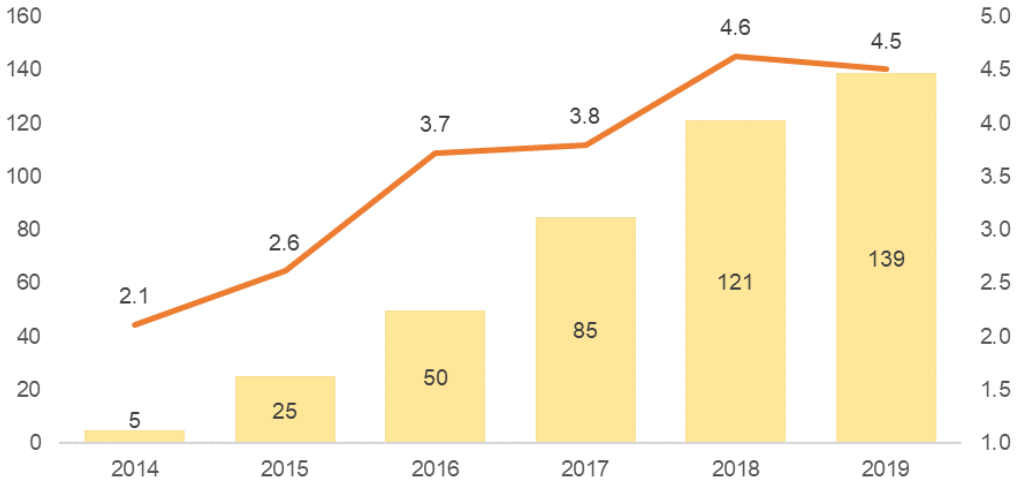
Figure 2. 23 - Expenditure on innovation per employee (2016, thousands of euros)



Source: ARTI elaboration National Statistical Office (ISTAT) data

The number of innovative start-ups in the region is continuously increasing (139 in 2019) with the share of the national total growing steadily to 4.5% (Figure 2.24).

Figure 2. 24 - Number of innovative start-ups and share of the total of Italy (right axis)



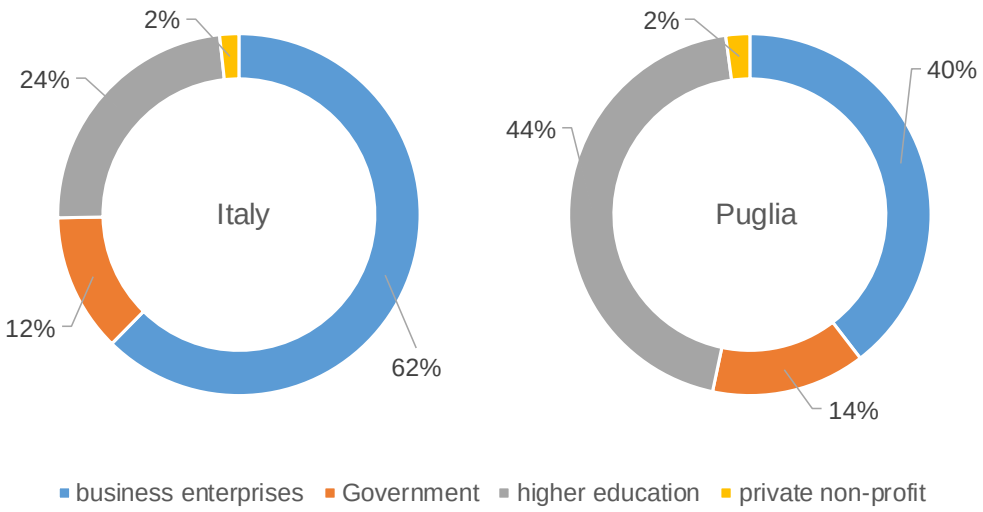
Source: ARTI elaboration on Commercial Register data

2.5. Research and Development

In the Puglia region in 2017 equal to about 580 million euros was the amount of investments in R&D, a value equal to about 1% of the regional GDP against a value of about 2.4% at national level (about 23.8 billion euros).

The higher education sector accounts for about 44% of total investment, followed by the business enterprise sector that accounts for about 40% and by the government sector with about 14% (Figure 2.25). The regional framework differs from the national average framework whereby over 60% of R&D expenditure is carried out by business enterprises sector and with the weight of the high education sector being reduced to 24%.

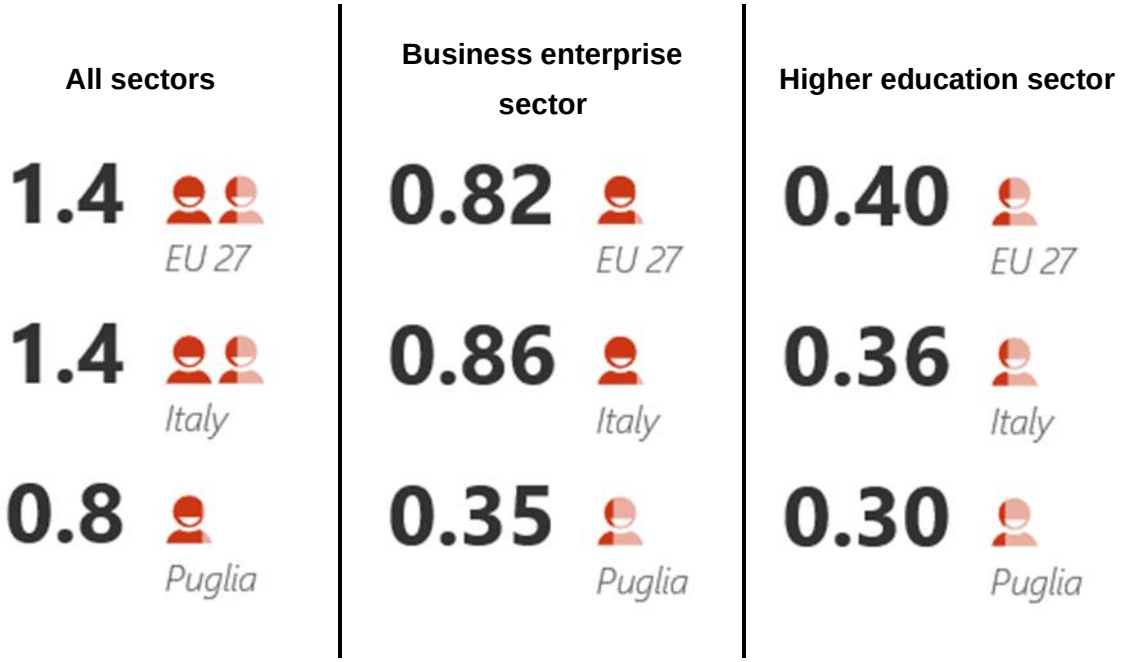
Figure 2. 25 - R&D intra-muros expenditure (2017, thousands of euros)



Source: ARTI elaboration on National Statistical Office (ISTAT) data

The lower R&D expenditure by companies translates into fewer R&D employees within the companies of the Puglia region (in 2017, one R&D employee for every thirty employees) with Italy which overall has a higher ratio to the EU27 country average: 0.86% versus 0.82% (Figure 2.26). The difference between the region and the national and EU-27 average in the high education sector is less wide. In the sector as a whole, the R&D workers in Puglia are less numerous than the (identical) average recorded for the whole of Italy and the EU27 countries.

Figure 2. 26 - R&D personnel and researchers (2017, % of total employment in full-time equivalent)



Source: ARTI elaboration on Eurostat data

According to the Regional Innovation Scoreboard (RIS[3]) of 2019, Puglia is a moderate innovator with a score of 61.2 despite a national average score of 78 (Figure 2.27) but slightly higher than the average of the scores, equal to 59.1, of the regions of Southern Italy.

[3] The Regional Innovation Index (RII) is calculated as the unweighted average of the normalized scores of the 17 indicators: Lifelong learning, International scientific co-publications, Most-cited scientific publications, Population having completed tertiary education, Public-private co-publications, Trademark applications, SMEs with product or process innovations, SMEs with marketing or organizational innovations, Innovative SMEs collaborating with others, Sales of new-to-market and new-to-firm innovations in SMEs, Employment in medium/high-tech manufacturing and knowledge-intensive services, Design applications, Non-R&D innovation expenditures in SMEs, SMEs innovating in-house, PCT patent applications, R&D expenditures in the public sector, R&D expenditures in the business sector.

Figure 2. 27 - Regional Innovation Scoreboard 2019 (relative to EU28 2019 = 100)

Source: ARTI elaboration on Eurostat data

On the digital front, enterprises in Puglia region are suffering from a gap compared to the average of Italian enterprises and, to a greater extent, than the average of European enterprises. In 2018, the DESI[4] index at regional level was lower than the Italian average (25.3 against 34.1) with the latter already suffering from a structural delay compared to the average of the EU28 countries (41.1). The comparison with the other Italian regions (Figure 2.28) highlights the delay of the Puglia enterprises (which occupy the third-last place, preceding only Molise, and Valle d'Aosta) and the possible wide margins for improvement for the regional digital agenda.

[4] The DESI (Digital Economy Society Index) is a composite index that summarizes relevant indicators on Europe's digital performance and tracks the evolution of EU member states in digital competitiveness. DESI indicators for the digitalization of processes include the use of management software (ERP), Cloud Computing of medium-high level of sophistication, social media and Big Data; for electronic commerce, the indicators refer to SMEs (10-249 employees): the share of companies that exchange at least 1% of turnover online, the share of online turnover and that of companies that sell online in other EU28 countries.

Figure 2. 28 - Digital Economy and Society Index (DESI) in Italian regions (2018)

Source: ARTI elaboration on National Statistical Office (ISTAT) data

There are also many production districts that bring together companies in the regional territory and to which they provide various services as well as providing an important contribution to the diffusion of innovation among businesses. Table 2.1 provides a list of the Productive Districts currently operating in Puglia.

Table 2. 1 - Productive Districts currently operating in Puglia

Productive Districts	Relevant Activity
DESPUGLIA (Apulian Sustainable Building District)	The district has concentrated its activities on the energy efficiency of buildings and on the use of waste building materials.
DIPAR (Environment and Reuse District)	The main areas on which the district operates are technological innovation, training, communication, and internationalization. The district set up the TRE.E network through which the companies involved have started internationalization activities, especially in the Balkans.
IT Production District	The district has set up an IT Observatory to study the dynamics of the sector.
DIALOGOI (Productive District of Communication in the Publishing, Graphic and Paper Industry)	The district collaborated with the Region taking care of the aspects related to the communication of some internationalization missions and fairs.
Puglia Creative Production District	The district has structured its governance ensuring an operational space for all the various dimensions of the cultural sector. In addition, the district conducted studies to analyze limits, needs and trends in the cultural industry.
Production District of Puglia Mechanics	The district is very active on issues concerning internationalization and the training of professional figures who guarantee long-term development in the sector.
Apulian Aerospace District	The district represents an excellence in the regional panorama (and not only). In addition to offering consultancy activities on the market, the district conducts studies, carries out promotional and dissemination activities and is very active in initiatives in favor of internationalization and training of professional figures.
New Energy District	The district is very active especially on research and development issues.
Wood and Furniture Production District	The district contributes to the development of the sector, focusing on the constant process and product innovation of the member companies, on the internationalization and specialist training of operators
DAJS (Agri-Food District of Jonian Salento Quality)	The district's activities are mainly focused on training, dissemination, and participation in public sector tenders.
Floro-nursery Production District	The district contributes to promote, support and encourage initiatives and development programs on a territorial basis aimed at strengthening competitiveness, innovation, internationalization, the creation of new and better jobs and growth, as well as the consolidation of the companies operating in the floro-nursery sector.
Pleasure Boat Production District	The district channels the synergies that have developed over the years through participation in internationalization missions, fairs and events, which have guaranteed a substantial growth in the visibility of the companies in the district and have allowed the start of collaborations with national and international partners.

Source: ARTI elaboration

The presence of research structures within the region is significant: the research infrastructure in Puglia is composed by 4 public Universities, 1 private University, and various sites of CNR, the National Research Council (6 Institutes, 19 territorial subdivisions and 1 organisational support units). In 2018, about 14.6 thousand students (+1.1% compared to 2017) have graduated from the regional universities, with a prevalence of those in the social sciences and hard sciences. Puglia also hosts a research centre of ENEA, the National Agency for New Technologies, Energy and Sustainable Economic Development, and some research units of CREA, the Council for research in agriculture and the agrarian economy analysis. Moreover, there are 4 technological districts: MEDISDIH on mechatronics, DaRE on agri-food, DTA on aerospace, DITNE on energy, Dhitech on ICT, and nanotechnologies. Puglia also hosts 6 Higher Technical Institutes (ITS), created to fulfil the demand by companies of new high technical and technological skills.

3. The policy instrument

3.1. Short description of Apulia RIS (priority areas, innovation fields, ….)

The Smart Specialisation Strategy (RIS3) of Puglia Region, SmartPuglia 2020, was concluded in June 2016, satisfying the ex-ante conditionality 1.1, related to the Thematic Objective 1. The RIS3 aims at strengthening the integration between policies for research and innovation, competitiveness, internationalisation, training, and education, improving connection to policies for environment, transport, welfare, and health. Moreover, the RIS3 aims at strengthening the competitiveness of the private sector by supporting the applications of technology; promoting development via the introduction of qualified human capital; supporting the use of innovative solutions to deal with the emerging social and environmental challenges; spreading digitalisation of local communities and promoting the implementation of an 'open government' approach; promoting networking to facilitate the circulation of knowledge beyond the local dimension.

The RIS3 is the result of a long and articulated participative process launched in 2013 by the Region supported by the Regional Agency for Technology and Innovation (ARTI). After an intense discussion with all the relevant stakeholders and Productive and Technological Districts, ARTI proposed a methodology defining a concentration mechanism based on the identification of the most important Key Enabling Technologies (KETs) for the Region, in terms of existing competences, and of the characteristics of a productive regional system.

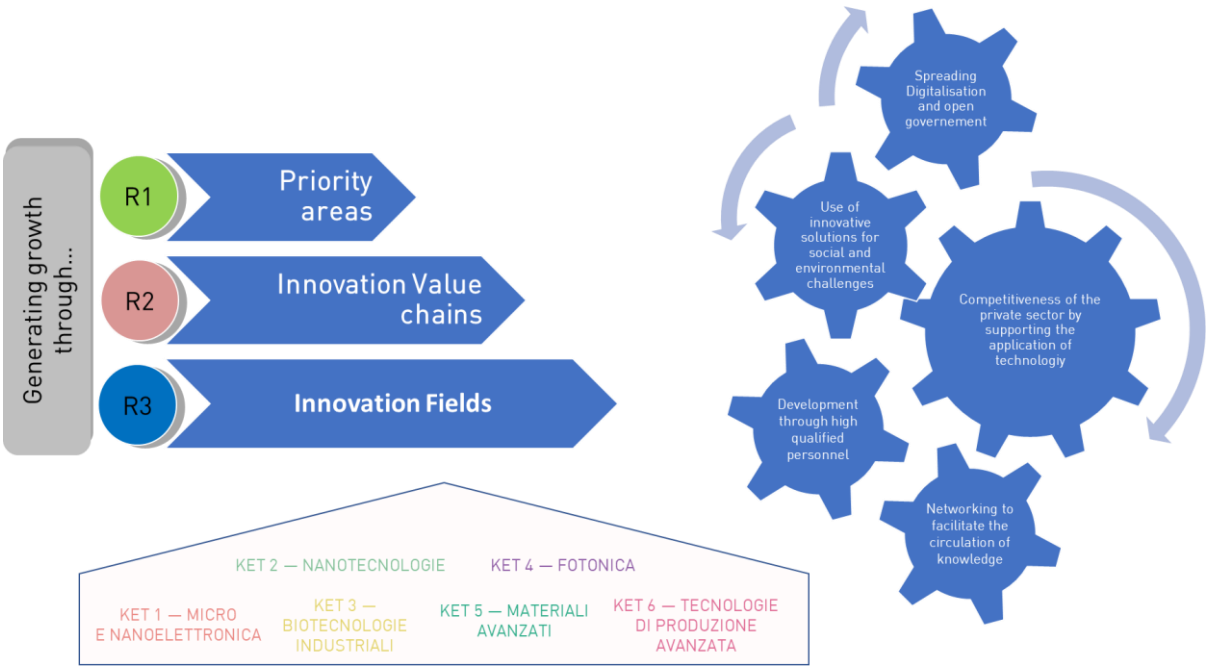
Following the mapping of the KETs, Puglia Region defined three Priority Areas of the RIS3: "Sustainable Manufacturing", "Human and Environmental Health" and "Digital, Creative and Inclusive Communities". For each of these areas, ARTI identified the "Innovation Value Chains", in which the RIS3 concentrates its resources in order to improve their competitiveness and market positioning, and the "Innovation Fields", that the RIS3 prioritizes for each Priority Area and Innovation Value Chain.

The complete classification tree is given in the following table.

Table 3. 1 – Classification of priority areas

Priority Area: SUSTAINABLE MANUFACTURING	
Innovation Value Chains	**Innovation Fields**
• Aerospace	• Aerostructures • Engine design, Propulsion • Avionics, Systems, Equipment • Design, simulation, validation, and management systems
• Transport	• Engine design, Propulsion • Other mechanical parts and subsystems • Systems, Equipment • Design, simulation, and management systems
• Mechatronics	• Control and actuating systems, robotics • Design, simulation, and management systems
• Other Manufacturing ○ Textiles and clothing ○ Furniture ○ Chemistry ○ ...	• Advanced manufacturing systems • New materials • Design, simulation, and management systems • Logistics
Priority Area: HUMAN AND ENVIRONMENTAL HEALTH	
Application Sectors	**Innovation Fields**
• Agro-food	• Food safety • Food products shelf-life prolongation, packaging • Functional foods
• Pharmaceutical	• Drug design
• Medical & Healthcare	• Medical diagnostics • Advanced therapies • Active aging and self-management of health
• Sustainable Energy	• Storage and smart distribution of energy • Distributed production of renewable energy • Energy efficiency
• Environment	• Sustainable management of natural resources and safeguarding of biodiversity and terrestrial and marine ecosystems • Risks prevention, defence and securing of land and coastal areas • Sustainable management of wastes and valorisation of scraps and by-products • Environmental remediation
Priority Area: DIGITAL, CREATIVE, AND INCLUSIVE COMMUNITIES	
Application Sectors	**Innovation Fields**
• Cultural industry	• Integrated management of cultural heritage • Production and communication of cultural and artistic contents • Promotion of dialogue and collaboration between creative industry and traditional manufacturing sectors
• Social innovation	• Empowerment of social networks and social inclusion

Figure 3. 1 - Innovation areas, KET's and areas of intervention



3.2. The Policy instrument: TO1 of Operative Programme of Puglia Region

In light of the growing investment capacity of the regional innovation system in industrial research and experimental development, within the 2014-2020 programming cycle, the Puglia Region has introduced new measures aimed at the business system (large, medium and small) , existing and recently established (start-up), to the world of research, public-private aggregations and those of users.

These measures refer to the regional Smart Specialization Strategy for Smart Puglia 2020, approved in its definitive version with Regional Council Resolution no. 1732 of 1st August 2014.

The theoretical reference is that of the "Quadruple Helix", in which, alongside the University, Industry and Government, there is added the active participation of associations and groups of citizens who collaborate with other subjects in the innovative process. This model allows all interested parties to be more aware of the challenges and needs, allowing researchers and industry to focus on faster development of solutions to be tested directly with users.

The Regional Operational Programme 2014-2020, and specifically Thematic Objective 1 represents the main financial instrument to implement the regional innovation strategy.

For the period 2014-2020, in accordance with the Smart Specialization Strategy, the Region has promoted an approach that envisages the integration between industrial policy and innovation policy, based on four areas of intervention:

- research and innovation;
- interventions on tangible assets;
- support for business start-ups;
- strengthening of skills.

Transversally arises the issue of digitalization, on which the Puglia Region has made important investments in the context of the Digital Agenda Puglia 2020, with the aim of strengthening the regional digital system through the integration of infrastructures, services and digital content capable to guarantee the participation of citizens in political life and the creation of favourable conditions for the development of new businesses.

The available funding instruments are made up of the ROP Puglia FESR-FSE 2014-2020 (Axes I and III for incentives for businesses and support for R&I and Axis II for investments in broadband), the Pact for Puglia - FC 2014 -2020 (for business support) and the Framework Program Agreement - Local Development.

Each Thematic Objective is placed within Axes which also contain Investment Priorities, Specific Objectives and Actions.

In the following pages, we will focus our attention on the

The **Priority Axis I** focuses on "**Research, Technological Development and Innovation**". The research and innovation objectives are consistent with the definition of the "Regional strategy of intelligent specialisation" aimed at the maximum integration of regional policies that have an impact on the following elements:

- the knowledge chain;
- the economic development;
- the quality of life.

Initiatives want to promote the internationalization of the regional innovation system.

Under the Thematic Objective "Strengthening research, technological development and innovation" SmartPuglia2020 finds its application through:

- the updating and completion of instruments aimed at **supporting the supply of innovation** (aid to strengthen the players in the regional innovation system and their cooperation) and **public demand for innovation** (innovative public procurement);
- integrations with support for **digital growth**, the connection between the training and professional needs of the production system, between the training offer at regional level and interventions to support access to credit for private investment in research and development;
- the provision of **aid for research and innovation for enterprises**, both large and small and medium-sized.

Specific objectives of the Priority Axis I are:

1. increasing the innovation activity of enterprises;
2. promotion of new markets for innovation;
3. increase in the incidence of innovative specialisations in knowledge-intensive perimeters;
4. strengthening the regional innovation system;
5. enhancing the capacity to develop excellence in R&D.

3.3. Overall description of the policy instrument

The **Priority Axis I** includes 7 Actions:

Action 1 – Support to R&D activities for the development of new sustainable technologies, products, and services

Action 1 is intended to carry out activities supporting R&D projects of companies operating in Puglia with reference to both for SMEs and for large enterprises and/or public-private partnerships. Projects may be prepared individually, or as part of wider and more articulated integrated investment projects combining tangible and intangible funds.

Investment supports in R&D are therefore aiming to achieve significant results, such as:

- to pool expertise both between companies interested in promoting joint research programmes and between companies and bodies specialised in order to provide adequate specialist skills and experience;

- to identify innovative technological solutions that support industrial innovation while safeguarding the environment, and producing positive impacts on it;
- to support the dissemination of a culture of research and innovation as a priority factor for the competitiveness of the regional production system, both in knowledge-intensive activities and in mature sectors.

Target beneficiaries: large, small and medium-sized enterprises.

Action 2 – Measures to support the economic exploitation of innovation and the industrialisation of research results

Action 2 promotes investment in tangible assets linked to investment in R&D for the acquisition of services for large companies.

Large companies can be financed in the industrialisation phase where this refers to the exploitation of technologies or innovative solutions in processes, products, services, and organisational formulas.

In addition – in line with the Community guidelines on the need to increase the contribution of European industry to the creation of overall added value – the Action is intended to further strengthen the creation of a territorial environment more conducive to growth and to the economic and employment development of Apulian manufacturing industry. This process could be implemented starting from the effects that the investments of larger companies are able to generate directly on employment and indirectly on the processes of innovation and smart specialisation of the induced system of local SMEs.

Target beneficiaries: large enterprises.

Action 3 – Measures for innovation and technological advancement of enterprises

Action 3 supports the purchase of services for the technological, strategic, organisational, and commercial innovation of enterprises in two ways:

1. supporting the demand for innovation on the part of companies through the acquisition of qualified services for the implementation of processes virtuous and not occasional;
2. contributing to the rationalisation and upgrading of the supply of services throughout the innovation lifecycle. The services must enable enterprises to create, absorb and bring to the market knowledge, and in particular:
    - to access to available knowledge and technology, including outside the region;
    - to develop new products, services, processes, or solutions;

- to acquire ideas, patents, knowledge;
- to activate processes of innovation of sense through creativity, design, etc.;
- to integrate the necessary skills according to the different innovation needs (technological, strategic, organisational, and commercial).

Action 3 also supports the technological advancement of enterprises through the funding of pilot lines and early product validation and large-scale demonstration actions. The action aims at transporting innovative ideas further along the innovation cycle chain (close to market approach) up to the construction of prototypes in a laboratory environment or in an environment with simulation interfaces to existing systems and the implementation of pilot lines.

Target beneficiaries: small and medium-sized enterprises and research organisations.

Action 4 – Interventions to promote new markets for innovation

The aim of Action 4 is to support:

1. public procurement of innovation and public-private partnership as a tool to stimulate innovation. In these cases, the public entity, in order to solve a specific problem related to its sphere of competence and/or sector of activity, commissions the implementation of a series of research, development and innovation activities, over a predefined period of time and in turn aimed at the design, production and testing of prototypes of products or services (or combinations thereof) not yet existing on the market, able to respond, once perfected and industrialized, to the practical needs that motivated them;
2. the generation of innovative solutions to specific problems of social importance (Living labs) creating an open ecosystem where researchers, businesses and citizens can experiment together with a new approach to research activities where they exchange needs, ideas and knowledge, design together and experiment with innovative technological solutions to solve existing problems. Living Labs stimulate social and organizational innovation, as they transfer research and development from the company's laboratories to real-life contexts. The Action aims to trigger a new path of experimentation of Living Labs involving the three main territorial reference systems of Smart Puglia 2020:
   - the regional system of public administration (Smart Cities & Communities);
   - the regional system of knowledge (Knowledge Communities);
   - the regional system of economic and productive development (Business Communities);
3. companies operating in the knowledge-intensive services sector to develop technological and non-technological innovation, i.e. radical technological innovation, product or service innovation, process innovation, integration of a service into a product, design or marketing innovation,

organisational or management innovation, innovation system or network, lifestyle innovation, public service innovation, social innovation, etc.

Target beneficiaries: enterprises, research organizations, local authorities, and socio-economic associations.

Action 5 – Interventions for the creation and consolidation of innovative start-ups

Starting from the areas provided by the Intelligent Specialisation Strategy, Action 5 ensures different activities:

1. support for the concretization and valorisation of innovative business ideas also through incubators, accelerators, Fab Lab, and makerspace;
2. support for the creation and support for the development of spin-offs of innovative start-ups;
3. implementation of the Exploratory Development process, during which potential applications are transformed into product prototypes and tested with key customers;
4. increase of the collaboration between large companies and start-ups;
5. services for accompanying young companies to start-ups.

Target beneficiaries: enterprises, universities, public research bodies, socio-economic associations.

Action 6 – Interventions to strengthen the regional and national innovation system, increase and empowerment of collaboration between companies and research facilities

Action 6 supports the realization of complex projects of R&D activities on few thematic and relevant areas and to the application of technological solutions functional to the realization of the strategy of RIS3. The action promotes:

- research-intensive clusters to stimulate innovative activity by furthering the sharing of structures and the exchange of knowledge and skills and to contribute effectively to knowledge transfer, networking, dissemination of information and collaboration between enterprises and other organisations in the cluster, and support for their connections at national and European level;
- synergies between the various direct Community programmes (H2020, etc.) and the ESI funds.

Target beneficiaries: enterprises, research infrastructures, public and private research laboratories, research organizations and public-private aggregations.

Action 7 – Interventions to support the research infrastructures of the Regional system

The aim of the Action 7 is to stimulate the use and development of Regional research infrastructures in a way that is synergistic and complementary with National and European plans. To reach the objective, the action provide the following activities:

- to stimulate the development of new technologies of cross-cutting interest to several thematic areas, to encourage the emergence of spin-offs and the transfer of new technological solutions to SMEs;
- to provide scientific and technical support to the production and research systems in order to gain access to pan-European infrastructures, including through the promotion of partnerships for research and innovation within European programmes;
- to support their modernisation and the appropriate standards of scientific quality and rigour, as well as international cooperation in the context of European research and innovation policies for full integration into pan-European networks of infrastructures within the European Research Area.

This action will have the areas of productive specialization and the KETs as perimeter.

Target beneficiaries: enterprises, research infrastructures, private research laboratories, research organizations and public-private aggregations.

The table below provides an overview of the actions implemented under Priority Axis 1, with goals and beneficiaries of each action.

Table 3. 2 - Actions under Priority Axis 1 of ROP Puglia 2014-2020

	Goals	Beneficiaries
Action 1	supports R&D projects of enterprises and/or public-private partnerships for the development of new sustainable technologies, products and services	large, small and medium-sized enterprises
Action 2	promotes investment in tangible assets linked to investment in R&D for large companies	large enterprises
Action 3	supports the acquisition of services for the technological, strategic, organisational and commercial innovation of enterprises	small and medium-sized enterprises and research organisations
Action 4	supports a) public procurement and public-private partnership to stimulate innovation, b) the generation of innovative solutions to specific problems of social importance, c) the development of technological and non-technological innovation in the knowledge-intensive services sector	enterprises, research organizations, local authorities and socio-economic associations
Action 5	supports innovative business through the creation and consolidation of innovative start-ups	enterprises, universities, public research bodies, socio-economic associations
Action 6	supports the realization of complex projects of R&D activities within the RIS3 strategy	enterprises, research infrastructures, public and private research laboratories, research organizations and public-private aggregations
Action 7	stimulates the use and development of Regional research infrastructures	enterprises, research infrastructures, private research laboratories, research organizations and public-private aggregations

Table 3. 3 - Measures implemented under each action of Priority Axes 1, goals, and financial resources

	Measure	Goals	Beneficiaries	Resources
Action 1	PIA small enterprises	investment programs (construction, expansion of production units and diversification and changes of the production)	micro and small enterprises	20 million €*
	PIA medium enterprises	investment programs (construction, expansion of production units and diversification and changes of the production)	small and medium enterprises	40 million €*
	Program contracts	investment programs (construction, expansion of production units and diversification and changes of the production)	small, medium, and large enterprises	80 million €*
Action 2				
Action 3	PIA small enterprises	investment programs (construction, expansion of production units and diversification and changes of the production)	micro and small enterprises	20 million €*
	PIA medium enterprises	investment programs (construction, expansion of production units and diversification and changes of the production)	small and medium enterprises	40 million €*
	Program contracts	investment programs (construction, expansion of production units and diversification and changes of the production)	small, medium, and large enterprises	80 million €*
	Innoaid	purchase of services for technological, strategic, organizational, and commercial innovation for projects related to specific innovation areas	micro, small, and medium enterprises	30 million €
Action 4	Innolabs	collaborative research projects between companies and research organizations for projects related to specific innovation areas	micro, small and medium, enterprises, private/public ODR	25 million €
	Open Labs - Fanghi	promote environments for testing new technologies (products, servicesto test their feasibility, performance and degree of usefulness for end users	single or grouped enterprises, ODR, freelancers	3 million €
	Open Labs - Perdite idriche	promote environments for testing new technologies (products, servicesto test their feasibility, performance and degree of usefulness for end users	single or grouped enterprises, ODR, freelancers	3 million €
Action 5	Tecnonidi	investment plans in the technological field for new production solutions / services	start-up and innovative small enterprises	30 million €
Action 6	Manunet 2017	investment in R&D and transnational collaborations in the member states of the Manunet Network	micro, small, and medium enterprises, innovative start-ups, and technological districts	250 thousand €
	Manunet 2018	investment in R&D and transnational collaborations in the member states of the Manunet Network	micro, small, and medium enterprises, innovative start-ups, and technological districts	280 thousand €
	Innonetwork	collaborative research projects between companies and research organizations for projects related to specific innovation areas	micro, small, medium, and large enterprises and their consortia organized on the net	55 million €
Action 7	Strengthening of Research Infrastructures (IR) of regional importance	strengthening of existing IR indicated in the PNIR (Ministerial Decree 577/2016) as a priority and responsive/coerent with the regional S3	business research infrastructure, private ODR	6 million €
	Strengthening of Research Infrastructures (IR) of regional importance	strengthening of existing IR reported by the Region, not priority in PNIR (the Airport Test Bed infrastructure for Puglia).	business research infrastructure, private ODR, local administrations	9 million €

* The resources refer to the total sum of the budget for Action 1 and Action 3.

In the following pages we will provide a detailed description of the measures implemented under OT1 of ROP Puglia and divided by the main objective.

A. Business support

a.1 PIA small enterprises

Objectives

To support small businesses in investments dedicated to:

- construction of new production units;
- expansion of existing production units;
- diversification of the production of an existing plant to obtain products never previously manufactured;
- fundamental change in the overall production process of an existing production unit.

Supported actions

The investment programs must concern investments in tangible assets, which must be compulsorily integrated with investments in research and development and / or with investments in technological innovation of processes and organization. In addition, investments in consultancy services relating to the environment, social and ethical responsibility, business internationalization and e-business, as well as participation in fairs, may be envisaged.

Potential beneficiaries

Micro and small enterprises

Eligibility criteria

Small enterprises (or inactive small enterprises controlled by a small enterprises) that:

- at the date of submission of the application have already approved at least three financial statements;
- in the three previous financial years they recorded an average turnover of not less than 1.5 million euro and in the 12 months preceding the submission of the application, they recorded a number of AWU at least equal to 10.

Small or micro-enterprises, with at least two approved financial statements, in accession to the small proposing company, provided that the members, if they do not meet the requirements of three approved

financial statements, with an average turnover of not less than 1.5 million euros and of the 10 AWUs, promote investments of an amount not exceeding 2 million euros.

Applications for access to subsidies must concern investment programs, with a total amount of eligible expenses and costs between 1 million euros and 20 million euros.

Investments can be made in the manufacturing and service sector (with some exclusions).

The facilitated initiatives must refer to units located / to be located in the territory of the Puglia Region.

a.2. PIA medium enterprises

Objectives

To support medium-sized enterprises in investments dedicated to:

- construction of new production units;
- expansion of existing production units;
- diversification of the production of an existing plant to obtain products never previously manufactured;
- fundamental change in the overall production process of an existing production unit.

Supported actions

The investment programs must concern investments in tangible assets, which must be compulsorily integrated, for medium-sized enterprises, with investments in research and development, while for small enterprises with investments in research and development and / or with investments in technological innovation of processes and organization. In addition, investments in consultancy services relating to the environment, social and ethical responsibility, business internationalization and e-business, as well as participation in fairs, may be envisaged.

Potential beneficiaries

Small and medium enterprises

Eligibility criteria

Medium-sized enterprises (or inactive medium-sized enterprises controlled by a medium-sized enterprises) that have already approved at least two financial statements at the date of submission of the application;

Small and medium-sized enterprises, in the ordinary accounting system, active and which have approved at least two financial statements on the date of submission of the application for access, participating in the integrated program presented by the proposing medium-sized enterprise;

Small and medium-sized inactive companies, participating in the integrated program presented by the proposing medium-sized enterprises, whose parent company has already approved at least two financial statements at the date of submission of the application.

Applications for access to subsidies must concern investment programs with a total amount of eligible expenses and costs between € 1 million and € 40 million.

Investments can be made in the manufacturing and service sector (with some exclusions).

The facilitated initiatives must refer to units located / to be located in the territory of the Puglia Region.

a.3 Program contracts

Objectives

To support large companies in investments dedicated to:

- construction of new production units;
- expansion of existing production units;
- diversification of the production of an existing plant to obtain products never previously manufactured;
- fundamental change in the overall production process of an existing production unit.

Supported actions

Investment programs:

- in the case of large enterprises, they may concern research and development projects which can be integrated with industrial projects in support of the economic enhancement of innovation and the industrialization of research results or industrial projects for the exploitation of innovative technologies or solutions in processes, in products or services and in the organization;
- in the case of participating small and medium-sized enterprises, they must relate to investments in tangible assets, which must be necessarily integrated with investments in research and development and / or with investments in technological innovation of processes and organization. In addition, investments in consultancy services relating to the environment, social

and ethical responsibility, business internationalization and e-business, as well as participation in fairs, may be envisaged.

Potential beneficiaries

Small, medium, and large enterprises

Eligibility criteria

Large enterprises (or inactive large enterprises whose parent company) that have already approved at least two financial statements at the date of submission of the application.

Small and medium-sized enterprises, in the ordinary accounting system, active and which have approved at least two financial statements on the date of submission of the access application, adhering to the Program Agreement presented by the proposing large enterprises.

Two or more large companies, of which only one assumes responsibility for the contractual proposal.

Investments can be made in the manufacturing and service sector (with some exclusions).

The facilitated initiatives must refer to units located / to be located in the territory of the Puglia Region.

a.4 Tecnonidi

Objectives

To support start-ups and innovative small-sized enterprises which intend to implement investment plans in the technological field. The investment project must have as its object the economic enhancement of new production solutions / services resulting from acquired knowledge and R&D activities carried out within the public and private research system.

Supported actions

Investment programs for:

- investment expenditure (for machinery, production plants and various equipment, furnishings, as well as vehicles in cases where they are commercial, provided they are dimensioned for actual production, identifiable individually for the exclusive service of the production unit subject to the facilities;
- construction and related works;
- intangible assets related to software investments, technology transfer through

- acquisition of exploitation licenses or patented or non-patented technical knowledge if they meet the following conditions: the investment constitutes a depreciable asset; the asset being invested must be purchased at market conditions from third parties over which the buyer does not have any direct or indirect control power; the investment must be included in the assets of the company's balance sheet and be used in the local unit to which the facility refers for at least three years, except in cases where it becomes obsolete from a technical point of view; the beneficiary of the aid agrees to repay the amount of the facilities linked to intangible investments if they are resold during the period previous referred (three years).

Potential beneficiaries

Start-up and innovative small enterprises

Eligibility criteria

Applicant enterprises belonging to one of the following types can access the concessions:

- be regularly constituted and registered in the register of innovative start-ups;
- have incurred R&D costs representing at least 10% of the total operating costs in at least one of the three years preceding the granting of the aid;
- have the Seal of excellence recognition.

Investments can be made in the manufacturing and service sector (with some exclusions).

The facilitated initiatives must refer to units located / to be located in the territory of the Puglia Region.

B. Support for collaborative research and innovation

b.1 Innonetwork

Objectives

To support the realization of collaborative research projects between companies and research organizations related to the lines of intervention of industrial research and experimental development.

The initiative finances innovation projects related to the following three Innovation Areas in which the Puglia Region has expressed its will to specialize within the document of "Regional strategy for research and innovation based on Smart Specialization for the 2014-2020 programming cycle":

1. Sustainable manufacturing,
2. Human health and the environment,

3. Digital, creative, and inclusive communities.

In addition, each candidate project must use a key enabling technology (KET) and respond to at least one of the regional priorities linked to the five social challenges (sustainable cities and territories; health, well-being and socio-cultural dynamics; sustainable energy; creative industry and cultural development; food security and sustainable agriculture).

Supported actions

Investment programs for:

- staff costs,
- expenses for instrumentation, equipment, and technological infrastructures, newly purchased, used for the realization of the activities foreseen by the project,
- expenses of "Research-Contract" contractually acquired by third parties (universities, public research centers and laboratories, private research centers and laboratories,
- expenses related to the development and registration of patents or other intellectual property rights generated by the project,
- expenses for specialist consultancy services or other equivalent services, including staff training,
- other operating costs, including costs of materials, supplies and similar products, directly attributable to the project.

Potential beneficiaries

Micro, small, medium, and large enterprises, and their consortia organized on the net (temporary purpose associations, network contracts, consortium, or consortium companies).

Eligibility criteria

Micro, small, medium, or large enterprises in single or associated form, in Consortium, in Temporary Association of Companies, Networks of enterprises with legal personality (Networks-Subject) or Networks without legal personality (Networks-Contract). Consortia and Networks are only admissible if they consist of minimum 2 and maximum 9 enterprises, of which at least one SME, and minimum 1 and maximum 3 research organizations. Each of the participating enterprises will not be able to support more than 50% of the total eligible expenses and research organizations must bear costs for a total value of between a minimum of 10% and a maximum of 30% of the total eligible costs of the project.

Investments can be made in the manufacturing and service sector (with some exclusions).

The facilitated initiatives must refer to units located / to be located in the territory of the Puglia Region.

b.2 Innolabs

Objectives

To support enterprises in the consolidation path of the regional strategy for research and innovation based on Smart Specialization for the 2014/2020 programming cycle. The project adopts the Living Lab approach, a methodology that connects potential users with designers, for testing new products or services useful for solving specific problems of social relevance.

The initiative finances projects involving the three main territorial reference systems of SmartPuglia 2020, i.e. the regional public administration system, the regional knowledge system, the regional development system.

Supported actions

Investment programs for:

- staff costs,
- expenses for instrumentation, equipment, and technological infrastructures, newly purchased, used for the realization of the activities foreseen by the project,
- research expenses for the purchase of licenses and software development
- other operating costs.

Potential beneficiaries

Micro, small and medium, enterprises

Eligibility criteria

Micro, small, medium, or large enterprises in single or associated form, in Consortium, in Temporary Association of Companies, Networks of enterprises with legal personality (Networks-Subject) or Networks without legal personality (Networks-Contract). Consortia and Networks are only admissible if they consist of at least:

- 2 enterprises (of which at least 1 SME)
- 1 SME and at least 1 research organization.

In addition, Consortia and Networks projects must satisfy the following constraints:

- at least 75% of the project costs must be borne by the companies;

- each of the enterprises will not be able to bear more than 50% of the total estimated eligible expenses;
- research laboratories must carry out activities within the candidate project for a minimum of 5% and for a maximum of 25% of the total costs foreseen by the project.

Investments can be made in the manufacturing and service sector (with some exclusions).

The facilitated initiatives must refer to units located / to be located in the territory of the Puglia Region.

b.3 Manunet 2017

Objectives

The measure supports micro, small and medium-sized enterprises in carrying out R&D and in initiating transnational collaborations mainly located in the member states of the Manunet Network.

Supported actions

Investment programs for:

- staff costs (researchers, technicians and other auxiliary staff employed in the research project) operating in the local units located in the Apulia region;
- expenses for equipment;
- expenses contractually acquired by third parties (technical skills, patents, consultancy services and equivalent services) used exclusively for the purposes of the project;
- other operating costs directly attributable to the project.

Potential beneficiaries

Micro, small, and medium enterprises, innovative start-ups, and technological districts

Eligibility criteria

Applicant enterprises will have to satisfy some capital / financial eligibility requirements. Innovative start-ups and technology districts are exempted from compliance with the eligibility requirements balance sheet / financial position if they are active and in possession of a financial statements approved on the date of submission of the application.

Investments can be made in the manufacturing and service sector (with some exclusions).

The facilitated initiatives must refer to units located / to be located in the territory of the Puglia Region.

C. Innovation services

c. 1 Innoaid

Objectives

To support enterprises in the purchase of services for technological, strategic, organizational, and commercial innovation.

The initiative finances innovation projects related to the following three Innovation Areas in which the Puglia Region has expressed its will to specialize within the document of "Regional strategy for research and innovation based on Smart Specialization for the 2014-2020 programming cycle":

1. Sustainable manufacturing,
2. Human health and the environment,
3. Digital, creative, and inclusive communities.

Supported actions

Investment programs for:

4. acquisition of consultancy services on specific problems directly related to the investment project presented,

- costs for obtaining, validating, and defending patents, other intellectual industrial property rights and other intangible assets,
- costs for the acquisition of innovation consultancy and support services.

Potential beneficiaries

Micro, small, and medium enterprises

Eligibility criteria

Micro, small, and medium enterprises in single or associated form, in Consortium, in Temporary Association of Companies, Networks of enterprises with legal personality (Networks-Subject) or Networks without legal personality (Networks-Contract). Consortia and Networks are only admissible if they consist of at least three enterprises in possession of the requirements indicated in the Public Notice. The Contract Networks and the ATI are admissible only if they consist of at least three enterprises in possession of the requirements indicated in the Public Notice.

Each enterprise, both individually and in association, may submit only one project. The subjects participating in the project will not be considered eligible by providing only consultancy or partnership building, project coordination or similar activities, if such a case is found, the entire project proposal will be rejected.

Investments can be made in the manufacturing and service sector (with some exclusions).

The facilitated initiatives must refer to units located / to be located in the territory of the Puglia Region.

3.4. Design or the policy instrument

In the early stages of the ROP preparation, the design of the policy instrument takes place through a large participatory approach that involves numerous subjects, policy makers, regional agencies and intermediate bodies and stakeholders representing companies, universities, and research centers. A very central role is represented by the Managing Authority which is the subject responsible of the implementation of the ROP which works in strong cooperation with the Department for Economic Development, Innovation, Education, Training and Jobs.

In the following stages and for the definition of the specific calls and measures implemented under the policy instrument, a very important participatory tool implemented by Puglia is represented by Economic and social partnership.

The Partnership between the Puglia Region and the Economic and Social Parties - CNEL is aimed at:

a) improve the quality of the programs by providing knowledge of the needs of the area to the choices of the administration and bringing their objectives and implementation methods closer to needs of potential recipients;
b) to improve knowledge, transparency, and participation in programs by civil society;
c) strengthen the democratic nature of the decision-making processes for development policies and allow broad protection of interests organized through a transparent discussion on decisions;
d) strengthen institutional capacities, including at local level, through joint control the advancement of programs and the stimulus and promotion of organizational innovation and management;
e) supporting the implementation of the programs and the diffusion of their effects by creating collaboration networks between local actors and with actors from other territories.

To achieve the above purposes, the parties undertake to create a method of exchanging that recognizes the role of the Economic - Social Partnership during the entire period implementation of the interventions and makes it clear the convenience for comparison for all parties

Thanks to continuous discussions with the economic-social partnership, the identification of the measures takes place in order to respond as much as possible to the needs of the regional territory

3.5. Map of the policy mix

Table 3. 4 - Map of the policy mix

Objectives	Dedicated Tools	Practice Reference
Increasing the number of enterprises engaged in R&D activities	Enterprise / university networks Financial grants for small firms Reimbursable loans	Innonetwork Tecnonidi
Increasing the number of enterprises engaged in transnational R&D activities	R&D and transnational collaborations	Manunet 2017 Manunet 2018
Supporting service innovation	Grants for the purchase of services for technological, strategic, organizational, and commercial innovation of enterprises	Innoaid
Development of new markets for innovation	Living labs involving the quadruple helix for innovative solutions to social problems	Innolabs
Supporting the introduction of new innovative products/services to the market	Financial grants for small firms Reimbursable loans	PIA small firms Pia medium firms Open Labs – Fanghi Open Labs - Perdite idriche
Supporting social innovation	Living Labs	Innolabs
Stimulates the use and development of Regional research infrastructures		Strengthening regional relevant Research Infrastructures (IR)

3.6. Implementation methods

The implementation processes

The Innovation and Research Unit of Regione Puglia, with Managing Authority, is the main organisation responsible of the implementation of the measures implemented under TO1 ROP Puglia together with Intermediary organisation.

Within the framework of the European Programmes and the limit identified by the Operational programme, for each call the Innovation research Unit identifies the category of beneficiaries and the financing mechanism.

For what concerns the implementation process, the Managing Authority identifies the intermediary organisation in charge of the implementation of the specific call.

Table 3. 5 - Measures implemented TO1 of Operative Program

Measures	Starting date	Type	Status	Duration	Organisation responsible of the implementation
PIA small enterprises	06/03/2015	a first come, first served basis	Open	Depending on the project	PugliaSviluppo
PIA medium enterprises	06/03/2015	a first come, first served basis	Open	Depending on the project	PugliaSviluppo
Program contracts	06/15/2015	a first come, first served basis	Open	Depending on the project	PugliaSviluppo
Innoaid	04/10/2019	a first come, first served basis	Open	12 months	InnovaPuglia
Innonetwork	02/10/2017	Call	Closed	18 months	InnovaPuglia
Innolabs	03/13/2017	Call	Closed	18 months	InnovaPuglia
Open Labs - Fanghi	05/05/2015 /28/07/2015	Public tender/ Call	Closed	12 months	Regione Puglia
Open Labs - Perdite idriche	05/05/2015/ 28/07/2015	Public tender/ Call	Closed	12 months	Regione Puglia

Tecnonidi	09/19/2017	a first come, first served basis	Open	Depending on the project	PugliaSviluppo
Manunet 2017	01/16/2017	Call	Closed	24 months	InnovaPuglia
Manunet 2018	30/01/2018	Call	Closed	24 months	InnovaPuglia
Strengthening of Research Infrastructures (IR) of regional importance		Negotial procedure		24 months	
Strengthening of Research Infrastructures (IR) of regional importance		Negotial procedure		24 months	

3.7. Budget

Table 3. 6 - Financial resources devoted to TO1 of Operative Program

Measures	Budget	Source of financing
PIA small enterprises	20 million €	TO1 ROP Puglia 2014-2020 TO3 ROP Puglia 2014-2020
PIA medium enterprises	40 million €	TO1 ROP Puglia 2014-2020 TO3 ROP Puglia 2014-2020
Program contracts	80 million €	TO1 ROP Puglia 2014-2020 TO3 ROP Puglia 2014-2020
Innoaid	30 million €	TO1 ROP Puglia 2014-2020
Innonetwork	55 million €	TO1 ROP Puglia 2014-2020
Innolabs	25 million €	TO1 ROP Puglia 2014-2020

Open Labs - Fanghi	3 million €	TO1 ROP Puglia 2014-2020
Open Labs - Perdite idriche	3 million €	TO1 ROP Puglia 2014-2020
Tecnonidi	30 million €	TO1 ROP Puglia 2014-2020
Manunet 2017	250 thousand €	TO1 ROP Puglia 2014-2020
Manunet 2018	280 thousand €	TO1 ROP Puglia 2014-2020
Strengthening of Research Infrastructures (IR) of regional importance	6 million €	TO1 ROP Puglia 2014-2020
Strengthening of Research Infrastructures (IR) of regional importance	9 million €	TO1 ROP Puglia 2014-2020

3.8. Governance

In recent years, the regional administration promoted important steps to improve the regional innovation governance system, aiming at increasing the effectiveness of programming and implementation. The regional administration established an organizational model called "Ambidextrous Model for innovation of the Regional Administration – MAIA", adopted by Presidential Decree of regional government (DGR, 31 of July 2015, n. 443). The Ambidextrous Model is characterized by the presence of 2 elements: exploitation capacity, referring to the strategies aiming at efficiently exploiting the existing knowledge internal to the organization and the exploration capacity, that includes all the strategies aiming at creating a competitive and sustainable advantage based on the acquisition of new knowledge and experimentation of new possible innovation trajectories. The proposed model, based on the "ambidextrous logic", redefines the organization of the Region, introducing six core Departments, that are the highest strategic bodies and that are supported by six Strategic Regional Agencies, entirely dedicated to the exploration activities. The Presidential Decree of Regional Government mentioned earlier also establishes the Management Board, that includes the management of Regional Agencies, the Directors of Departments, and the Cabinet chief of the President. The Management Board supports the President on decisions for innovation and strategic changes and defines the objectives of the Agencies.

The President of Puglia Region is responsible for Puglia RIS3. In the governance system of RIS3 is possible to recognize three levels, namely a "strategic body", a "technical body" and a "bottom-up element".

The "strategic body", referring to the Organizational model "MAIA", is coordinated by the Department for Economic Development, Innovation, Education, Training and Jobs, and also includes the President of the Regional Agency for Technology and Innovation (ARTI), that is a Professor at Politecnico di Bari.

The "**technical body"** includes the Service for Industrial Research and Innovation, the Management Authority of ROP and ARTI. It is defined in the document of RIS3 and named "Team S3", even if it has not yet been formalized by a Regional Government Decree. Moreover, the two in house structures, *InnovaPuglia spa* and *Puglia Sviluppo spa*, are also expected to give technical support, in accordance with their functions. In particular, the contribution of *InnovaPuglia spa* will focus on interventions for research and innovation supporting SMEs, the promotion of the public demand for innovation and the promotion of the digital platform "ApulianExcellence"; while the role of "PugliaSviluppo" is concentrated on making links between projects supporting R&I with more transversal interventions supporting competitiveness, credit access, innovative finance and internationalization.

Finally, the Regional Agency for Technology and Innovation – ARTI – focuses on monitoring and evaluation activities, collaborating with the Regional Evaluation Unit. ARTI is provided with high skilled human resources.

The "Team S3" take advantage of the Brussels Office of Puglia Region to be constantly in touch with the European Commission, in order to be continuously updated on Programmes that can promote the exploitation of synergies between ERDF, H2020 and other European Funds contributing to the implementation of RIS3-

Furthermore, it is established in the RIS3 document that the Coordinator of the Team S3 periodically organizes meetings aiming to assure the following activities:

- Monitoring and Evaluation of interventions financed by the ROP Puglia 2014-2020 contributing to the implementation of RIS3;
- Results of the update of the Apulian Innovation Scoreboard (annual);
- Update of survey on KETs;
- Analysis of RIS3 monitoring results (annual);
- Mapping update of public innovation needs.

The RIS3 document also establishes that the Team S3 will periodically have meetings with the relevant stakeholders, in order to share results of S3 monitoring activities and to involve them in the discussion and in the strategic definition of possible new instruments to increase the effectiveness in supporting regional innovation system.

3.9. Monitoring, assessment, evaluation

The monitoring of the policy instrument is strongly connected with the RIS3 monitoring system is characterized by the following features:

a) All output and result indicators are disaggregated across the various RIS3 priorities, according to a three-level tier: priority area, innovation value chain and innovation field.

b) For each RIS3 priority area or subdomain, only a few result indicators[5] are selected closely reflecting its specific innovation dynamics.

c) The translation of RIS3 priorities and goals in sets of result indicators and related target values is a process involving the relevant stakeholders, including the potential beneficiaries.

[5] The Puglia RIS3 Monitoring System distinguishes between two types of result indicators. Those that are common to all priorities and those that are specific to the priority and sub-priority level. The latter, which we cover in this document, are referred to as "Indicatori di Transizione", in the original documents, precisely because they capture the transition towards the objectives of the RIS3.

d) The data collection system is mainly based on information provided by the participants to the public calls

e) The cost and effort of data collection for building the indicators is largely incorporated in the routine processes of call for proposals and grants management.

f) The information collected by the monitoring system facilitates a process of continuous revision and adjustment of the RIS3 strategy and of the monitoring system itself, particularly concerning the entrepreneurial discovery process and its mapping through suitable result indicators.

Concerning the disaggregation of indicators measurements across the various sub-domains, a major problem arises: RIS3 thematic sub-domains are not easily translated into economy sectors and their related sets of NACE codes. In fact, what we call here "Innovation value chains" are often complex value chains in which companies and other organizations from different sectors exchange goods and services of various kinds. An example is the agri-food value chain, which not only includes companies in the food business, but also companies in the logistics, packaging, and ICT sectors, as well as research organizations and other influencing actors.

The first step to build a good monitoring system is to understand well the investment priorities and sub-priorities. To this aim, what is needed is a careful mapping of each innovation value chain in the region, through direct surveys, a time consuming and somewhat costly effort. A "proxy" of this analysis can be obtained by simply relying on the information provided by the companies (or other organisations) when they submit a proposal to a regional public call. The latter is the approach followed by Puglia, which is based on questionnaires that the applicants must fill in at two points in time: when they apply for a policy measure, and when they conclude the related project.

3.9.1. The use of indicators

For monitoring the effectiveness of the strategy, different types of indicators are used: output indicators, results indicators, and transition indicators.

For what concerns the design of the output indicators, two categories have been identified, each of them with a specific purpose. The first one aims at monitoring the efficiency in the implementation of the policy (e.g. number of funded projects, number of beneficiaries, etc.).This assessment is made for each "Innovation Value Chain", thus allowing for a relative appreciation of policy performance in the different RIS3 domains.

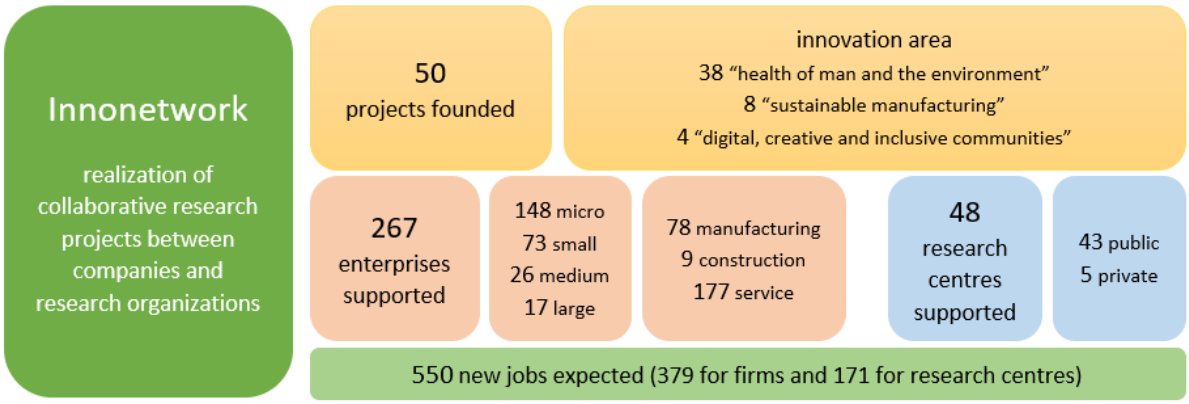
The second concerns the performance of the funded projects; here output indicators measure the direct quantities produced by the financed projects. A simple example is represented by the number of innovations introduced by firms thanks to the participation of the funded project.

Results indicators measure the socio-economic changes with reference to the population on which the policy intervention intend to produce an effect. In the RIS3 monitoring system, we have result indicators that are common to all RIS3 priority areas, measuring variables like employment rate, number of new start-ups, number of agreements between companies and research organisations, number of new patent applications etc. These result indicators, as indicated in module two, are measured somewhat far from the policy action.

At a finer level, we define result indicators that more closely capture the effect of our measures and the specific innovation dynamics of RIS3 priority and sub-priority areas. The selection of these indicators is and should be the outcome of a very carefully designed and implemented process, involving the key stakeholders in each RIS3 sub-domain.

3.9.2. The results

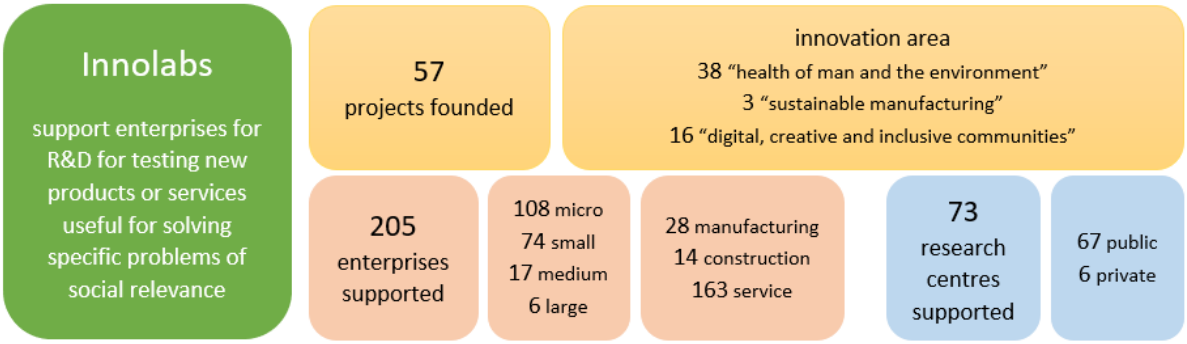
Innonetwork



Evidences: the funded projects were mainly concentrated in the areas of innovation "Agri-food", "Environment" and "Medical and health". Among the key enabling technologies that characterize large-scale projects are "Biotechnologies" and "Advanced production and transformation". The beneficiary companies are mostly micro enterprises (56.1%) and small enterprises (27.7%). Overall, 550 new employees are expected to be hired (379 by the companies) with a consequent increase in the company size in terms of employees. There has been a high intensity of relationships established between the beneficiary companies involved within the individual projects with the activation of synergies between different economic sectors thanks to the high sectoral heterogeneity of the companies involved.

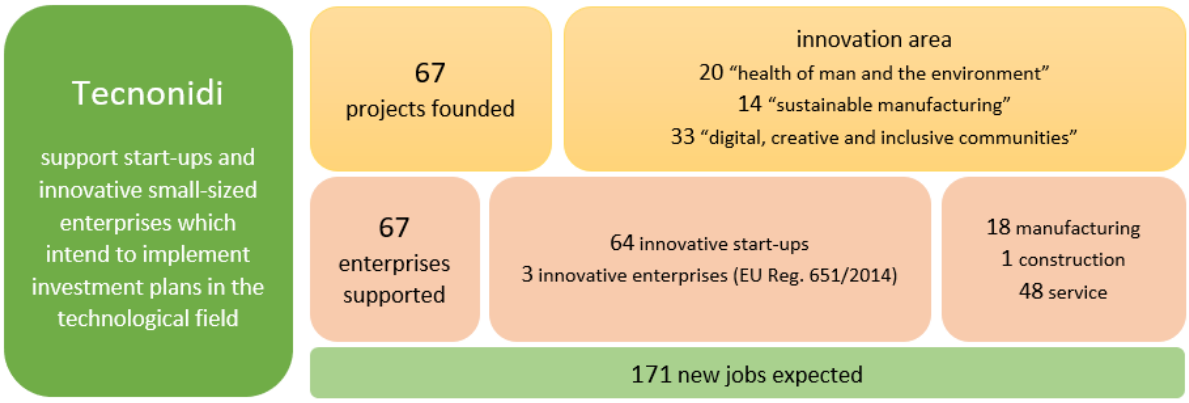
Relevant and transversal is the participation in the various project areas of software production and IT consultancy companies for the benefit of the digitalization of the companies involved. Through the funded projects, intense collaboration has also been created with universities and research centers (mainly regional).

Innolabs

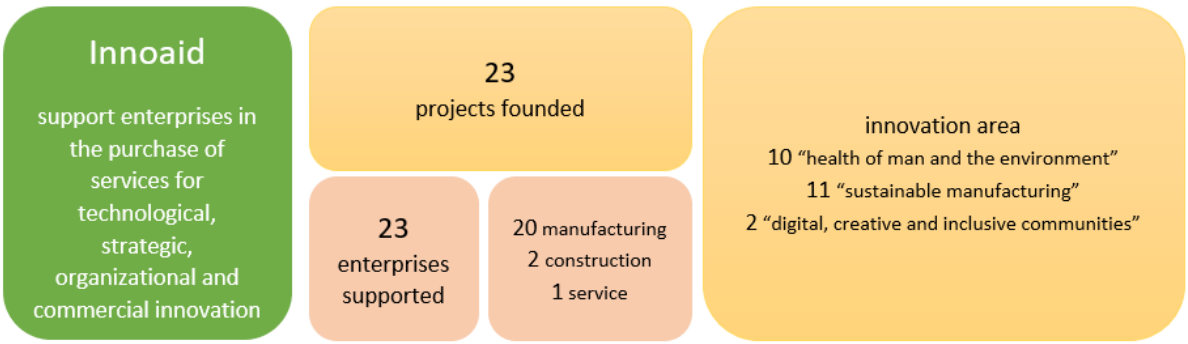


Evidences: the funded projects were mainly concentrated in the areas of innovation "Environment", "Medical and health" and "Cultural industry". The beneficiary companies are mostly micro enterprises (52.7%) and small enterprises (36.1%). Within the funded projects, medium-intensity relationships were established between the beneficiary companies with the activation of synergies between different economic sectors thanks to the high sectoral heterogeneity of the companies involved. The participation of software production companies and IT consultancy companies is confirmed as widespread and important. The collaboration of the beneficiary companies with the universities and research centers (mainly regional) is confirmed. The partnerships within the projects of the "Human and environmental health" innovation area and characterized by "Knowledge community" type interventions were more complex.

Tecnonidi (updated on December 31, 2019)



Innoaid (updated on December 31, 2019)



In addition to the information collected through monitoring, the policy makers acquire information relating to the ongoing and ex-post evaluation of the measures implemented. A central role is carried out by the Management Authority and by the Evaluation and Verification Unit of public investments, an independent body that deals with evaluation activities.

3.10. Designing the data collection system

A key feature of the Apulia RIS3 Monitoring System is that the data for calculating indicators are directly collected by the beneficiaries of the public policies, through a set of four questionnaires, which are delivered through a web interface during the application and, if successful, at the end of the grant. These questionnaires capture two levels of information: the project, with its expected outputs and results and the individual project prospers and beneficiaries, with their economic and innovation performance.

Basically, we have:

- An ex-ante and an ex-post **project** questionnaires and
- An ex-ante questionnaire for **applicants** and an ex-post one for **beneficiaries**

The ex-ante project questionnaires represent the first filter to sort the applications throughout priorities and sub-priorities. As in other European regions, in Puglia, most of the calls issued are not "priority-specific calls" and it is difficult to infer the RIS3 priority of a project based on the sector of the applicants. Through the ex-ante Project Questionnaire, indeed, organisations applying for a grant classify their project in a particular Innovation Value Chain and Innovation Field, select the prevalent KET and Technological Trajectory, insert relevant keywords and provide synthetic information on objectives and expected results. In this way it is possible to classify the projects through priorities and sub-priorities.

The ex-post questionnaire gets delivered at the end of the project. The questionnaire is the same for all priority areas, but each call has its own as each call has its own objectives and it is important to monitor them unambiguously. The information gathered through this questionnaires allows to quantify output indicators, linked to the specific call, that is the direct product of our policy intervention, not in terms of what is funded (for this we have the ex-ante project questionnaires) but on what is actually achieved.

The information gathered through this questionnaire, combined with that collected through the ex-ante questionnaire, allows disentangling the output indicators by priority and sub-priority. Examples of output indicators are the number of prototypes in a given priority and the number of collaborations per priority.

Instead through the ex-ante questionnaire for applicants and the ex-post questionnaire for beneficiaries it is possible to measure the socio-economic effects of public investment by looking at how the policy, by supporting given concrete initiatives, changes the organisations that pursue those initiatives.

For each "project questionnaire", several "applicants" may apply as sometimes regional calls finance consortia or partnerships. In this case, all applicants need to provide their own questionnaire and for this reason the number of applicants/beneficiaries' questionnaires may be larger than project questionnaires. Each organisation will answer the same questions in the ex-ante and ex-post surveys, but the questions contained in the ex-ante and ex-post questionnaires vary with the call and the RIS3

priority. Indeed, these questionnaires are modular with a **general part**, which is the same for all calls and priorities; **call-specific** elements and **priority/sub-priority-specific elements.**

So all applicants (and then all beneficiaries) provide a detailed picture of their organisation before and after our public intervention; the type of information provided vary according to the call they apply and the RIS3 priority to which they contribute to, precisely to capture the different types of innovation dynamics in place. By comparing the two pictures, we can understand whether our policies have had any socio-economic effect.

As the table below shows, many financed projects are not yet closed so the majority of information come from the ex-ante questionnaire through the information provided by beneficiaries. For the calls for which the information are available, in the following pages.

		State of Art (% progress)		
Action	Measures	Projects' investigation	Projects' execution Ex-ante monitoring	Ex-post monitoring
Action 1	PIA small enterprises	ongoing, on demand		
	PIA medium enterprises	ongoing, on demand		
	Program contracts	ongoing, on demand		
Action 3	PIA small enterprises	ongoing, on demand		
	PIA medium enterprises	ongoing, on demand		
	Program contracts	ongoing, on demand		
	Innoaid	50%	50% 100%	
Action 4	Innolabs	100%	50% 100%	
	OpenLabs - Fanghi	100%	100% 100%	100%
	OpenLabs - Perdite idriche	100%	100% 100%	100%
Action 5	Tecnonidi	50%		
Action 6	Manunet 2017	100%	100% 100%	100%
	Manunet 2018	100%	100% 100%	100%
	Innonetwork	100%	50% 100%	
Action 7	Strengthening of Research Infrastructures (IR) of regional importance	100%	100% 100%	100%
	Strengthening of Research Infrastructures (IR) of regional importance	100%	100% 100%	100%

4. SWOT analysis of the policy mix

Table 4. 1 - SWOT analysis

STRENGTHS	WEAKNESSES
• different organisations involved in the implementation of the different measures • number of enterprises benefiting from regional measures • involvement of the economic and social partnership for the definition of individual measures • listening to the territory with the collection of public innovation needs • continuous monitoring activity	• synergy between the different measures implemented under TO1 • absence of actions to enhance and systematize regional research facilities • poor integration with other ROP actions dedicated to training and education • little attention paid to the issue of strengthening transregional innovative activities • implementation of RIS3 almost exclusively with OP funds and absence of synergies with European funds
OPPORTUNITIES	**THREATS**
• role of territorial cooperation and integration with innovation policies	• reorganization of global value chains and loss of competitive advantage positions • high youth migration

5. Main conclusions and areas of improvement

1. The structural funds programme has been highly successful in reinforcing the innovation capacity of the business system and the cooperation in R&D projects among firms and research centres. This is demonstrated by the high level of participation and the number of beneficiaries among Sme's and large firms. The exchange of experiences among IMPROVE partners could provide useful input in terms of new approaches that should be implemented in Puglia.
2. The potential integration and synergy between ERSF and ESF can be better exploited. In this sense the experiences discussed within the IMPROVE partnership could provide interesting suggestions.
3. The relationship between TO1 of ROP Puglia and the RIS3 is strong as the structural funds are the main financial resource for the implementation of RIS3. The positive effect of RIS3 is a greater focus on objectives in terms of structural changes compared to past experience of cohesion policy that focused mainly on financial progress. Indeed the implementation of the Programmes financed by Structural Funds focused mainly on the acceleration of expenses, while the Smart Specialisation Strategies concentrate more on structural changes.
4. The integration among TO1 of ROP 2014-2020, other European funds and RIS3 is scarce and need to be improved.
5. The governance system is quite complex with a high number of institutions involved: for this reason it requires integration and coordination, while the consolidated practices of Programmes implementation generally encouraged separation between Departments. Indeed the governance of the RIS3 implies monitoring goals in terms of structural changes to which many programmes have to contribute, so it requires a combined analysis of different intervention results. This is the reason why there is the need of a stronger strategic coordination at high level.
6. The monitoring and evaluation system is well structured and is able to ensure continuous monitoring of the results produced by the policies. However, the governance of the monitoring system sees numerous actors involved. For this reason, coordination between the different institutions involved needs to be improved.
7. The regional experience shows interesting examples of stakeholders involvement in the ROP implementation. Anyway, it could be useful to identify tools for a continuous sharing of the results of the monitoring over time and to identify approaches that promote a more active participation of stakeholders in the policies choices.