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REGIONAL MAPPING REPORT - SLOVENIA

Project: Improving RD and business policy conditions for transnational cooperation in the manufacturing industry

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TARGET GROUP ASSESSMENT

Has this deliverable addressed any of the target group indicated in the application form?

Yes / **No**

If yes, please describe the involvement of each individual target group in the table below.

Target group	Number reached by the deliverable	Description of target group involvement
SME		
Regional public authority		
National public authority		
Higher education and research		
Business support organisation		

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1 Introduction

The objective of regional mapping is to provide insight into the current state of the manufacturing sector, particularly functioning of support environment in Slovenia from which production oriented small and medium enterprises (SME) can benefit on a long term. The regional report is drafted by following common methodology, which includes the analysis of supportive environment for manufacturing oriented companies - particularly smart specialization measures, priorities, indicators, implementation schemes, instruments, emerging trends in the manufacturing sector, analysis of existing support ecosystems and analysis of the main regional actors. Moreover, the supporting institutions and available support services are highlighted, in order to determine possible inclusion of these institutions in a common hub, and thus offer complementary services to SMEs and other target groups.

This report is provided as a single report, similar to reports from other countries, where each partner delivered mapping covering its own region. As a result, regional mapping reports are prepared for Austria, Bulgaria, Croatia, Czech Republic, Germany, Hungary, Romania, Serbia, Slovakia and Slovenia.

After the introduction, Chapter 2 is providing strategic background for the Smart Specialization Strategy including top-down description of strategies and status of their evolution at a national level, background analyses supporting development of strategies and highlight Smart manufacturing topics.

Chapter 3 is presenting support environment by highlighting the support environment structure, detecting actors responsible for implementation of strategies and other supporting actors like clusters, technology parks, R&D centres, competence centres, University incubators, Business incubators.

Chapter 4 presents Smart Factory support schemes and programmes including list of currently available or future programmes, grants, loans, etc.

Relevant statistical data for Slovenia manufacturing sector is presented in chapter 5.

Chapter 6 provides national Smart Factory related projects in execution by the project partner or partnering organisations.

Chapter 7 presents list of regional actors relevant for area of Smart Factory whereas actors are grouped by relevance (User, Solution provider or User/solution provider)

2 Strategic background

Europe 2020 is the EU's growth strategy for the coming decade. In a changing world, we want the EU to become a smart, sustainable and inclusive economy. These three mutually reinforcing priorities should help the EU and the Member States deliver high levels of employment, productivity and social cohesion.

Concretely, the Union has set five ambitious objectives – on employment, innovation, education, social inclusion and climate/energy – to be reached by 2020. Each Member State has adopted its own national targets in each of these areas. Concrete actions at EU and national levels underpin the strategy.

National and regional authorities across Europe have designed smart specialisation strategies in entrepreneurial discovery process, so that the European Structural Investment Funds (ESIF) can be used more efficiently and synergies between different EU, national and regional policies, as well as public and private investments can be increased.

Global production is increasingly characterized by custom-designed solutions contained in products and related services requiring extremely flexible organization. The production processes and products need to match the most demanding technical and environmental standards. One of the key elements in the process, from knowledge production, development to manufacture and marketing, is enabled by the information and communication technologies. It not only supports the integration and optimization of working processes and machines in individual factories but also the integration and optimization of the processes of the entire production chains irrespective of the location.

The industry of the future will be customized, adaptable to changes, resource efficient and internally and externally integrated. In Germany, the process of the introduction of these changes and of the adaptations to them has been called Industry 4.0. Using similar terms, the same content has been addressed by other industrially advanced European countries with which Slovenia already enjoys extensive cooperation. The Slovenian industry has to join these value chains rapidly and proactively as a partner, which means that the competences of its chains are to be strengthened and connected in such a way that sufficient critical mass will be attained in the selected areas. In a cooperative manner, more integrated solutions can be offered to the leading companies and Slovenia can be presented as a competent link of the value chain – a development partner who is capable of fast absorption of new technologies and business models owing to the existing global competences.

Strengthened investments, in particular by SMEs, are a necessary condition to upgrade to a higher development, technological and business level, to offer more complex products and services which follow the development requirements and trends of final producers and markets respectively. In business terms, priority (S) Industry 4.0: Smart Factories requires efficient models of the access to products and services from solution providers, a comprehensive package of development and

maintenance of products also through the participation of external stakeholders in relation to open innovation. From the technical and technological perspective, the (S)Industry 4.0: Smart Factories means the introduction of the systems of remote management, the establishment of virtual technological production systems, introduction of sensor systems enabling remote monitoring and management, modularity of products and solutions and the use of intelligent materials and systems, which reduces maintenance needs.

This priority therefore stems from the need to join the efforts of the Slovenian industry due to external factors, due to transformation of industry markets in the EU and beyond. At the same time, it builds on the existing comparative advantages. Currently, Slovenia clearly displays export comparative advantages in product groups such as “Machinery and mechanical appliances, electrical equipment” (section XVI – see FIDEA, 2014). These are the areas where Slovenia on the average generated EUR 5.7 billion of export annually in the 2011-2013 period. The estimated potential in the event of closing the pricing gap existing when compared to the best performers exceeds additional EUR 5 billion of export per year (ibid.).

Additional development incentives including the active role of the state are necessary as the data already reflect gradual technological falling-behind compared to the leaders (see Burger, Kotnik, 2014). In the NACE industries ranging from C25 to C28, Slovenia typically achieves export comparative advantages, especially in the fields of energy, resource and environmental efficiency whereas on the technological side, except in some areas (e.g. metal products), high risks of lagging behind the best performers can already be observed.

Products, services and systems of the (S)Industry 4.0: Smart factories priority area of application is developed on the cross-section of technologies from the following domains:

- Smart machinery with mechanical engineering, tools and devices,
- Mechatronic systems with electric motors, drives, controls, sensors and robotics,
- Management and organization technology including ICT and logistics (management of individual processes, machinery and equipment; planning, management, control and optimizing production lines or entire production, management of the plants and control of the product quality, support to logistics processes).

Development of these areas will be based on the simultaneous development of applied solutions on the basis of »key enabling technologies«, i.e. KETs. Additionally, high-performing network infrastructure of electronic communications (it also applies to other PAUs) will also need to enable high-speed Internet access.

In the above domains, Slovenia has well developed capacities and competences, namely the technologies and developed marketing channels which have already been supported by public development support schemes.

Objectives of priority (S)Industry 4.0: Smart Factories:

- Increased value added per employee via more demanding products and services,
- Higher energy and resource efficiency in production and
- Increased market shares of Slovenian partners in global value chains.

Even though this priority addresses different industries, in terms of monitoring at the macro level special attention will be paid to the following NACE industries: C25 Manufacture of fabricated metal products, except machinery and equipment, C26 Manufacture of computer, electronic and optical products, C27 Manufacture of electrical equipment and C28 Manufacture of other machinery and equipment. These are the areas where increased investments in development and renewal of production and in marketing are expected, which will be monitored on the basis of the data provided by AJPES.

2.1 Structure of S4 governance system¹

S4 is the key strategic document of the Government of the Republic of Slovenia in the field of innovation. S4 shall serve as the basis for Slovenia's development policy. The S4 governance system is a three-level system as demonstrated in the below-given figure:



Figure 1: S4 governance system

The state is responsible for S4 management, namely S4 preparation, supplementations, implementation, monitoring and evaluation. To establish close, operational and smooth cooperation supporting S4 implementation a working group called Implementation Working Group will be established at the national level within two months following S4 approval. The Working Group shall comprise representatives, namely State Secretaries, of ministries directly participating

¹ Source:

http://www.svrk.gov.si/fileadmin/svrk.gov.si/pageuploads/SPS_predstavitev/S4_dokument_2015_oktober_eng_clean_lekt.pdf

in S4 implementation. The Working Group will be headed by the State Secretary of the Government Office responsible for development with State Secretary of the Ministry responsible for science and State Secretary of the Ministry responsible for economy acting as deputy heads of the Working Group. The three State Secretaries constitute Working Group's chairmanship. The Working Group shall be responsible for inter-ministerial coordination of S4 activities implementation at the strategic and substantive level, namely by taking into account the competences of each participating institution. In addition to the Government of the Republic of Slovenia, which makes decisions relating to Slovenia's Smart Specialisation Strategy and amendments thereon, the Working Group is the institution which monitors and guides S4 delivery at the political level and thus ensures that the findings and recommendations made at a lower governance levels are actually realised.

S4 monitoring and evaluation

S4 implementation will be monitored by all three levels, in particular by the Working Group established at the national level, horizontally by NIP and by strategic partnerships at the level of individual areas of application. The unit responsible for S4 and established within the Government Office responsible for development shall establish a monitoring and evaluation system, namely in cooperation with ministries and implementing institutions. The unit will also be responsible for coordination with the monitoring and evaluation process in the framework of European Cohesion Policy.

S4 monitoring and evaluation will be based on the quantified objectives identified under S4 and founded on the entrepreneurial discovery process. Measurable S4 indicators, including the period of monitoring, are identified in the below-given table. The indicators at the level of areas of application will be further developed in a more concrete manner and, where relevant, revised following the preparation of action plans (roadmaps) developed by strategic partnerships, namely within six months following the establishment of each of the partnerships. Monitoring the progress with regard to the implementation of action plans will take place regularly on the basis of annual reports giving emphasis to achieving the set objectives and indicators. The annual reports are prepared by strategic partnerships by the end of the first quarter of the following year.

Monitoring by the state at the operational level shall be performed on a regular basis through the representative of the Government Office responsible for development as well as other state-level institutions in the framework of strategic partnerships themselves (depending on the area), which will also serve as a basis for close cooperation and introduction and implementation of the planned measures as well as potential additional measures which need to be implemented at the national level. Representatives of the state, participating in strategic partnerships, where appropriate, inform or include the Working Group when coordination and decision making at the national level is needed. The Working Groups monitors the progress at a strategic level at least once a year on the basis of the reports on the implementation of action plans, namely in the second quarter of the following year and additionally when the evaluations are taken into consideration. The Working Group gives its opinion about the annual reports serving as a basis for coordinating the activities at the strategic level between strategic partnerships and the national level.

A more detailed analysis and evaluation of action plans and the efficiency and effectiveness of strategic partnerships will be carried out in 2018. The evaluations will be detailed and implemented for each area of application taking into account technological and market specifics of each area.

2.2 Slovenia's Smart Specialisation Strategy (S4)

Smart specialisation is a platform for concentrating development investments in areas where Slovenia has the critical mass of knowledge, capacities and competences and where there is innovation potential for placing Slovenia within global markets and thus enhancing its recognisability. Smart specialisation is a strategy aiming to:

- a) strengthen the competitiveness of the economy by enhancing its innovation capacity
- b) diversify existing industries and service activities
- c) boost growth of new and fast-growing industries and enterprises

S4 is an implementing document relating to the already-adopted strategic documents. S4 addresses all four objectives set under the existing [Slovenia's Development Strategy](#) for the 2006-2013 period which pertain to establishing an "innovative knowledge society" for which Slovenia has already identified three key field-specific strategies, namely the [Research and Innovation Strategy of Slovenia 2011-2020](#) (RISS), [Slovenian Industry Policy](#) (SIP) and Digital Agenda, as well as other specific and relevant strategies in the field of nature protection, energy, education, etc. Slovenia's guidelines are thus integrated and outlined in a more concrete manner within a single and a consistent framework facilitating the implementation of focused and synergistic measures.

2.2.1 (S)INDUSTRY 4.0 is one of identified priority areas in S4

This priority area pertains to those areas of application, which, as a rule, have a dominant actor or a group of strong actors with an already-established cooperation with the scientific sphere but where the opportunities are not fully taken advantage of in terms of:

- a) stronger strategic links between strong private sector actors in order to offer integrated solutions and consequently to have a joint appearance on the market
- b) stronger links with research organisations in developing products with respect to the upcoming needs in the medium and long term
- c) stronger links with small and medium-sized enterprises in terms of strengthening supplier networks as well as creating development networks
- d) promoting the creation of new product directions by promoting the establishment of new companies
- e. modernisation and digitalisation of production processes and production cycle management

Factories of the Future (FoF) objective:

1. Comprehensive technological restructuring of tool industry by raising value added per employee by 25%, i.e. on average EUR 45,000 per employee by 2023.
2. Raising the level of digitalisation with automation and robotisation in manufacturing: in the automotive industry the rate of robotisation is comparatively high² so emphasis will primarily be put on introducing automation³. In all other areas automation as well as increasing the number of robots is key with the target standing at a 50% increase, i.e. an increase from 48 to 72 per 10,000 employees. In the framework of demonstration factories value added per employee will rise by at least 20%.
3. Connect knowledge and creativity of stakeholders in the field of photonics for new impetus and new market opportunities in the global markets with the aim of achieving the average value added of EUR 75,000 by 2023.
4. Increase export of automated industrial systems and equipment by at least 25% by 2023, in particular in tool industry, robotics and smart industrial mechatronic systems.

Focus areas and technologies⁴

1. Production optimisation: (distributed) production management and control, quality assurance, regulation and data processing, intralogistics, automation
2. Optimisation and automation of production processes: smart machines and equipment, mechatronic systems, actuators and smart sensors

Technologies to be used under the area of application Factories of the Future are cross-cutting and will – as a priority – be applied also in other areas of application as shown in the below given table (the identification of areas of application derives from the entrepreneurial discovery process).

Table 1: Identification of priority areas of application for enabling technologies

	1.1. Smart cities	1.2. Smart buildings and homes	2.1. Circular economy	3.2. Health - medicine	3.3. Mobility	3.4. Materials
1. Robotics			✓	✓	✓	✓
2. Nanotechnologies		✓	✓	✓		✓
3. Modern production technologies for materials		✓	✓	✓	✓	
4. Plasma technologies			✓	✓	✓	✓
5. Photonics and micro- and nanoelectronics	✓	✓		✓	✓	
6. Control technology		✓	✓			

² Source: <http://www.worldrobotics.org> : 638 robots per 10,000 employees in 2013.

³ The objective in terms of the number of demonstration factories in this field is specified under the domain "Mobility".

⁴ In light of the complexity of the area and linkages to other areas, this topic is divided into focus areas and technologies.

Empirical bases and SI competitive advantage

In the field “Manufacture of machinery and equipment” (C28), including “Manufacture of other special-purpose machinery” (C28.9), Slovenia has revealed comparative advantages in terms of intermediate and final products (see Burger and Kotnik 2014). The long-term dynamics, with the exception of the analysed period of the last two years, demonstrates continued strengthening of comparative advantage from 2004 onwards. The study FIDEA 2014 identifies huge untapped export potential which exceeds EUR 3.5 billion in the product group 84. The area also has great research potential. For example, in the field of photonics Slovenia has the highest number of diode-pumped solid-state medical lasers per capita with a series of small and medium-sized highly specialized companies many of which have become world leaders. In terms of the number of toolmakers per million inhabitants, Slovenia takes the second place with Japan having the highest number in the world. In terms of excellence of services Slovenia is second in Europe, preceded only by Portugal. This demonstrates that there is great potential for development.

During the entrepreneurial discovery process 16 initiatives, pertaining to the area of Factories of the Future, were prepared with an estimated investment value of EUR 950 million. Over 200 stakeholders participated in the preparation of these initiatives of which over 150 are representatives of the economy.

The area of smart factories is an extremely integrating and horizontal area with a marked interest of users as well as providers of smart factory technologies.

2.2.2 International dimension

Slovenia lies at the crossroads of the current and the future EU macro-regional strategies, namely the EU Strategy for the Adriatic and Ionian Region (EUSAIR), EU Strategy for the Danube Region (EUSDR) and the EU Strategy for the Alpine Region (EUSAR).

International partnerships have already been established, in particular through active involvement in platforms such as EFFRA, ISTMA, Žemva, CEEPUS, MATERA ERA-NET – Bonaco, MATERA-ERA-NET- Multifuncoat, Photonics 21, PPP platform euRobotics etc. Links with similar clusters in Central European countries (Austria, Poland, Czech Republic, Slovakia and Hungary) and the Balkans (Croatia, Serbia, Romania, Bulgaria) have also been established. Such links will serve as the basis for cooperation, in particular in the framework of territorial cooperation projects.

3 Support environment

In Slovenia supporting institutions for business oriented SMEs are chambers of commerce, chambers of crafts, centres of excellence, research centres, development centres, competence centres, technology centres, technology parks, incubators and other operating in the eligible program area.

All these institutions promote the emergence of new competitive companies that promise high added value and equitable regional development. Incubators support the realization of entrepreneurial ideas, the creation and development of enterprises, stimulating environment, subsidised leases of premises and administrative, intellectual services and other services for its tenants. Technology parks in one location bringing together business development, research and operations of new technology companies, its members while offering a supportive environment consultancy, easy exchange of information, transfer of knowledge, the necessary infrastructure and the like.

3.1 Clusters

Clusters represent a form of informal networking among businesses and other organizations in the sector in a given geographical area, which offers plenty of benefits of cooperation. Connectivity is based on common interests, the basic idea of clustering is based on cooperation, including companies that have market competition, which is somewhat illogical, but understandable since it is a common interest in development cooperation, transfer of knowledge and the development of new competences.

Organizational forms of business clusters are different and depend on each cluster, scope and content. All clusters have in common is that it is a common entrepreneurial activity in a particular environment, focused on the broader global market. Companies within the cluster are specialized and complementary but competing at the same time. In this way may be associated companies acquire larger and more complex transactions that create higher added value and increase their visibility in the market. Membership and participation in the cluster of micro, small, medium and large companies makes contact with partner organizations abroad. These may be companies, institutes, universities and other organizations of interest in terms of members. Organizations and individuals to find themselves in a network of international projects and partners from all over Europe or even the world's countries.

The objective of fostering the entrepreneurial clusters is to strengthen the infrastructure established at local, regional, national and international level and support the identified clusters at a certain level. Cooperation in research and development projects, the members of the cluster enables learning, networking and the development of competencies. Companies can spend a lot of time developing and training, participate in workshops, development and innovation of business models and the like. For micro, small and medium-sized enterprises means integration into clusters, a good opportunity and solution to consolidate its position in the domestic market and the penetration of

foreign markets. Affected companies easier to overcome challenges in the areas of foreign market entry, promotion, marketing, take on larger and more complex transactions, investments, technological development, and so on.

In Europe, there are more than 2,000 different industrial clusters, of which there are about 150 of those who are among the leaders in the world in terms of focus, specialization, size and employment. Around 40% of European jobs is based on clusters; and clustering of micro, small and medium-sized enterprises leads to more innovation and growth.

In Slovenia following **clusters** are existing based on information from Chamber of Commerce and Industry of Slovenia⁵:

1. Construction Cluster of Slovenia
2. Automotive Cluster of Slovenia (ACS)
3. District energy cluster
4. eAliansa IT Cluster
5. Economic Interest Association of Geodetic Service Providers
6. High Technology Products Manufacturers' Cluster
7. The Slovenian Environmental Cluster
8. Slovenian Plasttechnics Cluster
9. TECOS, Slovenian Tool and Die Development Centre
10. Toolmakers Cluster of Slovenia
11. Wood Industry Cluster
12. HVAC - Heating, Ventilation and Air-Conditioning Cluster
13. Slovenian Consulting Cluster

Furthermore there are following **technology networks** existing:

1. Technology Networks of Slovenia (TNS)
2. Technology network of information and communication technologies (TM ICT)
3. Technology network »Intelligent polimeric materials and pertaining technologies« (IPMT)
4. Technology network Process control technology (PCT)
5. National Center of Clusters and Technology Networks (NCCN)

⁵ Source: <https://www.gzs.si/pripone/oei31991d15798a9550a13065a.pdf>

3.2 Centres of excellence⁶

Centres of Excellence are a measure within the framework of the scientific and technology policy of the Republic of Slovenia aimed at promoting the concentration of knowledge at priority technological areas and horizontal linking along the entire chain of knowledge development, which is realised on the basis of strategic partnerships between the private sector and academia. This comprehensive inter-disciplinary research and development programme emphasises the horizontal objective of promoting the transition to an energy-efficient economy with low greenhouse gas emissions or strongly promoting the transition to a low-carbon society.

Eight Centres of Excellence were selected within a public call for the development of centres of excellence in 2009–2013:

1. The Centre of Excellence in Nanosciences and Nanotechnology (CE NS and NT)

Co-funding of the programme: €9.803.463,47

Globally proven successful scientific work of Slovenian researchers in nano-science and nanotechnology placed Slovenia in a very competitive position in nano-scale science and technology. By joining the efforts of a consortium of the best partners from universities, research institutes and industry, the Centre of Excellence NS and NT has set a clear goal of establishing technological infrastructure for the internationally competitive development of nano-sciences and nanotechnologies in Slovenia for the next decade and beyond. The programme focuses on establishing new technologies for the synthesis, processing (nano-factory) and characterisation of substances; this is comparable with related centres worldwide, which will enable international competitiveness in the implementation of top RR projects and programs, and in the development of new products.

2. The Centre of Excellence for Biosensors, Instrumentation and Process Control (CEBIC)

Co-funding of the programme: €10.000.000,00

This centre will unite national state-of-the-art technologies in the field of chemistry, biology, bioengineering, control systems and precision electrical instrumentation. These diverse and fast-growing technological areas will be combined in innovative applications and products in medicine, biotechnology and chemical engineering. The centre's programme covers the following research topics: sampling with embedded super-computing, the development of sensors based on diamond mono-crystals, distributed data sampling systems and the development and manufacture of equipment for ultra-precise timing systems; research of new applications and products for the purification of bio-molecules and nano-particles based on optimised Convective Interaction Media monolithic chromatography columns; time critical networks and control systems for large

⁶ Source:

http://www.arhiv.mvzt.gov.si/en/areas_of_work/science_and_technology/centres_of_excellence_and_competence_centres/

experimental infra-structures, for accelerator-based cancer therapy units and for the automation of fullerenes and carbon nano-tube production.

3. The Centre of Excellence for Integrated Approaches in Chemistry and Biology of Proteins (CIPKeBiP)

Co-funding of the programme: €8.407.000,00

This centre will link the top available expertise, knowhow, and technology of Slovenian research groups engaged in researching proteins, their characteristics and functions. In the areas of protein production, analysis and structure determination, high throughput methodological approaches, which improve the system capacity, will be applied; the use of nanotechnologies will reduce the required quantities of biomaterial. These technologies will be used in studies with a specific biological focus of high biomedical (infectious diseases, signalling pathways) and environmental (adaption mechanisms of extremophiles) importance, with discovery, optimisation and drug synthesis being the target technology developments. The created knowledge will be a driving force for the increasing competitiveness of small as well as large biotech companies.

4. The Centre of Excellence for Low-Carbon Technologies (CoE LCT)

Co-funding of the programme: €9.989.739,00

This centre unites all vital Slovenian potential in the area of new low-carbon energy resources and their use in stationary and mobile applications.

Its aim is to convert solar energy into electrical energy and store it in batteries and super-capacitors (lithium technologies) or to convert it into hydrogen to be used in fuel cells (hydrogen technologies). In the future, lithium and hydrogen technologies will cover a large range of energy consumers such as hybrid and electrically-driven cars, and the energy supply of buildings, etc. In the transitional period, hydropower, biomass and other energy sources will be used for the same purposes. The centre covers the whole scope from basic to applied research, development of prototypes and modules and systems, and combines complementary knowledge from practically all areas vital for the development of lithium and hydrogen technologies on the basis of the primary solar energy.

5. Centre of Excellence Advanced Non-Metal Materials with Technologies of the Future (CE NAMASTE)

Co-funding of the programme: €9.417.264,88

The objective of this centre is to foster crucial technological progress in selected areas relating to inorganic non-metallic materials and their application in electronics, optoelectronics, photonics, and in medicine: ceramic two- and three-dimensional structures, materials for overvoltage and EM protection; materials, micro- and nano-systems for sensors; soft composites for optical, electronic, photonic and sensor applications; bioactive, biocompatible and bio-inert materials. The centre is a multidisciplinary and trans-disciplinary consortium of research institutions and industry that decided to merge academic, technological and business expertise, skills, and equipment; it is composed of three research institutions with ten research groups, three non-profit organisations, four big companies and eight SMEs from different Slovenian regions.

6. Centre of Excellence for Polymer Materials and Technologies (CE PoliMaT)

Co-funding of the programme: €10.000.000,00

This centre connects the previously dispersed capacities of leading Slovenian research groups from the public sector and successful small, medium and large enterprises in the field of polymer materials. The centre's programme aims at developing polymer materials for advanced applications in line with sustainable development and low-carbon society policies in four areas: (1) technical products for advanced applications and energy, (2) coatings and adhesives, (3) renewable resources and (4) health. The centre's scientific excellence will be ensured through the publication of research findings in prominent journals, while the technological relevance will be built upon the breakthroughs both in polymer materials with target characteristics and advanced technological processes for their production, which will be used by the centre's partners in their production lines.

7. Centre of Excellence Space: Science and Technology (CE Space.si)

Co-funding of the programme: €9.966.506,00

This consortium of Slovenian scientists and engineers from academic institutions, high-tech SMEs and large industrial and insurance companies, which are integrated in the network of strategic partners from the EU, has strong research and technological capabilities to develop MEMS-based micro-propulsion, satellite control, communication, data and image processing and to engage in virtual and experimental research of micro- and nano-satellite systems. The new technologies for interactive remote sensing will greatly contribute towards local and global awareness of the significant environmental, social and economic factors associated with climate change, weather, hydrology, forestry, agriculture, spatial planning and natural disasters risks.

8. NMR Centre of Excellence for Studies in Biotechnology, Pharmacy and Physics of Matter (CE EN-FIST)

Co-funding of the programme: €9.970.013,00

Nuclear magnetic resonance (NMR) is an important spectroscopic method applied in the production and development of pharmaceutical preparations and new advanced materials; it is opening new possibilities in biotechnology and biomedicine. The development and characterisation of the new materials for storing hydrogen are in line with global trends in the transition to hydro-energy and, consequently, to a low-carbon society. The research work of this centre is focused on the development of energy efficient products, and, accordingly, on the horizontal objectives of promoting an energy-efficient economy with an emphasis on sustainable development.

3.3 Competence centres⁷

The competence centres are defined as development and research centres that are managed by partners from industrial sector and link partners from the industry and public research sector; they focus on the promotion of the development capability and the application of new technologies in manufacturing new competitive products, services and processes at priority areas of technological development. This function is complementary to that of the centres of excellence; together they constitute an autonomous whole in the area of research and development.

Seven centres were selected within a public invitation to tender for the development of competence centres in 2010–2013:

1. Competence Centre for Advanced Control Technologies (CC ACT)

Co-funding of the programme: €6.355.500,00

This competence centre operates in the field of control technology, which connects automation, computerisation and cybernetisation of processes and systems. It involves the "hidden technology" that is found in every complex piece of equipment, system or production process and, hence represents one of the key development factors in the world and is also very important for the future development of Slovenia. This competence centre will continue the research and development activities previously initiated within the Centre of Excellence for Modern Control Technologies and will follow the development strategy, which has been developed and implemented within the "Process control technology" technology network. The programme will contribute towards achieving the strategy's objectives by developing new (and improving the existing) products, services and technologies, by introducing and distributing these technologies among the users (mainly through demonstration projects), by fostering the creation of an innovative environment and by integrating in the international real and virtual developments and the economic environment.

2. Competence Centre — Advanced Systems for Efficient Use of Electrical Energy (CC SURE)

Co-funding of the programme: €6.399.999,00

This centre's main objective is to build the concepts of an active network, which will be based on new technologies and will be tested within the Slovenian electricity transmission network. A detailed evaluation of the new concepts in real situations will enable industrial partners to test the developed solutions and produce a final specification. The competence centre will carry out several demonstration projects on active distribution network solutions, i.e. systemic energy efficiency, a virtual power plant, an upgrade of the existing system of the distribution network management and the automated control of household consumption. These solutions will provide for unhindered

⁷ Source:

http://www.arhiv.mvzt.gov.si/en/areas_of_work/science_and_technology/centres_of_excellence_and_competence_centres/

linking of dispersed sources and for general energy efficiency by taking account of the production, transmission and end users.

3. Competence Centre Biomedical Engineering (CC BME)

Co-funding of the programme: €6.399.863,00

The long-term strategy of the centre is to permanently establish a large virtual research and development group joining companies and the academic sphere in the area of biomedical engineering, with a view to reaching a critical mass of knowledge, staff and material conditions enabling swift transfer of research findings into marketable products and revolutionary technological breakthroughs in the global market. This competence centre is designed to assemble the best biomedical engineering facilities in Slovenian science, technology and the economy. The centre's programme facilitates a higher concentration of investment in the area of new technologies and medical applications, closer cooperation between the scientific sphere and the economy, as well as enhanced transfer of knowledge into products and services with high value added.

4. Competence Centre for Sustainable and Innovative Construction (CC SIC)

Co-funding of the programme: €6.399.800,00

Sustainable construction can be defined as intertwined activities of researchers, investors, construction companies and industry, services and other factors aiming at achieving sustainable development while taking into account social, economic and cultural issues. Though most often sustainable construction is associated with the efficient use of energy in buildings and the use of natural materials, it is much more than this. It is a complex mosaic and this competence centre covers all the aspects involved. The centre also focuses on the development of key competences in the areas of great potential for innovative solutions and competence advantages in the global market. The environmental themes addressed by the competence centre primarily concern the use of natural resources.

5. Competence Centre for Biotechnological Development and Innovation (CC BDI)

Co-funding of the programme: €6.387.750,00

This competence centre is a strategic partnership between leading industrial partners and the most prestigious research organisations; together, they offer the required and sufficient critical mass of innovative industry and scientific excellence at a level comparable to international standards. The strategy of the centre's partnership builds on combining the efforts of the companies with excellent insight into the requirements in the area of functional foods, the leading development companies, and the public research organisations which master the most demanding and most advanced methods of developing new biotechnological approaches and relevant analysis. The competence centre strategy focuses on cooperation between partners; it will enable the participating companies to develop innovative and competitive products and services, and the participating research organisations to further strengthen their development and research excellence.

6. Competence Centre for Cloud-Assisted Services (CC CLASS)

Co-funding of the programme: €6.395.380,00

Cloud computing is one of the fastest growing segments of the ITC industry and one of the most important areas within the network systems. Developing competencies in this area will enhance the competitiveness of the partners participating in the project, and – through access to the most advanced technologies and knowledge in this area – also the competitiveness of the Slovenian economy. The consortium will enable the development of innovative services and products by concentrating the critical mass of knowledge and various complementary disciplines. The main objective of the programme is to develop services in the area of cloud computing. The research and building of competences will focus on the following themes: security, mobility, multi-tenancy, identity management, reliability, data management and the openness of the interfaces.

7. Competence Centre Open Communications Platform for Integrated Services (CC OPCOMM)

Co-funding of the programme: €6.398.000,00

The objective of this competence centre is to develop, in the medium-term, knowledge, technology and processes that will offer solutions to three key challenges and issues of the society: (1) slow expansion of internet and broadband access which results in the failure to take full advantage of the Future Internet and is caused by the overly expensive equipment and cost ineffective business models currently used in setting up the networks; (2) copious data, information, and content and the inability to use them effectively in comprehensive applications for individual areas of life (smart places, smart logistics, smart health, smart energy, smart grids, smart buildings and smart homes); (3) increase in the number of smart appliances, which are envisaged to be connected to the internet by the tens of billions by 2020; communication between those appliances will amount to more than 95 per cent of total information transmission and flow through modern communication networks.

3.4 Research centres

The research centres are institutions aimed at exploring, normally a specified area. Carry out basic and applied research, including using non-traditional techniques. They establish by many universities, with a view to implementing the specific research and educational activities. Most research centres demonstrates the scientific results of their work.

3.5 Technology parks

Technology parks are institutions that provide the concentration of knowledge, high technology, education and interaction with national and global institutions. They connect professionals and entrepreneurs who wish to realize their economic goals, which are based on new technologies. Similar to the business park whose primary objective is to business and production, technology parks, but the focus is on the development and scientific research activities. They set up mainly in the vicinity of higher education institutions and development centres and are attractive for top professionals, but also for young talents who want to improve and educate.

Technology parks in Slovenia are presented in Table 2.

Table 2: Technology parks

Country	NUTS2	Name	Institution type	Adress	e-mail	Webpage links
SI	SI04	Primorski tehnološki park d.o.o.	Technology park	Vrtojba, Mednarodni prehod 6, 5290 Šempeter pri Gorici	gtp@primorski-tp.si	http://www.primorski-tp.si/
SI	SI04	Tehnološki park Ljubljana d.o.o.	Technology park	Tehnološki park 19, 1000 Ljubljana	info@tp-li.si	http://www.tp-li.si/

3.6 University and Business incubators

The primary purpose of the incubators is to increase the potential for growth and survival of young firms by providing modular buildings, common technical infrastructure, managerial support and other support services. Business incubators are support organizations that assist in the creation, speeding up and long-term performance of the companies in that they provide space for the operation, advisory services, and opportunities for networking and collaboration with other companies.

University incubators in Slovenia are presented in Table 3.

Table 3: University incubators

Country	NUTS2	Name	Institution type	Adress	e-mail	Webpage links
SI	SI03	IRP Inštitut za raziskovanje podjetništva	University incubator	Ulica škofa Maksimilijana Držečnika 6, 2000 Maribor	info@tovarnapodjemov.org	http://www.tovarnapodjemov.org/
SI	SI04	Ljubljanski univerzitetni inkubator d.o.o.	University incubator	Vojkova cesta 63, 1000 Ljubljana	info@lui.si	http://lui.si/
SI	SI04	UIP, Univerzitetni razvojni center in inkubator Primorske d.o.o.	University incubator	Ferrarska ulica 8, 6000 Koper	info@uip.si	http://www.uip.si/

In Table 4 **Napaka! Vira sklicevanja ni bilo mogoče najti.** Slovenian Business incubators⁸ are presented.

Table 4: Business incubators

Country	NUTS2	Name	Institution type	Adress	e-mail	Webpage links
SI	SI04	INKUBATOR d.o.o. Sežana	Business incubator	Kraška ulica 2, 6210 Sežana	info@inkubator.si	http://www.inkubator.si/
SI		Pomurje Technology Park d.o.o.	Business incubator	Plese 9a, 9000 Murska Sobota	info@p-tech.si	www.p-tech.si
SI	SI03	Razvojni center Novo mesto d.o.o.	Business incubator	Ljubljanska cesta 26, 8000 Novo mesto	info@inkubator-nm.si	http://www.rc-nm.si/
SI	SI04	Razvojni center za informacijske in komunikacijske tehnologije d.o.o.	Business incubator	Ljubljanska cesta 24A, 4000 Kranj	info@rcikt.com	http://www.rcikt.com/
SI	SI04	Regionalni center za razvoj d.o.o.	Business incubator	Podvine 36, 1410 Zagorje ob Savi	info@rcr-zasavie.si	http://www.rcr-zasavie.si/
SI	SI03	RRA Koroška - Regionalna razvojna agencija za Koroško, d.o.o.	Business incubator	Meža 10, 2370 Dravograd	info@rra-koroska.si	http://www.rra-koroska.si/
SI	SI03	SAŠA inkubator d.o.o.	Business incubator	Šaleška cesta 2A, 3320 Velenje	info@sasa-inkubator.si	http://www.sasainkubator.si/
SI	SI03	Štajerski tehnološki park d.o.o.	Business incubator	Pesnica pri Mariboru 20A, 2211 Pesnica pri Mariboru	info@stp.si	http://www.stp.si/
SI	SI03	Inkubator Savinjske regije d.o.o.	Business incubator	Gregorčičeva ulica 6, 3000 Celje	info@inkubatorsr.si	www.inkubatorsr.si
SI	SI03	Mrežni podjetniški inkubator Ormož d.o.o.	Business incubator	Vrazova ulica 9, 2270 Ormož	jara@siol.net	http://www.ormoz.si/Podrocje.aspx?id=766
SI	SI03	Podjetniški inkubator Kočevje	Business incubator	Trata XIV 6, 1330 Kočevje	info@zavod-pik.si	http://www.zavod-pik.si/
SI	SI04	Podjetniški inkubator Kostel	Business incubator	Petrina 11, 1336 Kostel	info@inkubator-kostel.si	http://inkubator-kostel.si/
SI	SI03	Univerzitetni inkubator Savinjske regije	Business incubator	Kidričeva ulica 25, 3000 Celje	info@inkubator-celje.si	
SI	SI04	Zavod Znanje Postojna	Business incubator	Kolodvorska cesta 3, 6230 Postojna	inkubator@zavod-znanie.si	http://www.zavod-znanie.si/si/

Table 5 and Table 6 are presenting other Smart Factory relevant organisations in Slovenia.

Table 5: Business support organisations

Country	NUTS2	Name	Institution type	Adress	e-mail	Webpage links
SI	SI03	E-zavod, Zavod za projektno svetovanje, raziskovanje in celovite razvojne rešitve	Business support organisation	Čučkova 5, 2250 Ptuj	matjaz@ezavod.si	www.ezavod.si
SI	SI04	Gospodarska zbornica Slovenija	Business support organisation	Dimičeva 13, 1504 Ljubljana	info@gzs.si	www.gzs.si

⁸ Source: <http://www.podjetniski-portal.si/ustanavljam-podjetje/inovativno-okolje/Evidenca-subjektov-inovativnega-okolja>

Table 6: Ministries and governmental bodies

Country	NUTS2	Name	Institution type	Adress	e-mail	Webpage links
SI	SI04	Government Office for Development and European Cohesion Policy	Ministry/Government	Kotnikova 5, 1000 Ljubljana	gorazd.jenko@gov.si	gp.svrk@gov.si
Si	SI04	SPIRIT Public Agency for Entrepreneurship, Internationalisation, Foreign Investments and Technology	Ministry/Government	Verovškova ulica 60, SI-1000 Ljubljana	irena.meterc@spiritslovenia.si	www.spiritslovenia.si

4 Smart Factory support schemes and programmes

This chapter describes financial environment, support schemes and programmes including relevant policies in Republic of Slovenia. Furthermore identified currently available or future programmes, grants, loans specifically relevant for SFH project are presented.

4.1 Financial environment

Favourable financial environment is very important for development of each company. The importance is also reflected by the fact that the financing of SMEs one of the main topics of the discussions, documents and programs on entrepreneurship both at EU level as well as at the level of Slovenia, as a small business, despite its importance for the economic development of countries and regions often face great difficulty in obtaining finance.

Debt capital is one of most common sources of financing for SMEs. The most common form of debt capital are bank loans (short, medium, long term). A characteristic of debt capital is also that providers of debt capital does not interfere in the management of the company.

In the context of equity capital for start-ups are the most common private investment. Private investments are instances when an entrepreneur to obtain capital from other small entrepreneurs to realize their ideas. Among the permanent capital may also include investment by business angels (Glas 2000 345). Business angels, entrepreneurs apart from financial investments also help with their knowledge, experience and social capital.

Venture capital is particularly suitable for companies that have high growth potential and innovative or high-tech products. Venture capital is the permanent capital since an investor becomes a co-owner of the company. Investors tend to assist in the management, because you want a fast growing company, which will bring huge profits, which will also pay for their risk. There are many venture capital funds, which in Europe combine in the European Venture Capital Association (EVCA).

Republic of Slovenia also has a very important role in the financing of SMEs since through successful SMEs the state can ensure effective economic development and strengthen its competitive advantages. The forms of government financial aid include loans, state guarantees, and grants in the form of interest rate subsidies, export incentives, funding for product development and similar. The state can also set up venture capital funds. Apart from state support, also EU support plays a major role in the financial environment since European Union provides various grants, loans and guarantees to SMEs in the Member States.

4.2 S4 Support measures

Support measures for Smart Factory relevant areas identified in compliance with S4 principles are presented in **Napaka! Vira sklicevanja ni bilo mogoče najti.** and further described in this chapter.

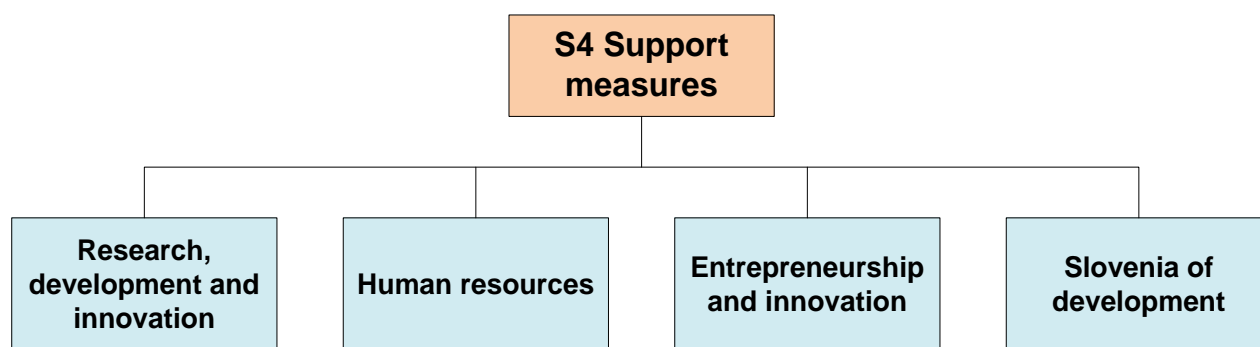


Figure 2: S4 Support measures

4.2.1 Research, development and innovation

4.2.1.1 Basic science

The main measures are mostly financed through the Slovenian Research Agency (SRA) which provides the core funding for national research potential. The key purpose of financing is to develop scientific excellence in a broad area of research (funding scientific disciplines with the aim of providing adequate corpus of internationally comparable knowledge, and providing research of national importance, in particular in the field of humanities and social sciences). SRA thus provides stable financing for research organisations, basic research in all areas and facilitates the operation of infrastructure centres. Funding the development of scientific staff is also very important as this ensures the development of new promising areas which do not demonstrate a direct and immediate economic impact.

Funding of research in the framework of establishing the European Research Area also falls within the same category. Based on the national research policy (which may be broader than S4 priority areas) such research aims to bring together/establish convergence of national research programmes in various thematic or horizontal areas.

OP will further support breakthrough research and development projects demonstrating potential in terms of the transfer of results into the economy with the aim of creating new innovation, technology and business solutions within S4 priority areas. During the pilot phase a smaller number of projects for the period of up to 2 years will be supported; such projects represent an upgrade of applicative projects financed by SRA, namely projects demonstrating potential in terms of commercialisation (including in the form of new companies). This pilot measure is a shift from co-financing research projects by national funds to co-financing under Structural Funds.

4.2.1.2 Research, development and innovation in value chains and networks

Improving international competitiveness and excellence in research to participate in value chains

The measure will promote the preparation and implementation of joint industry research projects (with an emphasis on TRL3-6) of economic entities and knowledge institutions with the aim of linking knowledge and competences relevant for developing new products, services and processes with high value added and a demonstrated market potential at the international level.

Support will be given to joint multi-annual projects of consortia demonstrating market potential in global value chains and networks, concentration of knowledge and competences, scientific and technological excellence, commitment and capability to invest in all stages of knowledge development and project sustainability (including the period of co-financing).

Support to RDI processes

The measure will focus on research and innovation projects developing new products, processes and services within priority areas of application (Phase TRL6-9). With regard to projects special attention will be paid also to non-technological innovation and investment, and to achieving sustained value, including industrial design and own brands. The measure will consist of three complementary instruments:

- smaller RDI projects of companies or partner consortia by also promoting non-technological innovation
- individual RDI projects of companies or partner consortia which are positively assessed in the framework of the SME instrument and other EU-level instruments targeting individual companies not reaching the threshold for project co-financing
- Major RDI projects of companies or partner consortia which require integration and cooperation of research institutions and enterprises, in particular SMEs. The instrument will be implemented in a complementary manner facilitating the continuation of successfully completed projects under the previous phase (TRL3-6) as well as funding of new initiatives.

4.2.1.3 Support to investments

The measure addresses the final stage of the development process of new products, namely:

- Development and installation of pilot lines, first validation activities, optimisation of advanced production technologies and first production while introducing ICT solutions.
- Testing new solutions developed for direct use in practice and a clear demonstration of their use (e.g. Living Labs, CreativeHubs, etc.). Support will be given to setting up the first reference project for demonstration solutions in real-world environments.
- Projects focusing on commercialisation of developed solutions and on new technologies entering the market (e.g. through (innovative) public procurement procedures).

4.2.1.4 Complementarity with Horizon 2020 and international initiatives

The measure will support integration of Slovenian partners in international networks, promoting research and attracting foreign top experts to Slovenia, mainly through schemes of complementary highly-competitive international calls for proposals (e.g. ERC).

Support will be given to activities relating to the establishment of the European Research Area (e.g. The ERA-NET), Innovation Union and Horizon 2020 with a focus on co-financing instruments targeted at expanding participation within Horizon 2020 (Teaming, ERA Chair, Twinning). Thus, complementary measures will support projects which pursue and achieve scientific excellence and are internationally comparable to the best research projects. Projects will have to demonstrate top-level quality in the context of initiatives and projects which are recognized as scientifically excellent in central EU Horizon 2020 programmes.

Support will also be given to international research and development projects on the basis of Articles 185 and 187 of the Treaty on the Functioning of the European Union (TFEU), e.g. EUREKA/Eurostars, and the activities pertaining to cross-border cooperation of regions, for example within the EU Strategy for the Danube Region.

4.2.1.5 Better utilisation and development of research infrastructure

Developing research infrastructures will be implemented in line with the European Strategy Forum on Research Infrastructures (ESFRI) roadmap and the national Research Infrastructure Development Plan, in particular in terms of establishing centres or partner facilities which support functional integration of Slovenian infrastructure into international infrastructure.

Infrastructure-related investments will focus on priority areas representing a precondition for international competitiveness of Slovenian RDI environment. Support will be given to upgrading the existing research infrastructure or, where relevant, the construction of new research infrastructures within S4 areas of application, and projects identified under the National Research Infrastructure Development Plan, in the framework of which emphasis will be given to the ESFRI projects. With regard to investments in research infrastructure Ministry responsible for science surveyed the overall research infrastructure financed by national resources, with the survey also covering the level of utilisation thereof. In terms of granting support to projects future investment will give particular emphasis to support (and the level of utilisation) with regard to the present state of infrastructure available to researchers. Specific attention will be given to infrastructure development in cooperation with economic entities. Thus, an important aspect (where possible) of research infrastructures development is the integration of the economy to promote faster economic development and direct cooperation with research organisations.

4.2.1.6 Specific measures

The field of sustainable food production will be supported under RDI policy. All other aspects of development in the field of sustainable food production, including human resources development and investments, will be addressed under Rural Development Programme, in particular under the following measures:

- Knowledge transfer and information and publicity activities
- Quality schemes for agricultural products and food
- Investments in fixed assets
- Establishment of producer groups and organisations
- Cooperation

4.2.2 Human resources

Key challenges addressed by the measures:

- provide sufficient number of qualified staff meeting the needs of the economy
- contribute to increasing value added by encouraging the establishment of new organisational and business models relating to human resources management in companies
- awareness-raising and integration of social partners and other stakeholders in order to identify their role in supporting these processes

Development policy will aim to establish integrity and enhance focus on priority areas, including the vertical project selection mechanism. The measures will enhance (i) addressing human resources development and staff competence (education, training and specialisation), (ii) establishing a clear distinction between specific measures supporting the identified area of application and horizontal measure within the education system.

4.2.2.1 Research potential of researchers and international mobility

With the involvement of researchers and their research potential the incentive will focus on the implementation of research projects with the cooperation of research organisations and the economy, while striving to transfer best practices that will have an impact on RDI activities of enterprises or the creation of new knowledge and its use in the context of research projects with foreign research organisations in Slovenia. Specific attention will be given to researchers who are returning to Slovenia after completing their research or educational work at international research and/or higher education institutions and who bring experience and know-how from abroad back home.

The measure will stimulate Slovenian enterprises which, based on their long-term needs, participate in shaping the research activities of researchers at research institutions, and transfer the knowledge of researchers to future researches as well as to economic research/development environment where enterprises will continue to carry out R&D activities in the context of the acquired knowledge and thus enhance the competitiveness of Slovenia's economy.

4.2.2.2 Strengthening development competences and innovation potentials

In the framework of this measure, which complements the preceding measure, research organisations play a key role as this segment needs to focus on the transfer of knowledge into economy and strengthening innovative potential of companies (e.g. mass innovation). The measure aims to initiate processes that facilitate strengthening of research and development departments in companies, in particular with the involvement of inter- and multi-disciplinary skills (creativity, art, design and other non-technological solutions).

4.2.2.3 Employee knowledge and competences

The measure focuses on strengthening specific knowledge, competences, skills and career development of employees in companies that operate and integrate within S4 priority areas (in particular the companies the nature of which makes the measure, relating to strengthening research potential of researchers, less relevant) to enhance their competitiveness. To a smaller extent the measure will also support other promising areas (e.g. culture and creative industries, language resources, paper industry, glass industry, etc.) having the potential to create better jobs and generate higher value added.

4.2.2.4 Young and creative Slovenia

People are of key importance in terms of knowledge- and innovation-based society and the competitiveness of the economy. In the next period priority will thus be given to promoting creativity, innovation and entrepreneurship of young people, talent development and improving their key competences in all phases of the educational process and vertically.

4.2.3 Entrepreneurship and innovation

The aim is to provide related, tailored and predictable/permanent support in all phases of company growth (from the pre-seed and start-up phase to the growth and maturity phase), and comprehensive support services.

4.2.3.1 Newly established enterprises and knowledge transfer

Establishment of new enterprises brings a dynamic dimension to the entrepreneurial environment with knowledge transfer from public research organisations to the economy representing an underutilised potential in terms of creating new value. Due to a high risk related to the introduction of new products, services and processes, innovation is commercialised via isolated formal establishments such as start-up companies. Start-ups are established mainly in the areas where knowledge with high value added is concentrated and where interdisciplinary groups are formed (mainly in knowledge institutions, creative centres etc.), namely where suitable entrepreneurial and creative dynamics has been established. In addition to establishing start-ups public research organisations transfer knowledge also through contractually regulated cooperation, selling or licencing intellectual property.

4.2.3.2 Growth and development of SMEs

Innovation, introduction of new technologies and models are important factors of growth and development for all types of companies. Mature companies having innovation potential for growth and development are one of the specific S4 target groups. One of the major problems of SMEs in Slovenia is that SMEs often struggle with development-management transition from a „family“ or „local“ company to a medium-sized or even global company having potential and ambition for fast growth.

Social enterprises (or social economy), where Slovenia has vast untapped potential, face similar problems as other SMEs, however due to the specifics related to all stages of the life cycle and the related need for specific skills social enterprises require support in particular during the start-up, growth and development phase. Thus, an integrated concept of support should be established for such companies which would ensure that they are properly integrated into the entrepreneurial environment. Promoting social entrepreneurship can act as an important complementary generator of cooperation and integration leading to new jobs.

Linking culture and creative industries as well as other economic sectors is the driver of innovation also in those branches of the economy where investing in research and development is low, e.g. in traditional sectors and services.

Planned measures:

- Infrastructure: entrepreneurial hubs and supportive environment; knowledge sharing platform (open innovation) as a form of promoting innovation in companies; creativity centre
- Financial mechanisms: microcredits, loans, guarantee schemes, equity and quasi equity financing, subsidies for start-up as well as mentoring for specific target groups (e.g. culture and creative industries, social enterprises)
- Content-related support: support by mentors and advisors, trainings in various fields (including social entrepreneurship, design management and transfer of traditional knowledge and skills); dissemination of modern methodology of product development, such as lean method; development of socially responsible intrapreneurship in companies at management and employee level; promoting the development of social innovation in internal and external entrepreneurial environments; preparing companies for international growth; integration and networking in various areas (e.g. with creative industries)
- Uniform implementation and promotion: organisation of informational, educational-motivational events across Slovenia with a view to promote the existing measures and infrastructure

4.2.3.3 Internationalisation and FDI

Internationalisation and FDI related measures address the promotion of enhanced international integration of Slovenian economy and attracting foreign direct investments (FDI), internationalisation.

4.2.4 Slovenia of development

4.2.4.1 Tax relief

Tax relief targets well-performing profit-generating companies which can reduce tax due to their investment in research and development (R&D). In accordance with their business activities, such companies can plan R&D expenditure to achieve two results simultaneously, namely competitive advantage through their R&D activity, and tax base reduced by the relevant R&D expenditure. Tax relief amounts to the 100% amount of the R&D investment.

The net effect for companies amounts to 17%. Slovenia will continue to implement this measure also in the next period.

4.3 Supporting schemes and measure of MGRT⁹

EU structural funds and investment funds in amount of 885.000.000 EUR are available for Slovenia between 2014-2020 via Ministry of Economic Development and Technology. Due to all available funds and other instruments for 2014-2020 it is expected to reach following indicators:

- For entrepreneurship it is foreseen to support more than 4,000 projects by companies, of which more than 800 support fast-growing businesses and 295 social enterprises,
- 12 supported networks of social enterprises
- 9 supported development partnerships
- 12 supported destination organizations
- 1000 trained people with new knowledge
- 1100 supported participation in trade fairs, of which 54 trade show in the field of wood
- 10 business clubs
- More than 500 new jobs in the field of internationalization
- 15 export plans
- 400 supported innovative start-ups
- 350 enterprises supported in international forums
- 210 supported companies to enhance the quality of business
- 5000 supported investors and domestic importers
- 350 companies supported with market research

In the area of non-grant and other financial instruments, support to over 2500 companies is planned.

Integral funds: The Ministry has an additional budget reserved, e.g. 181.215.000 EUR for years 2016 and 2017 and various other calls.

⁹ http://www.mgrt.gov.si/si/kako_do_sredstev/aktualni_razpisi/

A summary of relevant support schemes, measures and calls including information about implementation body, available budget, eligible costs and other relevant data is presented in Table 7.

Table 7: National support schemes summary

Country	Measure/Call	Objective	Implementation body	Budget (Mio €)	Beneficiary	Financing rate	Eligible costs	Max. grant (€)	Year from:	Year to:
SI	RD in value chains and networks, part II. Support for TRL6-9	Co-financing the implementation of innovation, research and development projects or consortia for new or improved products, processes or services, to the extent that they are confirmed in final form and suitable for use in real-world environments.	Ministry of Economic Development and Technology	74.20	SMEs, large companies and consortiums	micro and small companies up to 45 %, medium up to 35 %, large up to 25 %	staff costs and external experts, TBD	500,000.00	2018	2022
SI	Process voucher	Improving the competitiveness of companies by processes improvements (lean production, business process management, design management, etc.).	Ministry of Economic Development and Technology	3.00	SMEs with more than 10 employees.	up to 50 %	external contractors' costs	20.000 EUR/company	2016	2017
SI	Granting initiatives within the EUREKA initiative	Co-financing the Slovenian part of international R&D projects, approved by EUREKA program.	Ministry of Economic Development and Technology	4.50	SMEs and large companies	micro and small companies up to 50 %, large up to 40 %	staff costs, overheads, costs of instruments, equipment and external experts	100.000 EUR/each applicant	2016	2019
SI	Strengthening the companies competences and innovation potentials	Promoting R&D and innovation activities in companies through incorporating highly educated experts and including interdisciplinary knowledges (creativity, design, non-technological solutions) – Smart specialization strategies.	SPIRIT Agency	8.00	all companies in the Republic of Slovenia regardless of size	micro and small companies up to 45 %, medium up to 35 %, large up to 25 %	staff and indirect costs, external costs of researches and consulting services	50.000 to 200.000 EUR	2016	2017
SI	P7 2017 - Micro credit for micro and small companies	Enable micro and small companies quick and easy access to financing sources for improving operations and investment activities, which will allow faster development and further growth.	Slovene Enterprise Fund	5.00	all micro and small companies in the Republic of Slovenia	Credit	operations and investment activities	Credit from 5.000-25.000 EUR	2016	2017
SI	Loans and guarantees for SMEs (regional guarantee schemes)	Promoting R&D and innovation activities in companies through incorporating highly educated experts and including interdisciplinary knowledges (creativity, design, non-technological solutions) – Smart specialization strategies.	10 Regional Development Agencies in cooperation with banks.	-	SMEs	Interest rate and guarantee: depending on a given bank; guarantees up to 50 % of the loan principal		Loan: maximum 150.000 EUR	2016	2018
SI	Financial engineering actions (PS4) to promote technological development projects	SID Bank is on the basis of previous experience, proposing a new financial measure - the shift from PS1 to PS4. The aim is to promote technological development projects (research and development activity and / or initial investment).	SID Bank	30.50	all companies with capital/funds ratio better than 0,125	Credit for up to 75%.	Various categories	18.75MIO€	2017	2019
SI	Pilot / Demonstration Projects - part II.	Co-financing of demonstration projects to test new solutions for direct practical application and demonstration of the use in accordance with the Strategy for smart specialization	Ministry of Economic Development and Technology	7.75	MSP, large companies	micro and small companies up to 45 %, medium up to 35 %, large up to 25 %	staff cost, equipment depreciation, external research costs, patents and knowledge, administration and other costs	TBD	2018	2020

5 Trends in the manufacturing sector

Relevant manufacturing trends based on EUROSTAT¹⁰ statistical data are presented in this chapter.

Indicator presented on Figure 3 covers the number of enterprises active during at least part of the reference period. The data is broken down by size classes of persons employed.

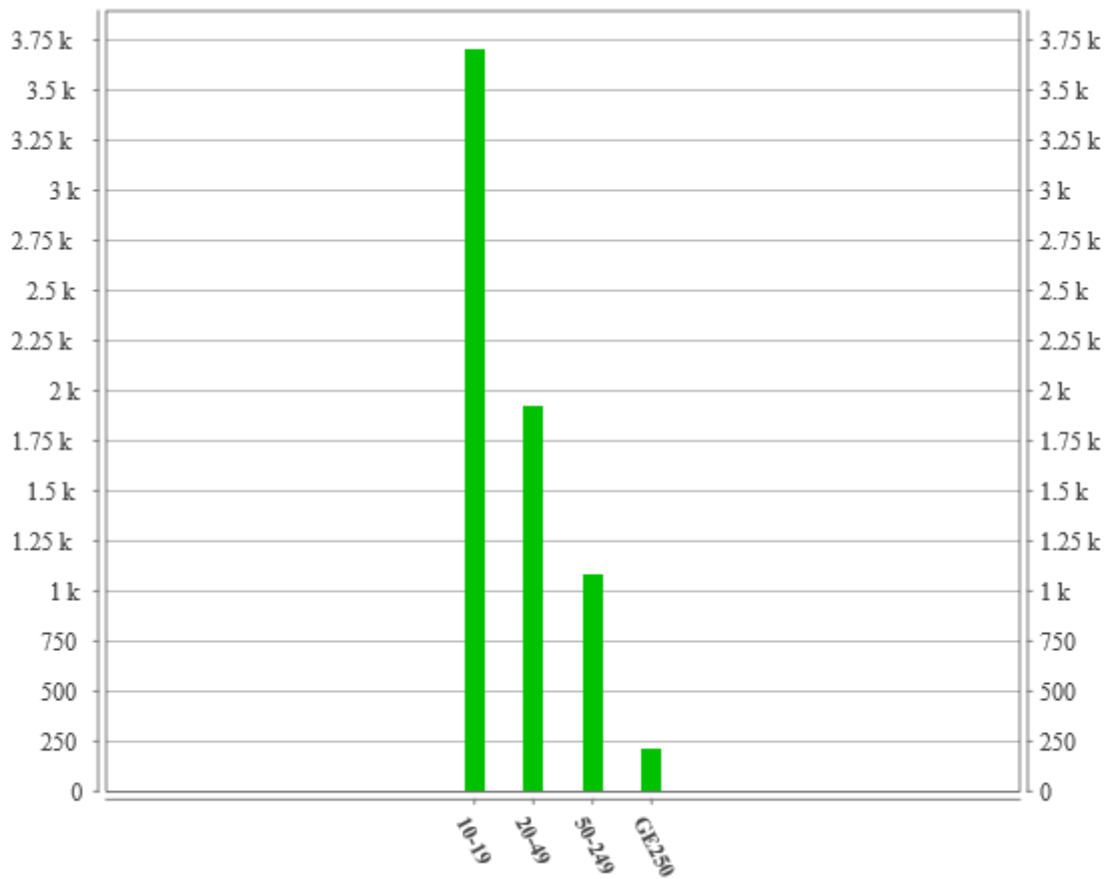


Figure 3: Slovenia - Number of enterprises in the non-financial business economy by size class of employment

¹⁰ <http://ec.europa.eu/eurostat/quip/themeAction.do>

Turnover is the total of all sales (excluding VAT) of goods and services carried out by the enterprises of a given sector during the reference period and is presented on Figure 4. The data is broken down by size classes of persons employed.

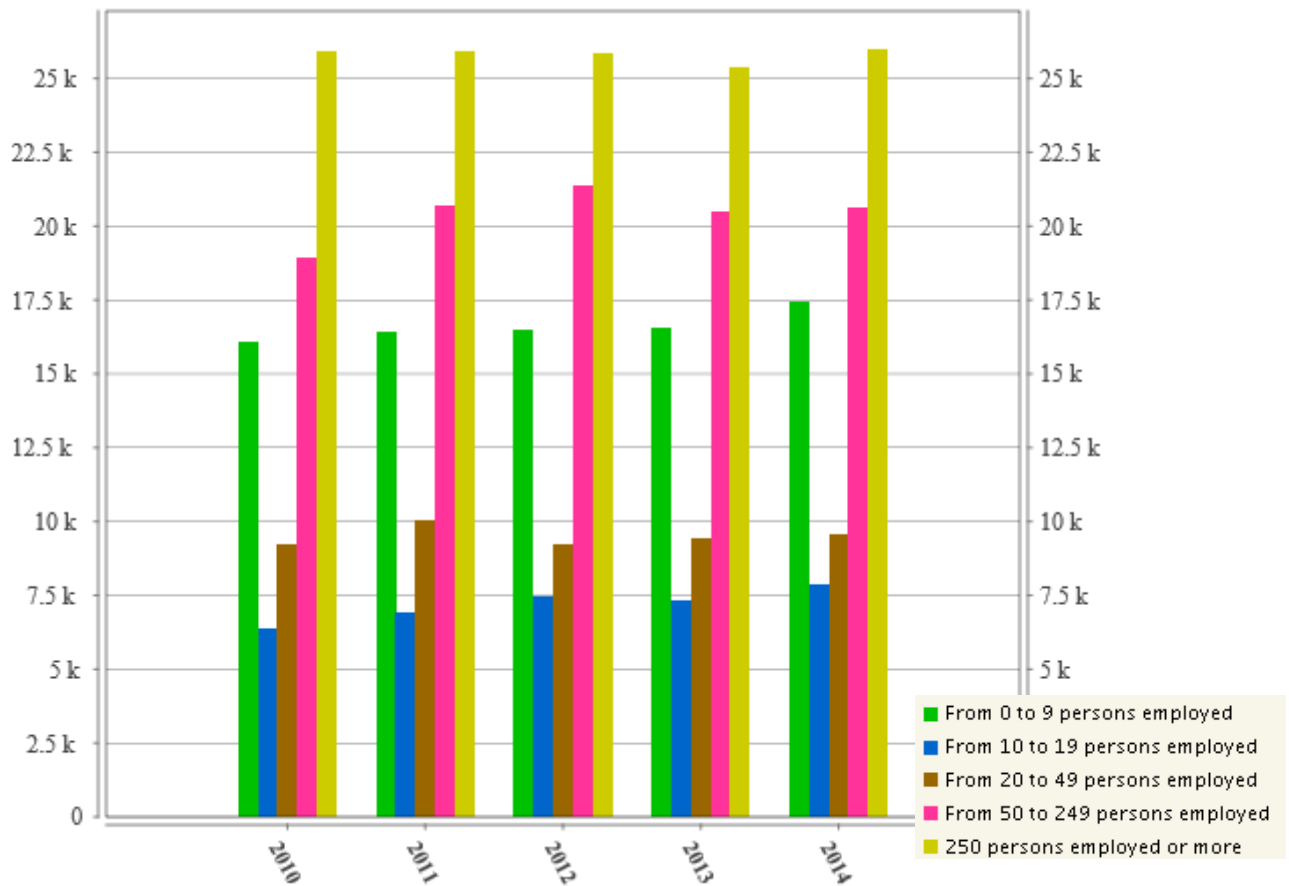


Figure 4: Slovenia - Turnover of the non-financial business economy by size class of employment - Millions EUR

The Turnover Index presented on Figure 5 is a business cycle indicator showing the monthly evolution of the market of goods and services in the industrial sector. It also records the evolution of turnover over longer periods of time. The turnover of industry index is not deflated. It is therefore the objective of this indicator to measure the market activity in the industrial sector in value.

Data are compiled according to the Statistical classification of economic activities in the European Community, (NACE Rev. 2, Eurostat). Industrial turnover is compiled as a "fixed base year Laspeyres type volume-index". The current base year is 2010 (Index 2010 = 100). The index is presented in calendar and seasonally adjusted form. Growth rates with respect to the previous month (M/M-1) are calculated from calendar and seasonally adjusted figures while growth rates with respect to the same month of the previous year (M/M-12) are calculated from calendar adjusted figures.

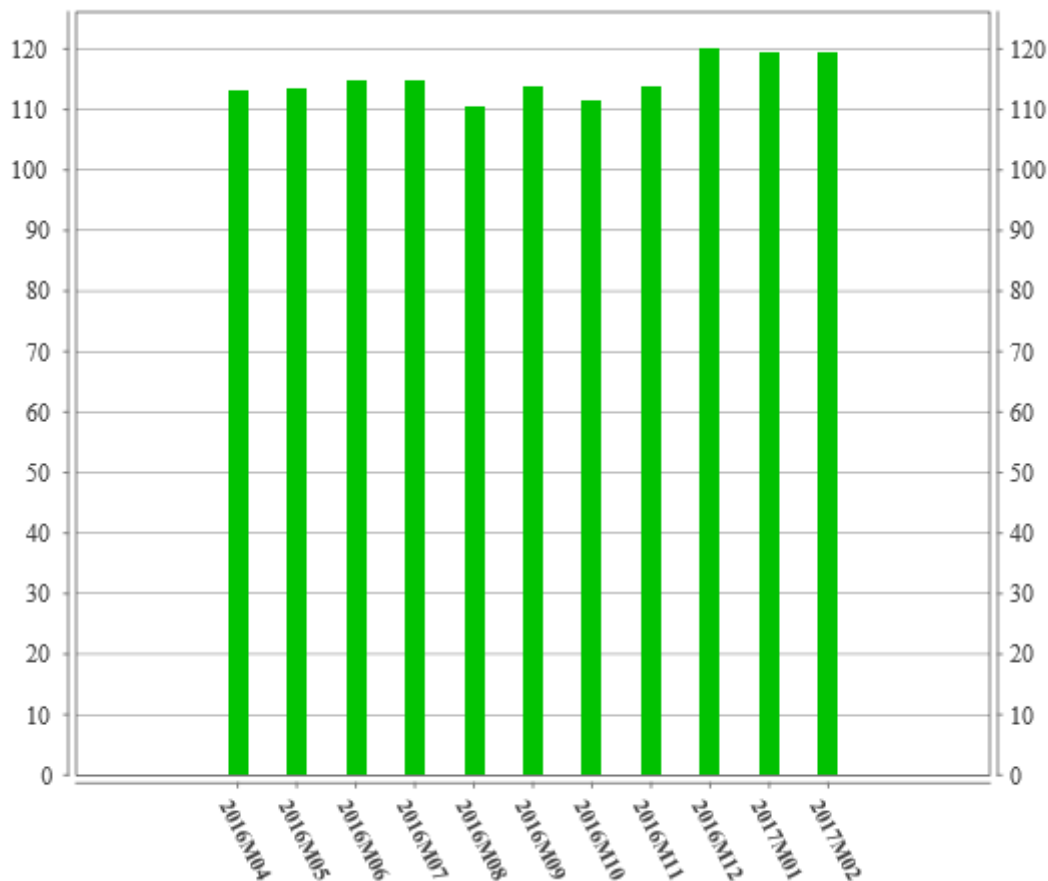


Figure 5: Slovenia - Turnover in industry - manufacturing

The industrial production index presented on Figure 6 shows the output and activity of the industry sector. It measures changes in the volume of output on a monthly basis. Data are compiled according to the Statistical classification of economic activities in the European Community, (NACE Rev. 2, Eurostat). Industrial production is compiled as a "fixed base year Laspeyres type volume-index". The current base year is 2010 (Index 2010 = 100). The index is presented in calendar and seasonally adjusted form. Growth rates with respect to the previous month (M/M-1) are calculated from calendar and seasonally adjusted figures while growth rates with respect to the same month of the previous year (M/M-12) are calculated from calendar adjusted figures.

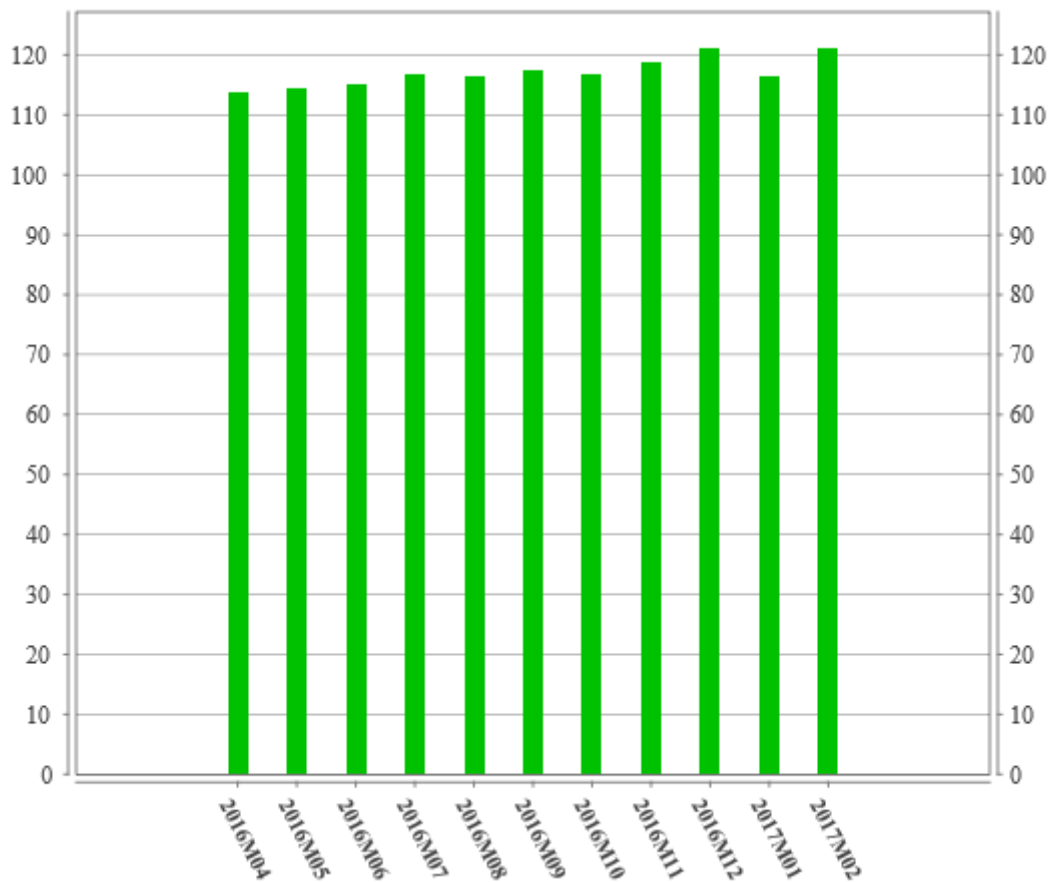


Figure 6: Slovenia - Production in industry - manufacturing

6 Smart Factory related projects

This chapter presents relevant national projects in execution by the partner or partnering organisations. Due to quantity of information in this chapter only an extract table is presented below and more data is included in Annex XLS file – sheet “Projects”.

Table 8: Smart Factory related projects - extract

Main applicant country	Project name	Programme name	Year from:	Year to:
SI	GOSTOP	RDI in value chain and networks	2016	2020
SI	ICON	Interreg CENTRAL EUROPE	2016	2019
SI	SMART FACTORY HUB	Danube	2016	2019
IT	3DCentral	Interreg CENTRAL EUROPE	2016	2018
AT	CARE4TECH	Interreg Alpine Space	2016	2019
IT	GREENOMED	Interreg Mediterranean	2016	2019
IT	TITEA	Erasmus+	2016	2019
RO	T4	Erasmus+	2016	2019
AT	IRIC	Interreg Slovenija-Avstrija	2016	2019
SI	Smart Production	Interreg Slovenija-Avstrija	2016	2019
SI	FIDES	OP IPA Slovenija-Hrvaška 2007-2013	2011	2013
SI	INTERINO	OP IPA Slovenija-Hrvaška 2007-2013	2011	2013
SI	Energo optimum	Program cezmejneg sodelovanja Slovenija-Madžarska 2007-2013	2009	2012
SI	Zdrava hrana	Program cezmejneg sodelovanja Slovenija-Madžarska 2007-2013	2009	2012
AT	BRIDGE	OP Slovenija–Avstrija 2007-2013	2010	2013
SI	INNOVATION 2020	OP Slovenija–Avstrija 2007-2013	2009	2012
SI	KBB	OP Slovenija–Avstrija 2007-2013	2009	2012
SI	RECOVERY	OP Slovenija–Avstrija 2007-2013	2011	2013
SI	INNO CBC	OP Slovenija–Avstrija 2007-2013	2014	2015
SI	Regionalni inovacijski center	INTERREG IIIA Slovenija - Avstrija	2006	2007

Main applicant country	Project name	Programme name	Year from:	Year to:
SI	Mreža kooperacijskih struktur na območju Pomurje-Radkersburg	INTERREG IIIA Slovenija - Avstrija	2005	2006
HU	ACCESS	INTERREG IVB - CENTRAL EUROPE	2010	2013
AT	CNCB	INTERREG IVB - CENTRAL EU	2010	2012
IT	CLOUD	SOUTH EAST EUROPE	2012	2014
SI	CROSBOR&D	Pobuda Skupnosti INTERREG III A Sosedski program Slovenija/Madžarska/Hrvaška 2004-2006	2005	2007
SI	IB Manager	4TH Call EraSME	2008	2010
IT	B2S2B	Interreg IIIC	2005	2007

7 List of regional actors

This chapter presents Smart Factory relevant actors identified by PTP.

Production oriented SMEs as potential users of solutions are presented in Table 9. The data is collected in Annex XLS file – sheet “Reg. actors”.

Table 9: List of regional actors – users

NUTS2	Name	Institution type	Industry sector	Service type 1	Service type 2	Adress	Webpage links
SI03	Atrium d.o.o.	SME	OTHER	Manufacturing		Kolodvorska 28 9240 Ljutomer Slovenija	http://www.atrium-pohistvo.com/
SI03	Elektromaterial d.o.o.	Large Enterprise	Electrical and electronic engineering industries	Manufacturing	Engineering	Kolodvorska 8 9220 LENDAVA SLOVENIJA – EU	www.elektromaterial.si
SI03	ELRAD INTERNATIONAL d.o.o.	Large Enterprise	Electrical and electronic engineering industries	Manufacturing		Ljutomerska cesta 47, 9250 Gornja Radgona, Slovenija	www.elrad-int.si
SI03	Farmtech d.o.o.	SME	Mechanical engineering	Manufacturing		Industrijska ulica 7 SI-9240 Ljutomer Slovenia	www.farmtech.eu
SI03	GORENJE ORODJARNA d.o.o.	Large Enterprise	Mechanical engineering	Engineering	Manufacturing	Partizanska 12, 3503 Velenje, p. p. 107, Slovenija	www.gorenje-orodjarna.si
SI04	KOGAST GROSUPLJE D.D.	SME	Food industry			Adamičeva cesta 36, 1290 Grosuplje	www.kogast.si
SI04	LES & VEHO D.O.O.	SME	Food industry			Dobro Polje 3, 4243 Brezje	www.mizarstvo-sivic.com
SI03	Medicop d.o.o.	SME	OTHER	Manufacturing	Engineering	Obrtna 43 SI-9000 Murska Sobota Slovenia	www.medicop.eu
SI03	MENART d.o.o.	SME	Mechanical engineering	Engineering	Manufacturing	Poljska cesta 21, 3210 Slovenske Konjice, Slovenija	www.menart.net
SI03	Miniplast d.o.o.	SME	OTHER	Manufacturing		Plese 9a 9000 Murska Sobota Slovenija	www.miniplast.si
SI03	MITHRAEUM D.O.O.		Food industry			Lokve 10 b, 8340 Črnomelj	www.mithraeum.si
SI04	Pipistrel d.o.o., 3D Studio Pipistrel	SME	Aeronautics industries	Manufacturing	Research and dev.	Goriška cesta 50, 5270 Ajdovščina, Slovenija	www.pipistrel.si

NUTS2	Name	Institution type	Industry sector	Service type 1	Service type 2	Adress	Webpage links
SI04	ROTO INOX D.O.O.	SME	OTHER			Prvomajska ulica 39, 5000 Nova Gorica	
SI04	ŠKRLJ D.O.O.	SME	Food industry			Dunajska cesta 196, 1000 Ljubljana	www.sk-group.biz
SI03	Šumer d.o.o.	SME	Mechanical engineering	Manufacturing	Research and dev.	Cesta v Celje 2, 3202 Ljubečna, Slovenia	www.sumer.si
SI03	TITERA d.o.o.	SME	Textiles, Fashion and creative industries	Research and dev.	Engineering	Obrtna ulica 40, 9000 Murska Sobota, Slovenija	www.titerad.com
SI03	USOL d.o.o.	SME	Electrical and electronic engineering industries	Manufacturing	Engineering	Kolodvorska ulica 43, 9220 Lendava	www.usol.si
SI03	VARSTOJ d.d.	SME	Mechanical engineering	Manufacturing	Engineering	Industrijska ulica 4, 9220 Lendava, Slovenija	www.daihen-varstroj.si

Identified potential solution providers for Smart Factories are presented in **Table 10**.

Table 10: List of regional actors - solution providers

NUTS2	Name	Institution type	Industry sector	Service type 1	Service type 2	Adress	Webpage links
SI03	ASTRON d.o.o.	SME	Electrical and electronic engineering industries	Research and dev.	Engineering	Cesta XIV. divizije 51, 2000 Maribor, Slovenia	http://www.astron.si/
SI03	ATES D.O.O.	SME	Electrical and electronic engineering industries	Engineering	Consulting	Mroževa ul. 21, 2310 Slovenska Bistrica	www.ates.si
SI04	Bent Excellent d.o.o.	SME	Electrical and electronic engineering industries	Engineering	Services	Dragomelj 82, 1230 Domzale	www.bent.si
SI03	Castoola d.o.o.	SME	Electrical and electronic engineering industries	Services	Engineering	Plese 9a, 9000 Murska Sobota	www.castoola.com
SI03	CBRZNET d.o.o.	SME	Electrical and electronic engineering industries	Engineering	Services	Plese 9a, 9000 Murska Sobota	info@centerbrezicnosti.si
SI03	ELMITEL d.o.o.	SME	Electrical and electronic engineering industries	Engineering	Research and dev.	Orehovci 1A, 9250 Gornja Radgona	www.elmitel.com www.evinyardapp.com
SI03	EMO ORODJARNA d.o.o.	SME	Mechanical engineering	Manufacturing	Research and dev.	Bežigrajska cesta 10, 3000 Celje, Slovenija	www.emo-orodjarna.com
SI04	GOSTOL-GOPAN D.O.O.	SME	Mechanical engineering	Engineering	Manufacturing	Prvomajska ulica 37, 5000 Nova Gorica	www.gostol.eu

NUTS2	Name	Institution type	Industry sector	Service type 1	Service type 2	Adress	Webpage links
SI04	Kolektor Sisteh d.o.o.	Large Enterprise	Electrical and electronic engineering industries	Engineering	Research and dev.	Šlandrova ulica 10, 1231 Ljubljana	www.kolektorsisteh.com
SI03	Laboratory for Electronic and Information Systems LEIS – R&D Activities	R&D center	Electrical and electronic engineering industries	Research and dev.	Education/Training	Smetanova ulica 17 2000 Maribor Slovenia	https://www.leis.um.si/en/
SI04	LIMOS D.O.O.	SME	Food industry	Engineering	Manufacturing	Kidričeva cesta 51, 4220 Škofja Loka	www.limos.si
SI03	Litostroj Ravne d.o.o.	SME	Mechanical engineering	Engineering	Manufacturing	Koroška cesta 15, 2390 Ravne na Koroškem, Slovenia	http://www.litostrojravne.com/
SI04	LPKF Laser & Electronics d.o.o.	SME	Electrical and electronic engineering industries	Engineering	Research and dev.	Polica 33, 4202 Naklo, Slovenija	http://www.lpkf.si/
SI04	METERA d.o.o.	SME	Electrical and electronic engineering industries	Engineering	Research and dev.	Stegne 23A, 1000 Ljubljana	www.metera.si
SI04	Metronik d.o.o.	SME	Mechanical engineering	Engineering	Research and dev.	Stegne 9a, 1000 Ljubljana, Slovenia	http://www.metronik.si/
SI03	MIEL Inženiring d.o.o.	SME	Electrical and electronic engineering industries	Engineering	Research and dev.	Efenkova cesta 61, 3320 Velenje, Slovenia	www.miel-i.si
SI04	MODRI PLANET d.o.o.	SME	OTHER	Services	Research and dev.	Vojkova cesta 45, 1000 Ljubljana, Slovenija	www.3Dsurvey.si
SI04	ROBOTINA d.o.o.	SME	Electrical and electronic engineering industries	Engineering	Services	OIC Hrpelje 38, 6240 Kozina, Slovenija	www.robotina.com
SI04	SALVIRT	SME	OTHER	Education/Training	Research and dev.	Dunajska cesta 136, 1000 Ljubljana	www.salvirt.com
SI04	SOLOPEX d.o.o.	SME	Electrical and electronic engineering industries	Engineering	Research and dev.	Pionirska cesta 9, 1360 Vrhnika	www.solopex.com
SI04	Špica International d.o.o.	SME	Electrical and electronic engineering industries	Services	Engineering	Pot k sejmišču 33 1231 Ljubljana, Slovenia	http://www.spica.si
SI04	TALISMAN D.O.O.	SME	Mechanical engineering	Engineering	Services	Bobovek 31, 4000 Kranj	www.talisman.si
SI03	TECOS, Slovenian Tool Development Center	SME	Mechanical engineering	Engineering	Research and dev.	Kidričeva ulica 25, 3000 Celje, Slovenia	www.tecos.si
SI04	Telos d.o.o.	SME	Electrical and electronic engineering industries	Engineering		Seljakovo naselje 42, 4000 Kranj, Slovenia	http://www.telos.si

A number of companies presented in **Table 11** was identified for acting as potential user and also solution provider for Smart Factories.

Table 11: List of regional actors - Users/solution providers

NUTS2	Name	Institution type	Industry sector	Service type 1	Service type 2	Adress	Webpage links
SI04	Fotona d.o.o.	SME	Electrical and electronic engineering industries	Research and dev.	Engineering	Stegne 7, 1000 Ljubljana, Slovenija	http://www.fotona.com
SI04	GOAP d.o.o.	SME	Electrical and electronic engineering industries	Manufacturing	Research and dev.	Ulica Klementa Juga 7 5250 Solkan Slovenia (EU)	http://goap.eu/
SI03	ORTOTIP d.o.o.	SME	Mechanical engineering	Engineering	Services	Obrtna ulica 40, 9000 Murska Sobota, Slovenija	www.ortotip.com
SI03	ROBOTEH d.o.o.	SME	Mechanical engineering	Manufacturing	Research and dev.	Goričica 2b, 3230 Šentjur, Slovenija	www.roboteh.si
SI03	TRANSPAK d.o.o.	SME	Mechanical engineering	Engineering	Research and dev.	Noršinska ulica 27 9000 Murska Sobota, Slovenija	www.transpak.si
SI03	VAR d.o.o.	SME	Mechanical engineering	Engineering	Manufacturing	Panonska 23, 9250 Gornja Radgona, Slovenija	www.var.si
SI03	VIPOLL d.o.o.	SME	Mechanical engineering	Engineering		Bučevci 1a, 9242 Križevci pri Ljutomeru, Slovenija	www.vipoll.si

8 List of annexes

- XLS file “D3.2.1_Regional mapping Database_SFH_v06_PTP.xlsx”



Microsoft Excel
97-2003 Worksheet

Figure 7: FILE - D3.2.1_Regional mapping Database_SFH_v06_PTP.xlsx