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REGIONAL MAPPING REPORT - SERBIA

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		

SADRŽAJ

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 Serbia 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 review of legislation in Serbia, as well as an overview of strategies relevant for this area and the potential development of this sector at the national level.

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 6 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

New strategic approach to industrial development – baseline for establishing the national framework – research and innovation strategy for smart specializations (ris3)

The European Union, under the threat of the economic crisis that has posed the greatest challenge to the European government to date, halting the development of the European economy, destabilizing the financial market and threatening to create an army of 2.7 million unemployed in the next two years, presented a document named European Economic Recovery Plan in November 2008, which was adopted by the European Council in December 2008. In the part of the Plan relating to research and innovation, *inter alia*, a partnership initiative between the private and public sectors was launched with three key programs:

1) Factories of the Future - FoF, with a volume of investments of EUR 1.2 billion in development activities in the manufacturing sector;
2) Energy-efficient Buildings - EeB, with a volume of investments of EUR 1 billion in development activities in the construction sector;
3) Green Cars - GC, with a volume of investments of EUR 1 billion in development activities in in the automotive sector.

A special budget fund of € 3.2 billion has been allocated for these programs to supplement existing funds previously allocated for these research and development priorities. In this instance, science has most directly been placed in the function of industrial recovery and job preservation, through a new momentum of targeted technological research and restructuring of the foundations of the industry, manufacturing in particular, through the introduction of new, high-tech content and the construction of new organizational concepts of factories and industrial systems. The manufacturing industry is a vital element of the European Union's economy, it remains the main driver and bearer of prosperity, generating about 20% of the EU-27 added value and 18% of employment, with more than 30 million jobs. The list of priorities in the Strategy on Scientific and Technological Development of the Republic of Serbia does not include production technologies, even though the industry, which is also the driver of Serbian economy, is in an extremely difficult state and requires an urgent recovery program.

By adopting a strategic framework, guidelines have been set up for the establishment of an effective national research system, which should contribute to economic growth through a more meritorious system of funding and adequate incentives for innovation. Key research and innovation issues remain: low overall allocations for science and research, emigration of highly educated population abroad ("brain drain"), insufficient cooperation between science and economy in terms of commercialization of research and innovative projects, lack of institutional framework to support innovation, and uncertainty of funding for scientific-research organizations.

The Research and Innovation Strategy for Smart Specialisation (hereinafter referred to as: ''RIS 3 Strategy'') is a strategic approach to economic development through targeted support for R & D

and innovation. The RIS 3 Strategy has been introduced as a planning mechanism in the framework of EU cohesion policy. European structural funds are the main source of funding for policy implementation and the concept of this Strategy has been introduced in the framework of the funds. To obtain the funding from the European structural funds, Member States and regions must adopt a Strategy, which would define decisions on the direction of development in this area before the approval of their operational programs to support these investments.

The RIS 3 Strategy is an approach that combines industrial, education and innovation policies so that countries or regions can identify and choose a limited number of knowledge-based priority investment areas, with a focus on their own strengths and comparative advantages.

The Interdepartmental Working Body for the Preparation of Research and Innovation Strategy for Smart Specialization of the Republic of Serbia was established under the Decision of the Government of the Republic of Serbia of 29 November 2016. Item 3 of the said Decision stipulates that the working body is to prepare the RIS 3 Strategy within two years, in accordance with the EU methodology.

Strategic documents important for preparing the RIS 3 Strategy:

- Industrial Development Strategy and Policy of Serbia for the period 2011-2020 and the Action Plan for the Implementation of the Strategy,
- Strategy for the Support to Development of Small and Medium-Sized Enterprises, Entrepreneurship and Competitiveness for the period 2015-2020 and Action Plan for the Implementation of the Strategy for the Support to Development of Small and Medium-Sized Enterprises, Entrepreneurship and Competitiveness for 2015 with the projection for 2016,
- Strategy for the Development of Information Technology Industry for the period 2017-2020,
- Strategy of Scientific and Technological Development of the Republic of Serbia for the period 2016-2020 – Research for Innovation,
- Strategy for Development of Education in Serbia by 2020,
- National Employment Strategy for the period 2011-2020,
- National Employment Action Plan 2017,
- National Youth Strategy for the period 2015-2025,
- Fiscal Strategy for 2017 with Projections for 2018 and 2019.

A brief analysis of parts of the above mentioned documents relating to the establishment and implementation of the innovation system is presented below to systematically highlight the comprehensiveness of the activities implemented in Serbia leading to the establishment of the innovation society.

2.1 Industrial Development Strategy and Policy of Serbia 2011-2020

Industrial Development Strategy of the Republic of Serbia 2011-2020 in the three stages of the process of transformation of the Serbian economy firstly foresees the establishment of a National Technology Platform based on existing capacities and knowledge, as well as the platform for interaction between industry and science. In the second stage, support for innovation in low-tech industries is envisaged in cases where there is a great potential for the introduction of technologically less demanding high output innovations. The third stage is based on research, development and innovation. The ultimate goal is to establish a National Innovation System that will unify:
(1) Research and development and education system;
(2) Innovation and technological capacity of the economy;
(3) Public administration (policy support), and
(4) Channels of absorption and diffusion of knowledge and innovation.

Industrial Development Strategy and Policy of Serbia 2011-2020 is the first development document that defines the basic development priorities of the Serbian industry and the ways of their realization in the next decade in a consistent and comprehensive manner;
1) Serbia's primary strategic development goal is the sustainable and dynamic development of an industry that can fit into the single market of the European Union (hereinafter referred to as: EU) and endure the competitive pressure of its members. Sustainable economic growth and macroeconomic stability of the Republic of Serbia are unsustainable without stable industrial growth, its dominant influence on exports, and thus on the balance of payments;
2) Industrial Development Strategy and Policy of Serbia 2011-2020 takes on a new dimension in the context of the effects of the global financial and economic crisis and defining of a new model of Serbian economic growth for the period 2011-2020;
3) The Strategy is in line with the EU's industrial policy and the goals of the New Europe 2020 Strategy;
4) The Strategy defines the basic goals and strategic directions of Serbia's industrial development on the way to building a new competitive industrial structure, based on the analysis and realistic assessment of the available development advantages of the Republic of Serbia in the context of global developments in the European and world market and long-term changes in world demand, bearing in mind the EU directives;
5) The Strategy Exports focuses on investments in the manufacturing industry, as the key generators of GDP growth in the next decade, because without their growth and structural change, Serbia's overall economic growth model is not attainable. Foreign direct investments (hereinafter referred to as: FDI), in addition to fresh capital, provide new jobs, introduce modern technology, efficient management and new corporate culture;
6) Small and medium-sized enterprises are the most important drivers of industrial growth and new employment;
7) New, high-quality and well-paid manufacturing jobs are one of the most important goals of the Strategy;

8) Social and state enterprises are not efficient, private property is the most efficient form of ownership. Therefore, the processes of privatization and restructuring should be completed as soon as possible;
9) Competition is the main lever of market economy. It is the task of the state to build more efficient market economy institutions in the interest of citizens and resolutely oppose all forms of dominant and other privileged positions, which implies the introduction of market criteria and public-private partnerships in infrastructural activities that are the backbone of every modern economy;
10) Serbia has a major long-term competitive advantage in the knowledge that it will use, through educational reform, to place a greater emphasis on research and application of innovations, as well as through the faster development of new information and communication technologies;
11) The Strategy fully focuses on the importance of revitalizing the devastated Serbian industrial centres;
12) An effective market economy aimed at increasing the welfare of all citizens is possible only in conditions of full democratization of a society based on strong state and social institutions and the rule of law;
13) Public sector reform involves the cutting of red tape and deregulation of state administration and raising its efficiency.

The concept of an innovative economy entails industries, which are based on:

1) Microelectronics;
2) Mechatronics;
3) Optical transmission of information;
4) Bio-technologies;
5) New materials;
6) Aerospace technologies;
7) Information and communication technologies;
8) Development and application of new technologies in the field of health and other social services and information and communication systems and traffic management.

The concept of the new industrial policy is oriented towards the export competitiveness of industrial products, focused on the process of consistent implementation of structural reforms and harmonization, and the process itself will occur in three stages:

1) Revitalization and renewal,
2) Restructuring and reengineering, which imply technological modernization of export areas,
3) Development and competitiveness, change in the technological profile of the industry, i.e. the change of the focus of industrial production from the dominantly low-tech to high tech field.

Industrial Development Strategy and Policy of Serbia 2011 - 2020 links numerous development documents adopted by the Government. Its implementation requires the synchronization of 13 different policies (education, technological development, research and development, restructuring and privatization, foreign investments, ICT, entrepreneurship, employment, energy

efficiency, environmental protection, protection of market competition, regional development, improvement of corporate governance).

This strategic document also has its own specific dimension in the process of accession to the European Union. The strategy is in line with the EU's industrial policy and the goals of the New Europe 2020 Strategy.

New model of industrial growth for the period 2011-2020 is export oriented and implies:
- Dynamic growth of investments,
- High rate of merchandise exports,
- Industry employment growth.

Special emphasis is placed on exploring the competitive position of key export sectors by 2020: food industry, vehicle industry, ICT industry, metal combine and pharmaceutical industry. Encouraging the development of these industrial areas and their expected multiplier effects on overall industrial development are based on knowledge and application of innovations, especially in the field of activating the development potentials of the leading export-oriented companies - national leaders.

2.1.1 Goals and measures of Serbian industrial policy

Innovation is the most effective method for growth of industrial productivity and structural change. The current situation in Serbia indicates that innovation is limited not only to the supply side (where there is a shortage of qualified labour force and laboratories, and the need for a more effective system of intellectual property protection, etc.), but also on the demand side (potential users of innovations in the business sector often treat innovation only as a technical or technological achievement or as an additional cost). These problems of imperfect conditions and asymmetries of information, as well as insufficient cooperation between research organizations themselves and between companies and research organizations can be resolved only if Serbia applies the best solutions of EU member states, by undertaking activities that will lead to the establishment and insurance of active and dynamic cooperation between the research organizations and universities, on the one hand, and the business community – industry, on the other hand. This will gradually lead to the creation of favourable conditions for the launch and implementation of important economic projects based on research results and innovations. In this context, state activities will focus on creating favourable conditions for faster industrial development through the allocation of a significantly larger share of resources in the form of aid for research and development projects, investment in new technologies and innovations in manufacturing processes and other operations and their implementation, investment projects which guarantee better environmental protection, energy saving, etc.
The Strategy elaborates in detail the model of Technology Platforms in Serbia, the essence of which is the close interaction between the three key players in the technological development process: industry – leaders in R & D activities – leaders in investment capital. Through its

regulatory mechanisms, the state creates a suitable environment for the functioning of this triangle in the process of generating and implementing new technological knowledge.

2.1.2 Reengineering of the Serbian industry 2013-2020

Industrial reengineering is an instrument of technological reconstruction of Serbian industry through an intensive innovation process. Implementation of this instrument in the Medium-Low-Tech (MLT) industry implies successful implementation of the technological transformation of the industry. Implementation of this instrument has its incubation stage (2013 - 2015) and the stage of full operational implementation (2015-2020).

Innovation policy, as a rule, focuses on the high-tech field (HT) in developed economies, whereby, low-tech and medium-tech fields are relegated to the second plane. New research indicates that this approach is incomplete, because the MLT industry has a large space for effective application of a diverse research and development content [60]. This fact is potentially very important when it comes to the Serbian industry. Innovation in MLT sectors can yield great effects on economic growth, primarily due to the fact that most of the industry is located in that field. Specifically, in 2008, the MLT sectors of Serbian industry involved 94.9% of industrial enterprises, which employed 93.1% of workers and generated 92.5% of GDP. The profile of the technological structure of the Serbian industry in line with the OECD ranking of the technology intensity of industrial sectors (LT - MLT - MHT - HT), is defined by the following approximate relations: 65 - 25 - 5 - 5 according to the number of companies, namely: 51 - 23 - 19 - 7 according to the number of employees.

The incremental character of innovation processes is characteristic of the MLT segment, since innovation processes are focused on raising productivity, differentiating the production program and improving marketing. Specific technology policy measures in the implementation of this instrument include the following:

1) Making of the Technology Map of the Serbian Industry with a detailed, objective and critical review of human and material resources, the structure of production program, organizational model, technological bases of the design of products/ processes, production and marketing, and interactions with the business environment.

2) Drafting of a Detailed Program for the Implementation of Innovation Processes in the MLT Sectors of the Serbian Industry with a focus on large industrial systems, drivers/ generators of development and a special focus on the segment of small and medium-sized enterprises, including technological incubators and other instruments for stimulating and strengthening entrepreneurship in the transfer of knowledge from the academic environment to the Industry for the domain of engineering sciences.

3) Full operationalization of strategic programs: PROGRAM 1 - Ecologically compatible industry, PROGRAM 2 – Industrial resource efficiency and PROGRAM 3 - Digitalized manufacturing processes - ICT agenda for industry.

4) Encouraging research and development processes of companies focusing on four areas of innovation actions:
(1) Product innovation,
(2) Innovation of technological processes,
(3) Innovation of the organization of the manufacturing/ business system and (4) innovation in marketing, with a particular focus on the practical implementation framework of the three strategic programs referred to in point (3). Develop special programs for stimulating innovation activities in the SME sector, including the creation of venture capital funds, popularizing and encouraging young scientists to launch their own business activities in high-tech and emerging industries through technological incubators and other incentives. Introduce new customs procedures that will remove administrative barriers within development projects in the development of experimental, demo and prototype installations, as well as in the procurement of experimental equipment (according to practice this is one of the very serious barriers to developing entrepreneurial initiatives).

5) Drafting of a special Program for Stimulating Industrial Entrepreneurship within the SME Sector, with the aim of encouraging young, capable and agile people to achieve their career ambitions. In particular, focus on: reducing administrative barriers, drastically simplifying formal procedures for establishing and operating companies and creating start-up funds.

2.1.3 Developmental expansion of Serbian industry 2018-2030

Developmental expansion of the industry is an instrument for changing the technological profile of Serbian industry through the construction of new high-tech sectors and the growth of innovation potentials and content through the intensive interaction of industry with research and development on educational institutions in the triangle of development defined by the NTPS Program (Program of the National Technology Platforms of Serbia).

2.1.4 Innovation as the driver of industrial development

Innovation, research and development are key factors in industrial competitiveness, along with knowledge and entrepreneurship. In this sense, innovation is perceived as the basis for transition to a knowledge-based society, and innovation policy is the most important strategic tool for achieving industrial competitiveness and the factor for maintaining and stimulating economic growth.

2.2 Strategy for the Support to Development of Small and Medium-Sized Enterprises, Entrepreneurship and Competitiveness for the period 2015 - 2020

The Strategy for the Support to Development of Small and Medium-Sized Enterprises, Entrepreneurship and Competitiveness for the period 2015-2020 establishes guidelines for the development of entrepreneurship and competitiveness based on private entrepreneurial initiative, knowledge and innovation. One of the dominant challenges of this Strategy is the poor link between research institutions and SMEs. This Strategy continues the policy of fully recognizing and applying of all documents that define EU policies in the field of entrepreneurship and competitiveness, primarily, the Europe 2020 Strategy and the Small Business Act. Particular attention has been paid to alignment with regional strategies related to this area, primarily with the South East Europe 2020 Strategy, and the EU Strategy for the Danube Region, as well.

The precondition for achieving sustainable socio-economic development and successful completion of the European integration process of the Republic of Serbia is the development of the economy, which builds its long-term competitiveness on private entrepreneurial initiative, knowledge, application of new technologies and innovativeness.

The Strategy for the Support to Development of Small and Medium-Sized Enterprises, Entrepreneurship and Competitiveness for the period 2015-2020 defines the framework, goals, priorities and measures to improve the development of micro, small and medium sized enterprises and entrepreneurship in the coming medium-term period.

The previous Strategy for the Development of Competitive and Innovative Small and Medium Enterprises for the period 2008-2013 ("Official Gazette of the Republic of Serbia", No. 103/08 – hereinafter referred to as: Strategy 08-13) improved the support for funding innovation projects of SMEs in the area of support to innovations. The Ministry of Education, Science and Technological Development encouraged innovative projects through the program of support to innovation activities (RSD 150 million were allocated from the budget in 2013). Fund for Innovative Activity was founded, establishing two new support programs through the Project of support to innovations in Serbia which is funded from the National program of the EU Instrument for Pre-accession Assistance (hereinafter referred to as IPA) for the year 2011. Within the Program of early development, 21 projects were supported in 2013, amounting to EUR 723,753.91, and through the Program of co-funding innovations, 10 projects were supported in the amount of EUR 640,421.67. Activities regarding the promotion of innovativeness through events organized by CCIS, Fund for Innovative Activity, NARD, etc. were continued. With the objective to support innovations, within action plans, activities to encourage participation of SMEs in international innovative and research and business programs/ networks were envisaged, such as: Competitiveness and Innovation Framework Program (CIP), EU Program “Eureka” and the 7th Framework Programme (FP7).

Within the activities of cluster support, the Ministry of Economy, and later the NARD, implemented the Program of support to development of innovation clusters in the total amount of RSD 113.6 million for the given five-year period.

2.2.1 Preview of development of SME sector

Concentration of SMEs by sector has not changed significantly over the years: the concentration in non-trade sectors is dominant and one in three enterprises or entrepreneurs from SMEs operates in the field of retail and wholesale trade, followed by services and manufacturing. The structure of SMEs in the manufacturing industry is dominated by economic entities operating in low-tech fields, with products of low added value and differentiation resulting in their weaker position on the market and low price and profit margins

2.3 Strategy of development of industry of information technologies for period 2017 until 2020

Support to the implementation of information technologies with aim of modernizing business in all industries.

In the history of industrialization, the use of energy as the main factor leading to revolutionary changes has been replaced in the second half of the twentieth century by information technology. The current wave of technology integration into all aspects of the economy erases clear boundaries between physical, digital and biological spheres and is increasingly referred to as the fourth industrial revolution or as Industry 4.0.

The term "Industry 4.0" comes from the High Technology Strategy adopted by the Federal Republic of Germany in 2006, which describes technological changes in production which make Industry 4.0, where strategic priorities have been set with aim of maintaining global competitiveness of German industry.

Measures to encourage the development of the IT industry would be incomplete unless one would observe broadened goal to improve level of implementation of information technologies with purpose of modernizing business in all branches of the economy. Term high-tech company is no longer related only to high-tech companies, but also to companies operating in various industries, but their business model is based on the use of modern technologies.

Measures in this area will be implemented through support programs aimed at sharing knowledge, experiences and good practice of using IT to support modern business models in different areas. In addition, the implementation of other measures from this strategy will also consider the possibility of extending the scope of these measures to encourage the development of an industry that uses innovative information technologies, regardless of the home industry.

The accelerated development of information technologies (hereinafter: IT) and the implementation of "smart solutions" that provide information technologies in other industries, represent a development opportunity for the overall economy and economic growth of our country. The past positive results of the IT industry in the Republic of Serbia point out the need for systematic support to that sector, as well as for creating an incentive environment for the convergence of information technologies and other technological innovations in order to strengthen the technological ecosystem in the Republic of Serbia.

2.4 Strategy for Information Technology Industry Development for the period 2017-2020

Support to the application of information technologies to modernize business in all economic sectors.

In the history of industrialization, the use of electric power as the main factor of revolutionary changes in the second half of the 20th century was replaced by the application of information technologies. The current wave of technology integration into all aspects of the economy is blurring the lines between the physical, digital and biological spheres and is increasingly referred to as a Fourth Industrial Revolution or Industry 4.0. The “Industry 4.0” term originates from a High-tech Strategy adopted by the Federal Republic of Germany in 2006 which described technological changes in manufacturing that make Industry 4.0 and set out strategic priorities to allow Germany to stay a globally competitive economy.

Measures to encourage the development of the IT industry would be incomplete unless broader goal of improving the level of application of information technologies for modernizing business in all economic sectors is not considered. The term of a high-tech company is no longer related only to companies doing business in the field of high technologies, but also to companies operating in various economy sectors, but their business model is based on the use of modern technologies.

Measures in this area will be implemented through support programs aimed at sharing knowledge, experiences and good practice of using IT as support to modern business models in various areas. In addition, the implementation of other measures under this Strategy will consider the possibility of extending the scope of these measures to encourage the development of an industry that uses innovative information technologies, regardless of the home industry.

The rapid development of information technologies (hereinafter referred to as: IT) and the application of “smart solutions” which information technologies provide in other industries, represent a development potential for the overall economic growth of our country. The past positive results of IT industry in the Republic of Serbia indicate a need for systematic support to that sector, as well as for creating an incentive environment for the convergence of information technologies and other technological innovations with the aim of strengthening the technological ecosystem in the Republic of Serbia.

2.5 Scientific and Technological Development Strategy of the republic of Serbia for the period 2016-2020

The Scientific and Technological Development Strategy of the Republic of Serbia for the period 2016-2020 - “Research for Innovation” was adopted with the mission to establish an effective national research system integrated into the European Research Area, contributing to economic growth, social and cultural advancement, increasing the standards of citizens and quality of life through improving scientific excellence and innovation development.

The institutional and strategic framework of the Strategy is based on the acknowledgement of the role of science, technological development and innovation in the socio-economic and overall development of the country, with a clear emphasis on the quality of education and research staff and competitive research for innovation. The Strategy relies in part on the positive experiences from the Scientific and Technological Development Strategy of the Republic of Serbia for the period 2010 – 2015 and on domestic valid sectoral development strategies and other strategic development documents and policies, and it is also associated with EU regional programs and strategies, in particular, in determining development priorities (Education Development Strategy of Serbia by 2020, Industry Development Strategy and Policy of the Republic of Serbia for the period 2011-2020, Strategy for the Support to Development of Small and Medium-Sized Enterprises, Entrepreneurship and Competitiveness for the period 2015 - 2020, Agriculture and Rural Development Strategy for the period 2014-2026, Information Society Development Strategy in the Republic of Serbia by 2020, Intellectual Property Development Strategy for the period 2011 - 2015, the South East Europe 2020 Strategy (SEE 2020), the Western Balkans Regional Research & Development Strategy for Innovation (WISE), the Strategy for the Danube Region, the Lisbon Strategy, Horizon 2020 and others. At the same time, the Strategy is a national roadmap for integration into the European Research Area, as it accepts and sets out measures for achieving the priorities and objectives defined by the European Research Area roadmap. The essential novelty of the Strategy is that it focuses around the "research for innovation” in function of the economic and overall social development of the country.

At the core of the Smart Specialisation Strategy lies the definition of priorities for knowledge-based economic development, and these priorities are identified on the basis of the country’s unique strengths and potentials. Smart strategy in science and innovations provide focussing and adjusting policy and investment-level support to key national priorities, challenges and needs for knowledge-based development.

The Strategy defines seven national priorities (thematic areas) based on a series of criteria, including: harmonization with country's development strategy and possibility to apply scientific results in the country and abroad.

These priorities are as follows:
1) Bio-medicine,
2) New materials & nano-sciences,
3) Environmental protection & countering climate change,
4) Energy & energy efficiency,
5) Agriculture & food,
6) Information and communications technologies (ICT) and
7) Improvement of decision making processes & affirmation of national identity.

These priorities, defined for a five-year period, are only to some extent compatible with the real needs of the Serbian industry, particularly from the aspect of its recovery, which is, among other things, necessary for increasing budget allocations for science. Science, particularly in its part related to technological development, which is essential for innovation processes in industry, must follow local specifics and industry priorities, or else, it comes to discrepancy, which paralyses the interaction of research - development institutions and industry, thus preventing the establishment of development spiral.

The Scientific and Technological Development Strategy of the Republic of Serbia for the period 2016-2020 states that cooperation with the Joint Research Centre of the EC will be expanded, especially in the development of smart specialisation strategy, exchange of information, use of databases, support to the process of accession to the EU and others.

The project of building the European Research Area is the central element of the EU Lisbon Strategy, and innovation activities are the key to implementation. Three per cent of gross domestic product should represent the total investment into research and it is an invitation to governments, and the business sector to increase the intensity of financing for research and development, with the adequate tax policy. The EU's "Horizon 2020" programme envisages that by the end of 2020, the overall research and development investment should amount to 3 per cent of GDP, of which 1 per cent should come from public sources, i.e. the budget.

If the Republic of Serbia wants to become part of the European Research Area by 2020, there has to be gradual increase of investments into research, development and innovation in order to achieve the objective set in the EU's "Horizon 2020" programme, in the period to come. Whether the achievement of this strategic goal, in the negotiation process, will be achieved in 2020 or later, referring to the aim that the total investment in science, technological development and innovation from all sources would be 3 per cent of GDP, and from the budget 1 per cent of GDP, will depend primarily on significant economic growth and available funds in the budget of the Republic of Serbia in the following years.

Further progress of the research and innovation system, and therefore the economic and overall development of the Republic of Serbia, in real terms, is not possible without increased material investments in science and research. The projection is that by 2020 the investments from the budget will be on the level of 0.6 per cent of GDP, and in line with the available resources of the budget of the Republic of Serbia, and the total investment from all sources of financing will reach 1.5 per cent of GDP, in order to achieve the vision of the Republic of Serbia supporting the excellence in science, relevant research and innovative system that affects economic and social development of the country.

2.6 Education Development Strategy in Serbia by 2020

The Education development Strategy in Serbia by 2020 sets out the purpose, goals, directions, instruments and mechanisms of the development of the education system and the role that education must play in economic, cultural, social, political, democratic and other developments of the country and in improving the strategic, cooperative and competitive capacity and position of Serbia in the contemporary world, especially in the European Union. The higher education based on research, innovation and entrepreneurship is defined as the main prerequisite for social, economic and cultural progress and development of the society. Improving doctoral studies creates new knowledge, which is the primary role of science at universities, to develop research potential. One of the directions of the development of doctoral studies is to support to applied research which provides a basis for the development of innovations.

Structure of future production system of the Republic of Serbia and the types of technologies that will be used – changes in the labour market demands

The strategic document “Serbia 2020: The Concept of Development of the Republic of Serbia by 2020” recognises this situation and states that “continued economic growth according to the existing model is not only undesirable, but it is no longer possible”, where it explicitly states the necessity of establishing a “new industrial policy based on the production of industrial goods, promotion of export, saving resources and energy efficiency” (2010). In this context, the Industry Development Strategy and Policy of the Republic of Serbia for the period 2011 - 2020 further elaborates and quantifies the set framework in detail (2010).

Service-based economies are successful if they have developed manufacturing industry in their structure. Therefore, the Republic of Serbia needs the following:

1) Revitalisation and technological re-engineering of the manufacturing industry, which is closely associated with the development of clusters, open to cooperation with universities and scientific-research institutions, competitive and export-oriented;

2) Development of a wide range of service activities associated with this production.

3) In keeping with the current industrial policy, the basis of the future manufacturing system of Serbia by 2030 will be determined by the process of reconstruction and transformation of the technological bases in the field of traditional low and middle technology (LMT) industry sectors. A new industrial strategy determines that this process will be accomplished by using three transformational instruments (3R package): revitalisation (2011 – 2015), re-engineering (2015 – 2020), and development expansion (2020 – 2030), with some of these tools overlapping in time.

4) In this context, the transformation processes and types of technologies of the future manufacturing system in Serbia will be determined by the impact of three key factors that are associated with the general trends of the development of the manufacturing technology in the global framework and with global social megatrends related to the engineering:
   1) new manufacturing paradigm of personalised, i.e. multivariant production;
   2) standards of energy efficiency, renewable energy sources and efficiency in the use of natural resources;
   3) standards of environmental protection and climate changes.

5) Technological bases of the new manufacturing paradigm are industrial ICT technologies, empowered by cognitive functions integrated into the manufacturing equipment: intelligent robots, intelligent numerically-controlled machines, intelligent automation, intelligent manufacturing systems. From the aspect of engineering in the upcoming decades, strategic programmes established by the European Commission named Factories of Future (FoF) are very important and include three key components:
   1) Smart Factories – a technological platform for agile manufacturing and personalisation, including the automatic control of manufacturing processes, manufacturing planning, simulation and optimisation, robotics and a complex of tools for sustainable development;
   2) Virtual Factories – a technological platform for creating new values within the global network operations, including the management of global supply chains;
   3) Digital Factories – a technological platform for the design of manufacturing processes and systems to manage the life cycle of products effectively, including simulation, modelling and other ICT CAx engineering techniques, which cover the complete life cycle of products.

6) Regardless of the current state of the domestic industry and its objective distance from such manufacturing systems, it is of existential importance for Serbia to create the necessary resources through the education system, particularly in the field of engineering and research, with the aim that in the near future it creates a strong and sufficient base for an efficient transfer of production technologies of this type and their integration in the industrial system of the Republic of Serbia.

7) Energy efficiency and renewable energy sources will create a very wide corpus of manufacturing capabilities through technological changes that will affect the LMT industrial sectors and winning new products.

Harmonisation of the technological development of the industry and the education system is achieved through the interaction that occurs in the labour market. The starting point in this process is the mutual understanding between the industry and the education system, that is, the establishment of a common ground through the construction of a harmonised classification system of skills/competences, qualifications and occupations. Such a classification system creates a basis for a deeper understanding of the labour market needs, allowing the establishment of curricula that effectively link the outcomes of the educational process with the work done in industrial positions (the focus is on the productive instead of the passive knowledge). In this regard, Serbia should use the framework of the EU 2020 initiative "Agenda for New Skills for New Jobs" and, by making the necessary adjustments, it should apply ESCO European standard (European Skills/Competences, Qualifications and Occupations standard – ESCO).

2.7 National Employment Strategy for the period 2011 – 2020

"Europe 2020" is based on: a) smart growth which implies an economy based on knowledge and innovation, b) sustainable growth that promotes more efficient use of resources and energy, and c) inclusive growth, which should enable the social and territorial cohesion. The new Europe 2020 Strategy defines where EU should be in 10 years through the following quantitative targets:

- Raise the employment rate of the population aged 20–64 to at least 75 per cent;
- Increase the percentage of GDP allocated to research and development from 1.9 to 3 per cent;
- Reduce greenhouse gas emissions by at least 20 per cent compared to 1990 levels (or by as much as 30 per cent if the conditions are right), increase the share of renewable energy in final energy consumption to 20 per cent, and achieve a 20 per cent increase in energy efficiency;
- Reduce the share of early school leavers to 10 per cent from the current 15 per cent and increase the share of the population aged 30–34 having completed tertiary from 31 per cent to at least 40 per cent;
- Reduce the number of people living below national poverty lines by 25 per cent, lifting 20 million people out of poverty.

These interrelated targets will be as always translated into national targets through a set of integrated recommendations (guidelines). Instead of 24, the number of new guidelines "Europe 2020, is reduced to 10, which should ensure the coherence of employment policy and broader economic policies of member states.
One more novelty the European Commission pointed out is seven flagship initiatives to catalyse progress under each priority theme: 1) "Innovation Union", 2) "Youth on the move", 3) "A digital

agenda for Europe", 4) "Energy efficient Europe", 5) "An industrial policy for the globalisation era", 6) "An agenda for new skills and jobs" and 7) "European platform against poverty".

Projections of trends in the labour market 2010 – 2020.

Industrial employment will increase by nearly 170 000 people over the projected period, i.e. for almost a quarter of a share of employment in the industry in total employment will increase from 24.2 per cent in 2010 to 26.4 per cent in 2020.

2.8 National Employment Action Plan 2017

On the basis of the National Employment Strategy for the period 2011-2020, performance assessment for the first five years of its implementation, the results of the activities conducted, the projected macroeconomic developments and labour market trends, and in consultation with social partners and relevant institutions, employment policy development by 2020 should be focused on:

1. Support for job creation;
2. Employability enhancement;
3. Support for structural adjustment.

At the same time, it is essential to continuously implement activities aimed at further developing and strengthening social dialogue and sector cooperation, decentralising employment policy, enhancing youth employability and employment, providing support to redundant workers in the process of labour market reintegration and increasing women's participation in the labour market. Support in this process has been provided by the International Labour Organization (ILO), the World Bank and the European Commission.
In the forthcoming period, the focus will be on Council Decision (EU) of 5 October 2015 on guidelines for the employment policies of the Member States for 2015, which are part of the Europe 2020 integrated guidelines and concern following:

1) Boosting demand for labour, i.e. the creation of quality jobs, promotion of entrepreneurship and small and medium-sized enterprises, together with improving the overall economic environment, to alleviate barriers in the labour market and promote the inclusion of hard-to-employ groups;
2) Enhancing labour supply, skills and competences and aligning education outcomes to labour market needs to facilitate effective school-to-work transition. Special attention should be given to people in the NEET group with a view to their activation and participation in the labour market;
3) Enhancing the functioning of labour markets, along with strengthening social dialogue and fight against undeclared work;

4) Fostering social inclusion, combatting poverty and promoting equal opportunities for all in the labour market.

In March 2016, the total year-on-year industrial output growth stood at 8.8 per cent. The highest contribution to growth was made by manufacturing industry, with its 5.9 per cent growth rate, driven by food, tobacco, rubber and plastics industries. In addition, the growth trend continued in electric power generation and mining (16.6 per cent each). In the first quarter of 2016, the total industrial output recorded a 10.5 per cent growth.

2.9 National Youth Strategy for the period 2015-2025

The Republic of Serbia recognises young people and their special and important role in the society. Young people are the present and the future of our society, a resource of innovations and a driving force of the development of society. Therefore, it is required to continuously and systematically invest in youth development and to establish a partnership between the youth and the state in order to increase the active participation of young people in society, encourage their social integration and ensure their inclusion in the development of youth policy.

The NYS identifies nine strategic goals as desired changes to be achieved with respect to young people in the areas of interest to young people. The successful implementation of NYS in the next ten (10) years will result in the improvement of, among other things:
– Employability and employment of young women and men;
– Quality and opportunities for acquiring qualifications and development of competencies and innovation of young people.

2.10 Strategy for Information Technology Industry Development for the period 2017- 2020

The Strategy for Information Technology Industry Development for the period 2017-2020 was adopted, which includes measures to improve the growth of IT production and indirect impact on the overall economic growth, as well as to reduce the economic gap between urban and rural areas.

The rapid development of information technologies (hereinafter referred to as: IT) and application of “smart solutions” which information technologies provide in other industries, represent a development potential for the overall economic growth of our country. The past positive results of IT industry in the Republic of Serbia indicate a need for systematic support to that sector, as well as for creating an incentive environment for the convergence of information technologies and other technological innovations with the aim of strengthening the technological ecosystem in the Republic of Serbia.

It is estimated that in the Republic of Serbia, 50,000 to 100,000 new jobs in the information technology sector could be opened by 2020, and that there is a great lack of professional IT staff, which is also registered in the European Union. Therefore, it is necessary to invest and support the development of IT staff in order to take advantage of employment opportunities. It is also necessary to use the potential of information technology applications in other economic sectors, education, business, public administration, through investment in research and development.

One of the segments that is recognized for development is encouraging the development of own products, in contrast to the present situation, where most companies in this area are oriented towards the so-called outsourcing, which implies the development of non-domestic products. In view of this, this Strategy foresees measures aimed at solving this problem, which relate to support to domestic companies and business associations to enter foreign markets, as well as the promotion of the Serbian information technology industry.

In line with prominent strategic priorities, measures should be implemented in the following areas:

1) support for IT entrepreneurship and start-up projects;
2) incentive tax policy;
1) support to appear on foreign markets;
2) support the application of information technologies for the purpose of modernizing business in all business sectors;
3) improvement of the legal framework;
4) improvement of human resources potential;
5) promotion of the Serbian information technology industry.

These strategic measures will contribute to the growth of IT production and will affect the overall economic growth, as well as the reduction of the economic gap between urban and rural areas, which is the overall goal of this Strategy. As technology of the future and networking and application of smart solutions, information technologies are a solid basis for rapid GDP growth, job creation, a transparent and competitive market, and the "smart growth" of the entire economy.

The aim of the measure to support the development of the start-up ecosystem is to strengthen associations (IT clusters, startup hubs and technological incubators etc.) in order to increase their ability to support the establishment and accelerated development of a large number of new business entities in the field of IT.

2.11 Fiscal Strategy for 2017 with projections for 2018 and 2019

The Government will continue improving the business climate in the next three years through active measures. The achieved fiscal stability will bring about improved macroeconomic performance. The growth model that has been established is based on increased investment and

exports. Additional impetus to long-term sustainability of growth should come from complex and comprehensive reform processes, which the Government will continue implementing in order to eliminate existing barriers and risks. This will encourage private initiative, promote entrepreneurship and innovation and affirm growth based on knowledge and technological development, which in turn will generate new jobs and help reduce unemployment.

Attainment of the Government's ambitious objectives will increase the standard of living by achieving sustainable, smart and inclusive growth, which will imply promotion of competitiveness and more efficient use of resources and development of a knowledge- and innovation-based economy, coupled with increased participation in the labour market, poverty reduction and social cohesion.

The machine industry and metalworking, textile industry, electronic goods and electrical equipment industry, and rubber and plastics industry have recently positioned themselves as Serbia's leading industries. The noticeable recovery in these industries was certainly driven by the large pool of qualified workforce, as well as foreign direct investment (hereinafter referred to as "FDI"), which ensured technology transfers and boosted competitiveness. Even though these industries have long-standing traditions in the Serbian economy, at present they should be seen as "infant industries" and their performance should be preserved and improved by creating a conducive environment, primarily by removing any barriers that the free market has failed to eliminate. In the medium term, they should be made less reliant on imports for raw materials and inputs, which will positively impact on the foreign trade balance and provide an impetus to other related activities. Furthermore, in addition to these general measures, it is also necessary to adopt tailored solutions to address any specific issues associated with the sectors concerned.

The reindustrialization process is complex and demands synchronized efforts from all economic policy makers, coupled with harmonized reforms of the judiciary and education, support to infrastructural projects, and passage of relevant environmental legislation. These efforts will be boosted by the formation of an industrial zone and by implementation of the Strategy for the Development of Small and Medium-Sized Enterprises, Entrepreneurship and Competition in the period 2015-2020. According to forecasts, successful implementation of this process and strengthening of activities with untapped potential could increase the manufacturing industry's share in GDP to about 20 per cent in five to seven years, which would additionally contribute to dynamic and sustainable economic growth.

The projected GDP growth rate for the period from 2017 to 2019, amounting to 10.3 per cent, indicates the accelerated growth trend and is based on the growth of domestic demand through intensified investment activity and recovery of private consumption. Economic trends and outlook for Serbia will to a large extent depend on the developments in the international economic environment, as well as on how successfully the real and public sector reforms are implemented. Reform laws and greater efficiency of administration have contributed to the creation of a favourable business environment, which will ensure the continuation of the initiated investment cycle as the leading development factor. The growth of foreign direct investments will provide for the transfer of technology and know-how, and contribute to increasing competitiveness of the

overall economy. On the other hand, the economic policymakers focus on the SME and sole trader sector, which is expected to significantly contribute to the growth of domestic investments, and thus the growth of employment and standard of living in the coming period. Sound and sustainable growth, with balanced regional development that is ensured through the establishment of industrial zones, will provide for further reduction of internal and external imbalances.

Structural reforms promoting the business environment include concrete activities that focus on the following area: the newly established ministerial council for information technology will in the forthcoming medium-term period implement a number of initiatives designed to increase exports of the IT sector, which will contribute to job creation and promote the innovation environment.

2.12 Global Innovation Index

According to the latest Global Innovation Index report which ranks countries by their capacity for, and success in, innovation. Serbia was ranked last year at 65th out of 128 countries. In the last three years, a significant shift in place was not made (67th in 2014 and 63rd in 2015), while the Innovation Index has moved mainly below 37th. The report is prepared by Cornel University, INSEAD and the World Intellectual Property Organization, and the analysis is based on a number of sources, including data from the World Bank and the World Economic Forum.

The rank of the top ten countries has barely changed in the past five years, so Switzerland is firmly in the forefront, followed by Sweden, the United Kingdom, the United States and Finland. Last year, however, one of the countries in the category of middle income countries - China, joined the top 25 economies.

According to the main 7 pillars (institutions, human capital and research, infrastructure, market sophistication, business sophistication, knowledge and technology outputs and creative outputs), Serbia does not stand out in good or bad position (if we exclude the market sophistication pillar that includes the protection of small investors, the level of market capitalization, investment risk capital and other indicators, where it occupies an unquestionably 109th place). Individual pillars show significant differences in Serbian innovation drivers. A satisfactory 44th place was achieved in the pillar of the number of domestic patent applications and the number of PCT registrations of residents relative to purchasing power parity. However, when we see that Serbia is ranked high in number of scientific and technical publications in relation to purchasing power parity, as high as at 8th place, it can be concluded that patenting is still not a key product of scientific research. The fact that according to the share of graduated students in engineering disciplines according to the total number of graduated students, Serbia occupies a high 21th place, also indicated that here is a significant place to increase patent applications. The level of cooperation between universities and the economy in the field of research is not favorably assessed, and Serbia is ranked below the 89th place. On the other hand, according to the share of GDP allocated for research and development, Serbia is on a twice-high place and occupies 44th place. Bearing in

mind the strategic commitment of Serbia to further increase investment in research and development, we can expect better placement in the coming period.

In general, Serbia's position can and must be improved in a number of areas. When we add to this data the latest Global Competitiveness Index report published by the World Economic Forum, according to which Serbia is ranked at 90th out of 138 countries, it is clear that Serbia must invest in further development of innovation and competitiveness of the economy. The insight into certain low positions that these reports allow give us a guideline to critical points that should be addressed.

3 Support environment in Serbia

The development of business infrastructure is of great importance for the development of SMEs, namely the development of: business incubators, industrial parks/zones and technology parks. Business infrastructure is, as an important instrument for the development of a competitive SME sector, mentioned in various developmental documents, but there are no strategic and legal frameworks governing its development. The funding of the construction and the activity of business infrastructure has so far mainly been based on an ad hoc principle, through the funds of the National Investment Plan, bilateral donations, loans and credits from international financial institutions.

Industrial zones, parks and business incubators represent an important pillar of the regional development policy of the Republic of Serbia. In support of the identification, formulation and future funding of public municipal investment projects, including the establishment of industrial zones, technology and industrial parks and business incubators, the Standing Conference of Towns and Municipalities (hereinafter: SCTM) has established a reference database for these projects – SLAP Hereinafter: SLAP).

On the other hand, the Law on Innovation Activity ("Official Gazette of the Republic of Serbia", No. 110/05, 18/10 and 55/13) recognizes business and technology incubators and science and technology parks as organizations for providing infrastructural support for innovation activities, and they can be, as such, registered in the Register of the subjects of innovation activity, at the Ministry of Education, Science and Technological Development.

The Strategy on Scientific and Technological Development of the Republic of Serbia for the period from 2010 to 2015 ("Official Gazette of the Republic of Serbia", No. 13/10) foresees investments in the infrastructure of the Republic of Serbia in the field of science and technology, implemented through the Project Management Unit, and for this purpose the Republic of Serbia has secured a loan from the European Investment Bank, which is used for funding several projects, among the most significant ones – the establishment of four science and technology parks (Belgrade, Niš, Novi Sad and Kragujevac).

Information on business infrastructure in the Republic of Serbia is not systematized and there is no single register, which is caused by the fact that the area of business infrastructure is not

adequately systemically regulated. SIEPA runs a database of investment locations in the Republic of Serbia, which are available to both the domestic and foreign investors.

Within the Register of Companies for Infrastructural Support for Innovation Activities, led by the Ministry of Education, Science and Technological Development, five science and technology parks and five business and technology incubators have been registered.

Despite a certain number of new institutions established in Belgrade, Novi Sad, Niš and Kragujevac, in the past five years (eight business and technology incubators, four science and technology parks, and four technology transfer centres), there is still a shortage of infrastructural support for innovations in the Republic of Serbia. However, these organizations for providing infrastructural support for innovative activities often do not have enough capacities, either human or financial, to fulfil their mission. A large number of business and technology incubators have been established with an aim to support “spin-off” and “start up” companies, but they often represent donor initiatives for which no long-term and sustainable funding is provided.

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.

The Government of the Republic of Serbia has been providing institutional and financial support for the development of clusters in Serbia for more than ten years. The first steps in the development of clusters were taken in 2004, through the mobilization of actors and the raising of institutional capacities, primarily the capacity of the line ministry as well as of other organizations and institutions dealing with the development of clusters, SMEs and entrepreneurship (Chambers of Commerce, entrepreneurial associations, cluster initiatives and the like).

Clusters in Serbia are mostly established in larger urban centres in Serbia: Belgrade, Novi Sad, Niš, Subotica and Kragujevac. The reason for high concentration of clusters in these cities can be in the fact that most of them were established with technical assistance from national or foreign development agencies, with offices in large cities in Serbia. Most clusters in Serbia are either local or regional, although some initiatives from Belgrade were established with the aim to be national clusters.

This is the list of few clusters that are active in the field of manufacturing:

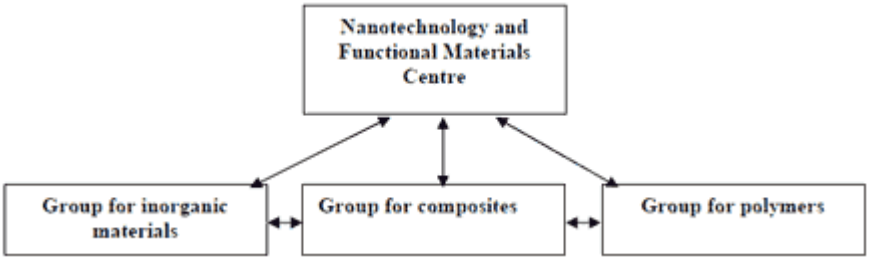
- Vojvodina ICT cluster from Novi Sad; (with 34 members - companies) – Milan Šolaja, milan.solaja@vojvodinaictcluster.org
- ICT Network from Belgrade;
- Serbian automobile cluster from Belgrade (with 33 members);
- The business association ICT cluster of central Serbia from Kragujevac (with 23 members);
- Fashion and Clothing Industry Cluster of Serbia from Belgrade FACTS (with 15 members);
- Ni-KAT cluster from Niš (23 members) - Goran Mladenović, goran.mladenovic@ni-cat.org
- Vojvodina metal cluster from Temerin (with 90 members) - Zoran Pekez, zpekez01@gmail.com

3.2 Centres of excellence

1. Nanotechnology and Functional Materials Centre at the Faculty of Technology and Metallurgy University of Belgrade (NFMC FTM UB) was established in order to integrate very small faculty research groups or individuals, which have all conducted their research in the field of nanotechnology and functional materials independently, in such a way to increase necessary resources and perform competitive and up-to date research activities.

The Nanotechnology and Functional Materials Centre- NFMC FTM UB consists of three groups: Group for inorganic materials, Group for polymers and Group for composite materials. These groups deal with materials for application in environmental engineering, biotechnology, biomedicine and pharmaceutics, photovoltaics, batteries, fibre-optic light guide, nanocomposite coatings etc.

Organizational chart of NFMC FTM UB



2. The Center for Solid State Physics and New Materials (CSSPNM) is a part of the Institute of Physics at the University of Belgrade. Their research interest is mainly concerned with the study of optical, transport and magnetic properties of a wide group of materials (from semiconductors and high-temperature superconductors to insulators and magnetic materials). The principal interests of the Center are the vibrational properties of these materials. The present experimental methods include the Brillouin and Raman scattering, photoluminescence, ellipsometry, optical reflectivity and transmission measurements (from far-infrared to UV spectral range), AFM and STM measurements, as well as other optical measurements in a wide spectral range under high pressure and low temperatures. In addition, magnetic and transport properties are investigated using the 14 Tesla cryogenic free magnetic system and the Hall-effect set-up, respectively. There is also a substantial theoretical effort in computing the phonon and magnon dispersions of the materials under investigation.

The CSSPNM also uses different techniques for the synthesis of samples including sintering methods, sol-gel technology, single crystal growth techniques (Bridgman, Czochralski, floating zone, etc.), thin-film technology (thermal evaporation and spattering) including photolithography and impurity doping.

The topics in the focus of recent activities are the theoretical and experimental studies and numerical simulations of various properties of nanostructured systems like high-k wide band gap semiconductors and insulators (such as CeO_2, TiO_2, ZnO), nanosized ferroics as $BiFeO_3$ doped with different rare earth elements such as Nd, Gd, Sm and Y. The vibrational, magnetic and electronic properties of strongly correlated electron systems (vanadates, titanates, manganates), the light scattering by spin waves in oxides, impurity effects in semiconductors and high $T_c$superconductors, to mention just a few of them, are subject of our permanent interest.

Properties of photonic and meta-materials are also some of the main investigation directions in their research.

3. The Center of Microelectronic Technologies (CMT), previously Centre of Microelectronic Technologies and Single Crystals, is a department within the Institute of Chemistry, Technology and Metallurgy (ICTM), itself a member of the University of Belgrade. CMT performs research and development in the field of microelectronic technologies, microsystems and nanosystems.
CMT is the only producer of microchips in Serbia. In our production we do not use licenses and know how of third parties – all CMT devices and systems represent solely the results of the work of the CMT staff. The whole production cycle, from fundamental physical, electronical, chemical and other concepts through analytical modeling and numerical simulation, photolithography and planar technology procedures, microfabrication, production of the chip itself, its mounting and encapsulation, measurement and testing, its incorporation into the system is 100% a result of research in CMT labs.
Currently CMT is the only research team in Serbia and in western Balkans to perform research and fabrication of MEMS and NEMS devices (micro and nanosystems). For this we use micromachining and other technologies of micro and nanofabrication.
CMT is mostly oriented to research and development of various types of sensors, detectors and measurement transmitters. The results of the CMT research are usually finished devices, components and systems that are directly applied in industry, medicine, etc. Based on its own technologies and its own fundamental research, CMT utilized its original design to develop and produce for market silicon piezoresistive pressure sensors, absolute and gauge pressure, pressure difference, level and temperature transmitters, silicon PIN photodiodes, InSb and HgCdTe infrared detectors, tin oxide-based transparent heating elements, etc.

4. Center of Excellence for Molecular Food Sciences, Faculty of chemistry, University of Belgrade was awarded a center of extraordinary values status in the field of natural sciences by the Board for accreditation of scientific and research organizations, Ministry of education, science and technological development on April 11th 2014.
The Center consists of teachers, researches and associates from Chairs of biochemistry, analytical and applied chemistry, Faculty of chemistry, University of Belgrade, and is organized into five research teams according to scientific scope, food and biotechnology research approach: Food proteomics team, Food molecular biotechnology team, Food enzymology team, Food biotechnology team, Food analysis team.
Since 2006 the Scientific Computing Laboratory has been recognized as a EU Centre of Excellence for modeling of complex systems. Its researchers use state-of-the-art High Performance Computing resources to conduct numerical simulations and visualizations of classical and quantum many-body systems. The main research topics covered include numerical evaluation of path integrals, study of strongly correlated quantum systems, investigation of granular compaction, and modeling of transport in nano-porous materials.

5.SCL-IPB has decisively increased the quality and impact of its research effort, and has grown into a recognized leader in HPC in South East Europe. During this time SCL-IPB has been partner in Europe's flagship e-Infrastructure projects EGEE II, EGEE III, and this continues in

PRACE and EGI-INSPIRE. The laboratory has been extremely active at the regional level in SEE-GRID, SEE-GRID-2, SEE-GRID-SCI, and the new HP-SEE project. The research on complex materials is principally funded through a seven-year National research grant ON141035, and EU Centre of Excellence grant CX-CMCS. Specific SCL-IPB activities are funded through a NATO reintegration grant, a Swiss SCOPES project, and several bilateral projects. Outreach to education has been conducted through the LA@CERN project.

6. Institute of physics - Center for non-equilibrium processes

7. The Centre of Research Excellence in Nutrition and Metabolism (CENM) is part of IMR involved into fundamental and applied nutritional research in Serbia and region of West Balkan countries. The Centre is consist of food scientists, nutritional researchers, medical doctors, molecular biologists, pharmacists, biochemists and bioinformatics all of whom are active in basic and applied nutritional research, most advanced country's studies on nutrition, food and human health. Our research focuses on determining the nutrient requirements necessary to promote well-being for children and adults. Our scientists examine how nutrition plays a role in the prevention of the major diseases affecting modern man today and conditions associated with aging.
The Centre of Research Excellence in Nutrition and Metabolism is dedicated to understanding why there are individual as well as epidemiological differences in nutrient requirements and metabolism. Using recent advances in nutritional science and molecular biology, the CENM is using the synergistic approaches between basic bio-medical sciences and clinical research and between clinical research and population health research with common goal of better understanding the nutrient role and action underlying obesity and diabetes.

8. Center for zoonoses transfer of food and vector Institute for Medical Research (IMR), Belgrade University (BU) was developed on the basis of the former Department, later the Group of Parasitology IMI, a present-day Group for Microbiology and Parasitology as a statutory organizational units of IMI, and make it IMI statutory three laboratories:

- Laboratory of Medical Parasitology
- Laboratory of Medical Entomology
- Laboratory of Molecular Diagnostics.

The Center today represents the leading position both in Serbia and in the region for cutting-edge research in the field of parasitology, the education of young researchers in this field, as well as the training of physicians on practical diagnosis. A special place is reserved for research in the field of infection with Toxoplasma gondii, whose quality has resulted in the appointment of the Laboratory for Toxoplasmosis IMI for the National Reference Laboratory for Toxoplasmosis (Toxo NRL) by the Ministry of Health of Serbia.

9. The Center for Quantum Theoretical Physics - part of the Department of Physics University of Belgrade. Center for Quantum Theoretical Physics consists of three research groups working in the fields of condensed matter physics, quantum and mathematical physics, and high-energy physics.

Our research focus is on mesoscopic transport, quantum correlations in superconductor - ferromagnet heterostructures, noise and full counting statistics, properties of the high-temperature superconductors, topological insulators, critical behavior and avalanches in ferromagnets, Barkhausen noise theory and experiment, kinetic models and simulations in gas discharges, critical properties of two-dimensional branched polymers, etc. For more information please visit the web pages of our group members.
We focus on a development of the group-theoretical methods and their application in the physics of low-dimensional systems. We study band structure, optical conductivity, plasmon excitations, Raman spectra, mechanical properties, electric and thermal transport, spin magnetic orderings etc. of low-dimensional systems like carbon and inorganic nanotubes, helical carbon nanotubes, graphene, polymers, and DNA. We have developed a *POLSym* software package which can be used in polymer and nanotube research by scientists who are non-specialists in the group theory.
Research of our group is in quantum field theory and quantum gravity. We focus on renormalizability of field theories including models Beyond Standard Model (BSM), supersymmetric and noncommutative gauge theories, construction of noncommutative field theories and analysis of their symmetries and conservation laws, quantization of gravity, noncommutative geometry, models of noncommutative gravity, and Hawking radiation.
Center for Quantum Theoretical Physics is recognized as a Center of Excellence by the National Council for Science and Technological Development and is funded by the Ministry of Education, Science, and Technological Development.

10. The Laboratory for Bioarchaeology was established in 2008, as a teaching and research unit of the Department of Archaeology, Faculty of Philosophy – University of Belgrade. Bioarchaeology includes research and analysis of organic material from archaeological sites, namely through scientific disciplines of physical anthropology, archaeozoology and archaeobotany. The Laboratory was founded in order to improve the teaching process in the field of bioarchaeology, by means of interaction of lectures and research. The Laboratory provides macroscopic and microscopic analyses of human and animal remains, and collaborates with various institutions equipped for DNA, stable isotope and lipid analysis. The Laboratory houses two collections, the Palaeoanthropological and the Archaeozoological reference collection.

11. Center for the synthesis, processing and characterization of materials for use in extreme conditions "CEXTREME LAB" within the Institute of Nuclear Sciences, Belgrade University was founded in 2014. The center is accredited in September 2015 by the Committee for Accreditation of Scientific Research Institutions and it is the only officially accredited Center of excellence of the largest institute in the country.
The Center is engaged in research that require an interdisciplinary approach; ie. basic and applied research in the border area of basic sciences (chemistry, physics, biology) and engineering. Therefore, the research groups from different fields have joined, ie. Laboratory made to work on the same task and Efficient solved problems, with the aim of increasing the necessary human resources and research infrastructure, and the capacity to perform specific and current research activities, as well as connect with other scientific-research institutions and centers in the country and abroad . Laboratory within the Center are formed not only for fudamentalnih research, but also for specific development and applied research.

12. Center for molecular medicine and stem cell research has been established at the Faculty of Medical Sciences, University of Kragujevac 02.12.2013. 'under the Faculty Council no. 01-13011 / 4.
SCIENTIFIC RESEARCH: Evaluation of novel cellular and molecular determinants important in the development of organ-specific autoimunsti and growth, and metastasis experimental tumors; Testing of stem cells as well as the applicability of embryonic stem cells, induced pluripotent stem cells as well as stem cells adultnuh. Regenerative Medicine; Testing importance of innate immunity in the pathogenesis of periapical granuloma. Pathogenesis peripakalnih lesions.
The type receptors and of ion channels through which endothelial, complexes with gold or platinum, and drugs from the group of antidepressants, antipsychotic and antihypertensive agents affect the tone and spontaneous activity of isolated smooth muscle of the gastrointestinal and urogenital tract.
Determination of genetic changes, biochemical signaling pathways disturbed and imunofenotipiskih changes in patients suffering from leukemia, lymphoma, lung tumor, colon tumor, breast tumor and odontogenic tumors face.
Analysis the procedures and materials for the efficient removal of toxic substances get into the environment (waterways, soil and food), which exhibit genotoxicity.
Test for cytotoxic imunimodulatornih and characteristics of the peptide compounds and metal complexes (gold, platinum, ruthenium).

3.3 Competence centres

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.

3.4 Subjects of innovation activity

In order to perform the activities of research, creation, development, implementation and placement of innovations, as well as of obtaining the status of an organization for performing innovation activities, the following can be registered at the Ministry:

1) development and production centre;

2) research and development centre;

3) innovation centre.

3.4.1 Development and production centre

A development and production centre is an innovation organization that creates innovations, implements new technologies, markets products, services and technologies, based on its own innovative activity and development.

Name	Postal code / city	Address	Phone	E-mail
EuroContract d.o.o., Beograd	11158 Beograd	Gundulićev venac 48	011/3241-314	office@eurocontract.co.rs
Infoprojekt d.o.o., Valjevo	14000 Valjevo	Knez Mihajlova 84	014/227.652	
Pogled telekomunikacije d.o.o. Niš	18000 Niš	V.Mišića 58/2	018 4 510 920	office@pogledtel.rs
Vrška-Press d.o.o. Zrenjanin	23206 ZRENJANIN	Tot Ištvana 79	023/522 815	office@vrskapress.co.rs
CINI Invest, d.o.o., Čačak	32000 Čačak	ul. 15. bb	032 5563-305	office@cini.co.rs
Preduzeće za istraživanje, konsalting, inženjering i transfer tehnologija sistem DC 90 d.o.o., Beograd	11307 Ritopek, Beograd	Smederevski put 67	011/852 6655	dc90@eunet.rs
ELMED d.o.o., Temerin	21235 Temerin	JNA 166	021/844767	office@elmedint.com
Fazi d.o.o. Niš	18000 Niš	Novoprojektovana bb	018 4558 880	office@fazi.rs
HPS HIO-PROTECTION system d.o.o., Novi Sad	21000 Novi Sad	Pozorišni trg 5	021/4725-424	office@hio.technology.com
Institut MOL d.o.o., Stara Pazova	22300 Stara Pazova	Nikole Tesle 15	022/317-652, 022/317-649	mol@mol.rs
SDD Information technology group d.o.o., Beograd	11060 Beograd	Volgina 15	011 6772 195, 011 6773 964, 011 6781 938	office@sdditg.com
Technalia Serbia d.o.o., Beograd	11000 Beograd	Vladetina 13	011 3246 419	
Uniplast d.o.o., Preljina	32212 Preljina, Čačak	Stara Pruga 91	032 380 285	office@uniplast.rs

Zesium mobile d.o.o., Novi Sad	21000 Novi Sad	Mičurinova 8	021/270 22 80	info_ns@zesium.com
Zlatarna Celje d.o.o., Beograd	11000 Beograd	Rankeova 4	011 344 09 29	marina@zlatarnacelje.rs
Tajfun hil, d.o.o., Novi Sad	21000 Novi Sad	Bulevar Oslobodjenja 69/V	(0)21 30 10 474	info@typhoon-hil.com
Belit d.o.o., Beograd	11000 Beograd	Obilićev venac 18-20	011/20 30 403	office@belit.co.rs
BSK d.o.o., Obrenovac	11500 Obrenovac	Cara Lazara 1	011/87 20 874, 011/87 28 359	office@bsk.rs
Centar za investicije i finansije d.o.o., Beograd	11000 Beograd	Internacionalnih brigade 56	011/244 16 58	office@cif.co.rs
DCA laboratorije hemije farmacije i medicine Ivica Savić, preduzetnik, Leskovac	16000 Leskovac	Norvežanska 22	016.34.41.477	dca.laboratorije@gmail.com
Društvo za trgovinu i usluge Eksport Import Desing d.o.o., Beograd	11070 Novi Beograd	Partizanske avijacije 18a/11	011/31 31 690; 011/31 32 094	office@desing.rs
Institut za ekonomsku diplomatiju d.o.o., Beograd	11000 Beograd	Pregrevica 168	011/307 7612, 307 7613	ied.bg@open.telekom.rs, mr.ied2@gmail.com
Ekovel centar d.o.o., Beograd	11000 Beograd	Ugrinovački Put 104	011 3774750	office@ekovel.com
Hemi-Eco d.o.o., Beograd	11030 Beograd	Blagoja Parovića 4	011 3555-724	hemieco@gmail.com
Interhem company d.o.o. Beograd	11080 Zemun	Slobodana Đurića 9	011 3757-747	office@interhem.rs
Vizantina d.o.o., Beograd	11000 Beograd	Podzemni prolaz na Terazijama lok.2, Beograd(kod Pozorišta na Terazijama i Hotela "Moskva")	060 / 15 05 009, 060 / 50 37 537	kristaligalerija@gmail.com
Milinković company d.o.o., Beograd	11070 Novi Beograd	Živojina Lukića Vajara 58e	011/318 - 07 - 00	milinkovicco@gmail.com

Proxima d.o.o. Čokot, Niš	18250 Niš - Čokot	Moravska 7	018/4291 290	office@proxima-medical.rs
IMP Računarski sistemi, d.o.o., Beograd	11060 Beograd	Volgina 15	011/6773 204, 6784 400	racunarski.sistemi@pupin.rs
Pur-Pur Technology d.o.o., Beograd	11000 Beograd	Vojvođanska 106	011/6157 727	office@purpurtechnology.com
Simprolit d.o.o., Beograd	11010 Beograd	Kostolačka 67	011 397 67 70, 060 543 21 91	simprolit@gmail.com, simprolit.bgd@gmail.com
Agrounik d.o.o. Beograd-Zemun	22310 Šimanovci	Krnješevačka BB	022 481 981	agrounik1@gmail.com
Biounik d.o.o. Zemun	11080 Beograd	Milana Uzelca 11	064/6467324	agrounik1@gmail.com
SPEBO d.o.o. Leskovac	16000 Leskovac	Norvežanska 16	016 344 1 344	info@spebo.co.rs
Tetragon d.o.o. Čačak	32000 Čačak	Kralja Petra I br. 38	(0) 32 370 130	contact@tetragon-doo.com
Ekovisan institut d.o.o., Beograd	11080 Zemun	Jerneja Kopitara bb	011 316 1155	visan@visan.rs
WIG d.o.o., Beograd	11070 Novi Beograd	Milutina Milankovića 26	011 3953-000	info@wig.rs
Znam Co. D.o.o., Beograd	11000 Beograd	Kumodraška 114	063 352 658, 011 8233 042	znamco@mts.rs, marax@ptt.rs, znamco@ptt.rs
AEDES-COOP d.o.o., Beograd	11080 Zemun	Prvomajska 109	011 3166 311	aedes@sezampro.rs
Razvojni centar WBC d.o.o., Beograd	11102 Beograd	Sremska 9	011 361-3896	
Unit inženjering d.o.o., Beograd	11000 Beograd	Majke Jevrosime 31	011 184485	
Grin elektrik d.o.o., Beograd	11010 Beograd	Slobodana Jovića 45	064/3970 033	Green.electric.doo@gmail.com
Privredno društvo Centar za vinogradarstvo i vinarstvo d.o.o., Niš	18000 Niš	Kolonija Ei 6	018/4269-438	iradojevic73@yahoo.com
Centar za krompir d.o.o., Guča	32230 Guča	ALBANSKE SPOMENICE 21	032/854-086	czkguca@yahoo.com
Veterinarska stanica Koker d.o.o. Adaševci	22244 Adaševci	Branka Radičevića 7	022 737232	veterina@neobee.net

3.4.2 Research and development centre

A research and development centre is an innovation organization for conducting applied and developmental research, creating innovations and placing new knowledge and technology, within its own production and services or within the production and services of other business entities.

Name	Postal code / City	Adress	Phone	email
Istraživačko-razvojni centar "Alfatec" d.o.o., Niš	18000 Niš	Bul. Nikole Tesle 63/5	018/293 920	office@alfatec.rs
Dunav net d.o.o. Novi Sad	21001 Novi Sad	Antona Čehova 1	+381 21 528 493	info@dunavnet.eu
Sentronis a.d. Niš	18115 Niš	Aleksandra Medvedeva 14	018 588404	info@sentronis.rs
AlfaNum d.o.o., Novi Sad	21000 Novi Sad	Bulevar Vojvode Stepe 40	021/475 0204; 021/475 0205	info@alfanum.co.rs
Biogranum d.o.o. Novi Sad	21000 Novi Sad	Toplice Milana 20	021/30-10-456	office@biogranum.com
Bioirc d.o.o., Kragujevac	34000 Kragujevac	Prvoslava Stojanovica 6	034/500-088	fica@kg.ac.rs
"FTN-IRAM-PT" d.o.o., Novi Sad	21000 Novi Sad	Fruškogorska 11	021-4801-100	
Krušik-IRC, Valjevo d.o.o.	14000 VALJEVO	Vladike Nikolaja 59	014/221-121	krusikkomerc@eunet.rs
AMSS-Centar za motorna vozila d.o.o., Beograd	11000 Beograd	Porečka 4	011/2080124	pisma@cmv.rs
Galenika-fitofarmacija a.d. Beograd-Zemun	11080 Zemun	Batajnički drum bb	011/3072 302	nikolic@fitofarmacija.rs
Ihis Techno experts d.o.o., Beograd	11080 Zemun	Batajnički drum 23	011 6195 700	ihis@eunet.rs
IMR Institut d.o.o., Beograd	11090 Beograd	Patrijarha Dimitrija 7	011/3564-011	kabinetimr@imr.co.rs
Imtel-komunikacije, a.d. Beograd	11070 Novi Beograd	Bulevar Mihaila Pupina 165b	011 311-1215	info@insimtel.com
PKB Agroekonomik d.o.o. Beograd	Padinska Skela, 11213 Beograd	Industrijsko naselje b.b.	011/8871 175	institut@pkbae.rs

Rudarski institut d.o.o. Beograd	11080 Zemun	Batajnički put 2	011 26 15 796; 011 21 99 394	direktor@ribeograd.ac.rs; office@ribeograd.ac.rs
TechnoLab CMV d.o.o. Beograd	11030 Beograd	Turgenjeva 3	011/35 45 225	office@tehnolab.rs
Vlatakom d.o.o., Beograd	11070 Novi Beograd	Arčibalda Rajsa 51, poslovna zgrada Milutina Milankovića 5	011/377-11-00	office@vlatacom.com
Centar za strna žita d.o.o., Kragujevac	34000 KRAGUJEVAC	SAVE KOVAČEVIĆA 31	034/ 333-046	strna.zita@gmail.com
Poljoprivredna stručna služba Institut Tamiš d.o.o., Pančevo	26000 Pančevo	Novoseljnski put 33	013/313-092	intam@panet.rs, instituttam@open.telekom.rs
PSS Poljoprivredna stanica d.o.o., Novi Sad	21000 Novi Sad	Temerinska 131	021/478-02-20	poljostanica@neobee.net

3.4.3 Innovation centre

An innovation centre is an innovation organization in which scientific results, achieved by the centre or by another entity, as well as contemporary technological processes, are implemented in an original and systematic way in order to create innovations, develop prototypes, new products, processes and services or in order to improve existing ones in a certain area and at the same time conduct a transfer of knowledge and technology into the production and services of other business entities.

Name	Postal code / city	Address	Phone	Fax	Name E-mail
Centar za unapređenje životnih aktivnosti d.o.o., Beograd	11000 Beograd	Gospodar Jovanova 35	011 3208 550	011 2624 168	office@add-for-life.com
Inovacioni centar Hemijskog fakulteta u Beogradu, d.o.o., Beograd	11000 Beograd	Studentrski trg 12-16	011-2638606 lok. 750, 659, 681		Bsolaja@chem.bg.ac.rs

Inovacioni centar Elektrotehničkog fakulteta u Beogradu, d.o.o., Beograd	11120 Beograd	Bulevar Kralja Aleksandra 73	011/3370-123, 011/3218-455	011/3370-123	icef@etf.rs
Inovacioni centar naprednih tehnologija CNT d.o.o., Niš-Crveni krst	18000 Niš	Bulevar Nikole Tesle 61, lok. 5	+381 69 20 45679		office@icnt.rs
Inovacioni centar Tehnološko-metalurški fakultet d.o.o., Beograd	11120 Beograd	Karnegijeva 4	011 3370 475	011 3370 400	inocentar@tmf.bg.ac.rs, kamber@tmf.bg.ac.rs
Inovacioni centar Mašinskog fakulteta u Beogradu, d.o.o.,Beograd	11000 Beograd	Kraljice Marije 16	011/330 23 46	011/337 03 64	mburzic@mas.bg.ac.rs, jlozanovic@mas.bg.ac.rs

3.5 Technology parks

Within the group of organizations for providing infrastructural support for innovation activities science and technology parks have a special significance as they contribute to: the creation of work places at value added jobs and to high quality employment; to the creation of new jobs/companies based mainly on high technology, i.e. high technology intensive companies/jobs; and the transfer of technology from its source, the knowledge base, into the business sector, and therefore it is imperative that:

ST parks receive support from public funds for their establishment and early development, which is, in the practice of developed European countries, usually considered as the first five years of operating after the opening of the ST park for the reception of tenants.

The Ministry has already begun the funding of NTP-Beograd, and through a clear and transparent mechanism it will ensure the implementation of strategic goals (every year) following precise criteria and it will support the development of ST parks in other university centres as well. Other ministries and/or local self-governments will partially participate in the funding.

ST parks will establish adequate selection policies concerning tenants, who are integrated with the knowledge base (primarily with universities and institutes), or other relevant organizations which belong to the public and private sector but provide professional support for the innovative activities of tenants.

ST parks will periodically publicize the results concerning the number and efficiency of the companies, through their contribution to the creation of new work places, their overall activity and other information of interest for the development of support, the Ministry will perform regular monitoring as well as an evaluation of the activities of ST parks and the achieved results.

The following science and technology parks have been registered at the Ministry of Education, Science and Technological Development:

Name of	TIN	Registration	Postal code	Address	Web address

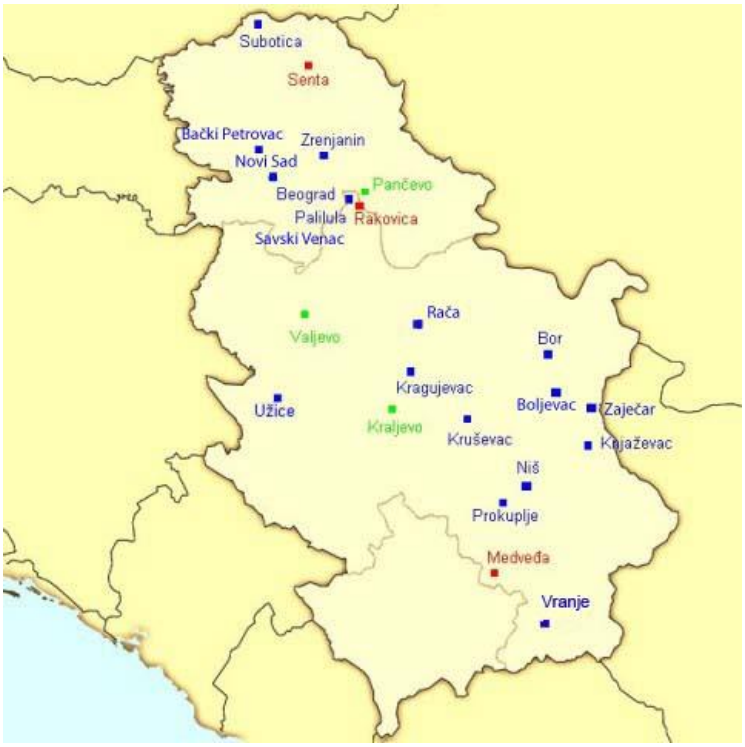
institution		number	and city/town		
IHIS Naučno-tehnološki park Zemun a.d.	100104464	07013361	11080 Beograd	Batajnički drum 23	www.ihis.co.rs
ICT HUB D.O.O. BEOGRAD, ZVEZDARA	115457073	20388307	11000 Beograd	Veljka Dugoševića 54 A 5	www.icthub.rs
NAUČNO TEHNOLOŠKI PARK "BEOGRAD", BEOGRAD, ZVEZDARA	109023482	21113115	11000 Beograd	Veljka Dugoševića 54	www.ntpark.rs
DCA - Laboratorije d.o.o. Leskovac	102303019	17226584	16000 Leskovac	Norveżanska 22	http://www.dca-labs.com/index.html
	107393266	20793112	32000 Čačak	Nikole Tesle 42	http://www.ntpcacak.rs/

3.6 University and Business incubators

Business and technology incubator

A business and technology incubator is a company whose main activity is making business space, administrative, technical and other services, available to newly established companies, for compensation, for a maximum period of five years from their establishment. The rights and obligations of the users of the services and the business and technology incubator are regulated by a mutual agreement. All entities using the services of a business and technology incubator receive the status of tenants of the business and technology incubator.

Network of business incubators in Serbia



Incubators registered at the Ministry of Education, Science and Technological Development:

Name of institution	TIN	Registration number	Postal code / city	Address	Web address
POSLOVNO – TEHNOLOŠKI INKUBATOR TEHNIČKIH FAKULTETA BEOGRAD D.O.O.	104625646	20183926	11000 Beograd	Ruzveltova 1a	www.bitf.rs
Kristal Infiz d.o.o. Beograd	1046698833	20213574	11080 Zemun	Pregrevica 118	
NOVA ISKRA DIZAJN INKUBATOR D.O.O. BEOGRAD, SAVSKI VENAC	108342877	20979887	11000 Beograd	Gavrila Principa 43	www.novaiskra.com
BIZ d.o.o. Zrenjanin	104431016	20127325	23000 Zrenjanin	Kralja A. I Karadjordjevica 2/IX	http://www.biz-zr.rs/

BINS d.o.o. Novi Sad	106574479	20633905	21000 Novi Sad	VOJVOĐANSKIH BRIGADA 28	http://inkubator.biz/rs

Table 1 and Table 2 are presenting other Smart Factory relevant organisations in Serbia:

Table 1: Business support organisations

Name of organization	Address	E-mail	Web address
Chamber of Commerce and Industry of Serbia	Resavska 13-15 11000 Beograd	info@pks.rs	www.pks.rs
Innovation Fund	Nemanjina 22-26 11000 Beograd	office@inovacionifond.rs	www.inovacionifond.rs

Table 2: Ministries and governmental bodies

Name	TYPE	Address	E-mail	Web address
Ministry of education, science and technological development	Ministry	Ruzveltova 1a 11000 Beograd		www.bitf.rs
Ministry of economy	Ministry	Kneza Miloša 2011000 Beograd	milica.zatezalo@privreda.gov.rs	www.privreda.gov.rs

Ministry of Public Administration and Local Self-Government	Ministry	Dečanska 8a 11000 Beograd	kabinet@mduls.gov.rs	www.mduls.gov.rs
Development agency of Serbia	Agency	Kneza Miloša 12, 11000 Beograd	office@ras.gov.rs	www.ras.gov.rs
Republic Secretariat for Public Policy		Vlajkovićeva 10, 11000 Beograd	**office@rsjp.gov.rs**	www.rsjp.gov.rs

4 Financing innovation activities - support schemes and programmes

This chapter describes financial environment, support schemes and programmes including relevant policies in Republic of Serbia.

Financial instruments based on investments in company capital are particularly significant for innovative and fast-growing SMEs, whether they represent pure capital investments or mezzanine investments, which combine both credit and capital-based investments. Although these companies comprise a small section of the SME sector, they are crucial for insuring the long-term competitiveness of a country in the market segments which are expanding (for instance, digital technology and information and communication technologies).

In developed countries, these financial instruments play a very important role in financing SMEs, while in our country they are still in development. In developed countries, it is the venture capital funds that are engaged in the financial instruments based on investments in company capital. Venture capital represents a special type of equity invested in business entities in the stages of their establishment, early development and expansion. Venture capital funds are most commonly established in the form of a limited partnership, a limited liability company or a joint-stock company, they manage the private equity of investors and invest it in the form of capital stock or equity participation of SMEs with high developmental potential in the stages of their establishment, early development and expansion (hereinafter: venture capital funds). In the Republic of Serbia, in addition to the sporadic investments of venture capital funds registered abroad, several investments of the European Bank for Reconstruction and Development have been recorded, through the Local Enterprise Facility (LEF) program, as well as the investments of the Small Enterprise Assistance Fund (SEAF).

Investment in the capital of potentially rapidly growing enterprises is also conducted by “business angels”, natural persons who invest their own private capital, knowledge and experience in start up companies with high developmental potential, in the early stages of their establishment and development, in exchange for ownership equity (hereinafter: business angels). The first network of business angels – the Serbian Business Angels Network (SBAN), has been established in the Republic of Serbia, which is yet to develop and commence with investments, as well as the Serbian Private Equity Association (SPEA).

Since 2006, the Ministry in charge of education and science has, within the framework of grants, provided support to newly founded, innovative companies, as well as support for the commercialization of research and the further development of innovative enterprises, through programs of support that were adopted in accordance with the law regulating innovation activity, as well as through the Innovation Fund from 2012, within the framework of IPA funds, the implementation of which is the responsibility of the World Bank.

Microfinancing is poorly represented in the Republic of Serbia, even though it represents an important alternative for economically weakest companies, which often cannot meet the

conditions for obtaining bank loans. The three organizations that operate in this field in the Republic of Serbia (Agroinvest, Micro Development Fund and MicroFinS) receive financial support from international donors, but they cannot place the funds directly, but through commercial banks, which significantly complicates the procedure and raises the price of these funds for their end users. In the countries of the EU, this type of financing comprises a significant part of the offer for micro and small enterprises, and also, large amounts of funds for this instrument are extracted from EU funds, e.g. through structural and cohesion funds within the program Joint Action to Support Microfinance Institutions in Europe (JASMINE). Other alternative forms of financing, such as leasing and factoring, are also not sufficiently developed in the Republic of Serbia.
Despite the unfavourable offer of loans from commercial banks, guarantee schemes and other alternative forms of financing have only just begun to develop in the Republic of Serbia. In addition to the first investments of venture capital funds and the initial activities of the SBAN, the development of the equity and mezzanine financing market is in its initial stages. In 2014, the Republic of Serbia took 79th place out of a total of 118 ranked countries according to The Venture Capital and Private Equity Country Attractiveness Index 2014 Annual.

There is no legal framework for the business operations of microfinance institutions, and the volume of leasing and factoring transactions is low. Under the EU Program for the Competitiveness of Enterprises and Small and Medium-sized Enterprises (COSME) and the Horizon 2020 Program (Horizon 2020), there are special financial instruments in the field of credit guarantees and capital-based investments, which can also be used by financial institutions from the Republic of Serbia, in order to offer better financing conditions to their users.

In addition to this, three instruments are available to the Republic of Serbia within the framework of the Western Balkan Business Development Program (WB EDIF), which is dedicated to SMEs in the region for financing innovative business projects: the Enterprise Expansion Fund (ENEF), through which it is possible to provide Investments in the capital of fast growing enterprises, the Enterprise Innovation Fund (ENIF), through which it is possible to provide venture capital investments for newly founded innovative companies and guarantee schemes that can be used by banks.

In order to reduce the difficulties that SMEs encounter in terms of access to loans due to the lack of collaterals or an increased funding risk, efforts should be continued to address the issue of collaterals, through the adoption of legislation for the establishment and operation of national, local and mutual loan guarantee schemes and the development of a national guarantee scheme.

In order to develop an environment for venture capital investments, equity investments, mezzanine financing and investments of business angels in SMEs, it is necessary to provide an appropriate legislative framework, establish a database of venture projects suitable for capital-based investments and establish a fund for joint investments in innovative enterprises with private funds. It is necessary to increase the use of funds from COSME and Horizon 2020 programs and the Western Balkan Enterprises and Innovation Program (WB EDIF) that are available to the Republic of Serbia.

Given that, in the Republic of Serbia, there is currently no legal framework for the realization of microfinance support, the microfinance sector activities are implemented through guarantee deposit schemes, so that the microfinance sector provides guarantee deposits to banks. In this way, the access to funds for micro-enterprises and entrepreneurs is more complex and more expensive. It is therefore necessary to establish a regulatory framework for the establishment and operation of non-banking non-deposit credit institutions, which would determine the licensing and supervision procedure for all types of specialized credit institutions that do not receive deposits from citizens.

The activity of leasing and factoring companies is regulated by law, but with the aim of increasing the volume of transactions, it is necessary to remove the regulatory constraints encountered by them and bring these financing sources closer to SMEs.
It is necessary to implement long-term measures for raising awareness and prepare entrepreneurs, business people, financial intermediaries and advisers for a greater use of alternative sources of financing, by intensifying the training in the area of investment readiness for enterprises and familiarizing them with the characteristics of capital-based investments, organizing meetings of potential Investors and SMEs, improving the availability of information on various available funding sources and their characteristics, and encouraging financial intermediaries to use the financial instruments available through EU programs (COSME, WB EDIF, Horizon 2020).

The EU's long-term competitiveness is based on knowledge and innovation, and allocations for research, development and innovation are high. In the financial perspective from 2007 to 2013, more than 50 billion Euros were available for research and development in the Seventh Framework Program (FP7), while 3.6 billion Euros were available through the Competitiveness and Innovation Program (CIP). For the financial perspective (from 2014 to 2020), the EU had planned even more funds. Through the COSME program, 2.3 billion Euros were dedicated, and through the Horizon 2020 program, the amount was as high as 80 billion Euros.

Innovation represents the application of a new or significantly enhanced product, process or service or marketing method or new organizational method, in business activities, work organization or relationships of an enterprise with its environment.
Innovation is any technological or non-technological improvement that creates added value (hereinafter: innovation). The economy of the Republic of Serbia is still characterized by a low level of innovation.

The web site Godina preduzetništva (The Year of Entrepreneurship), provides an overview of all current competitions intended for innovations, as well as of the closed competitions for the current year. http://godinapreduzetnistva.rs/Inovacije.aspx?id=17
Developmental projects: Financial support for developmental projects for entrepreneurs, micro and small legal entities (the Ministry of Economy and the Development Fund) http://godinapreduzetnistva.rs/Inovacije.aspx?id=19&idjezik=1
Funding of innovation projects: Financial support for innovation projects of legal and natural persons and innovation organizations, for the infrastructural support of innovation activities

(business and technology incubators and science and technology parks) – COMPETITION IS CLOSED – Ministry of Education, Science and Technological Development.
Competition for the Best Technological Innovation of 2017 – THE COMPETITION IS CLOSED FOR THIS YEAR – Ministry of Education, Science and Technological Development, Faculty of Technical Sciences, University of Novi Sad and Faculty of Technology and Metallurgy, University of Belgrade.
Support for innovative SMEs: A program for providing support to micro, small and medium-sized companies and entrepreneurs – RAS – competition extended until May 19, 2017.
The Early Development Program and the Innovation Co-funding Program – the Ministry of Education, Science and Technological Development provides funding and the holder is the Innovation Fund.

In the previous period, the implementation of various measures aimed at linking science and economy, such as the activities concerning the reorganization of science and technology institutes, the establishment of technology transfer centres and the network of technology brokers, has begun. Since the establishment and activation of the Innovation Fund, the support to high-tech start up companies has significantly improved.

The Innovation Fund has, on June 1, 2017, at a solemn assembly held at the Science and Technology Park, announced a continuation of its two programs of support for domestic innovation companies – the Early Development Program and the Innovation Co-funding Program. These programs are intended for the development of innovative technologies, products and services with market application and great potential for commercialization.

Under the Early Development Program, the Fund awards grants up to EUR 80,000 per project. The program is designed with an intention to support the survival of companies during the critical phase of research and development, and enable Serbian entrepreneurs to develop effective business capacities through which they will place their innovations on the market.
Within the framework of the Program for Co-Funding Innovations, the Fund awards grants of up to EUR 300,000 per project. This program is intended for companies that need significant financial resources for the realization of the development cycle of technological innovations and for covering the high costs of transferring research into a commercially viable product.

Companies can register a project from any field of science and technology and from any industry sector. The deadline for submitting applications starts today and runs **until September 1, at 3 pm**.

The funds for the renewal of these programs were provided from the budget of the Republic of Serbia, from the section belonging to the Ministry of Education of Science and Technological Development, through the Competitiveness and Jobs Project, which Serbia is implementing in cooperation with the World Bank. For the year 2017, a total of EUR 2.7 million has been allocated. These programs were implemented by the Fund as pilot activities from 2011 to 2016 under the Innovation Serbia Project. They were financed with a total of 6 million Euros from EU

IPA funds. A total of 41 projects under the Early Development Program and 11 projects under the Innovation Co-funding Program were supported.

They have resulted, among other things, in the creation of 300 new work places, the multiplication of revenues and company exports, as well as in the protection of dozens of patents in the domestic and foreign markets. About one third of the projects funded under these two programs have included the cooperation of economy and science.

They have proved themselves as a long-term sustainable funding mechanism that yields results even after the completion of the innovative projects themselves. These are also the first pilot programs that became a part of the permanent portfolio of services of the Innovation Fund.

The realization of the program for the implementation of joint innovative projects conducted by the representatives of economy and science and research organizations, as well as the competitions and other activities that promote innovation, has continued. The support for the strengthening of the innovation system and the promotion of innovations has, in the previous period, also been provided by projects funded from the IPA funds and by other donors, and through the participation of the Republic of Serbia in EU programs regarding this area, greater opportunities for funding innovative activities have been created.

However, one of the biggest weaknesses in the field of innovation development remains the weak link between science and research institutions and SMEs. SMEs do not regard science and research institutions as potential partners, while researchers do not recognize their target group in SMEs and consider that there is no significant demand for new technological solutions in the economy. Therefore, with an increase in investments in science, it is important to establish links and a cooperation between the economy and the science and research institutions, direct science and research institutions to adapt their work to the needs of the economy to the greatest extent possible and raise the awareness of entrepreneurs about the importance of innovations for improving their competitiveness.

In the upcoming period, it is very important to build and strengthen the capacities of the national innovation system as a whole, which will effectively enable the linking of science and economy and support the highly innovative SMEs, allow greater use of EU program funds available for these purposes, and encourage companies to think innovatively. It is also necessary to provide support for eco-innovations, the improvement of energy efficiency and the efficiency of resource use in SMEs and the development of innovative entrepreneurial ventures in the field of creative industries.

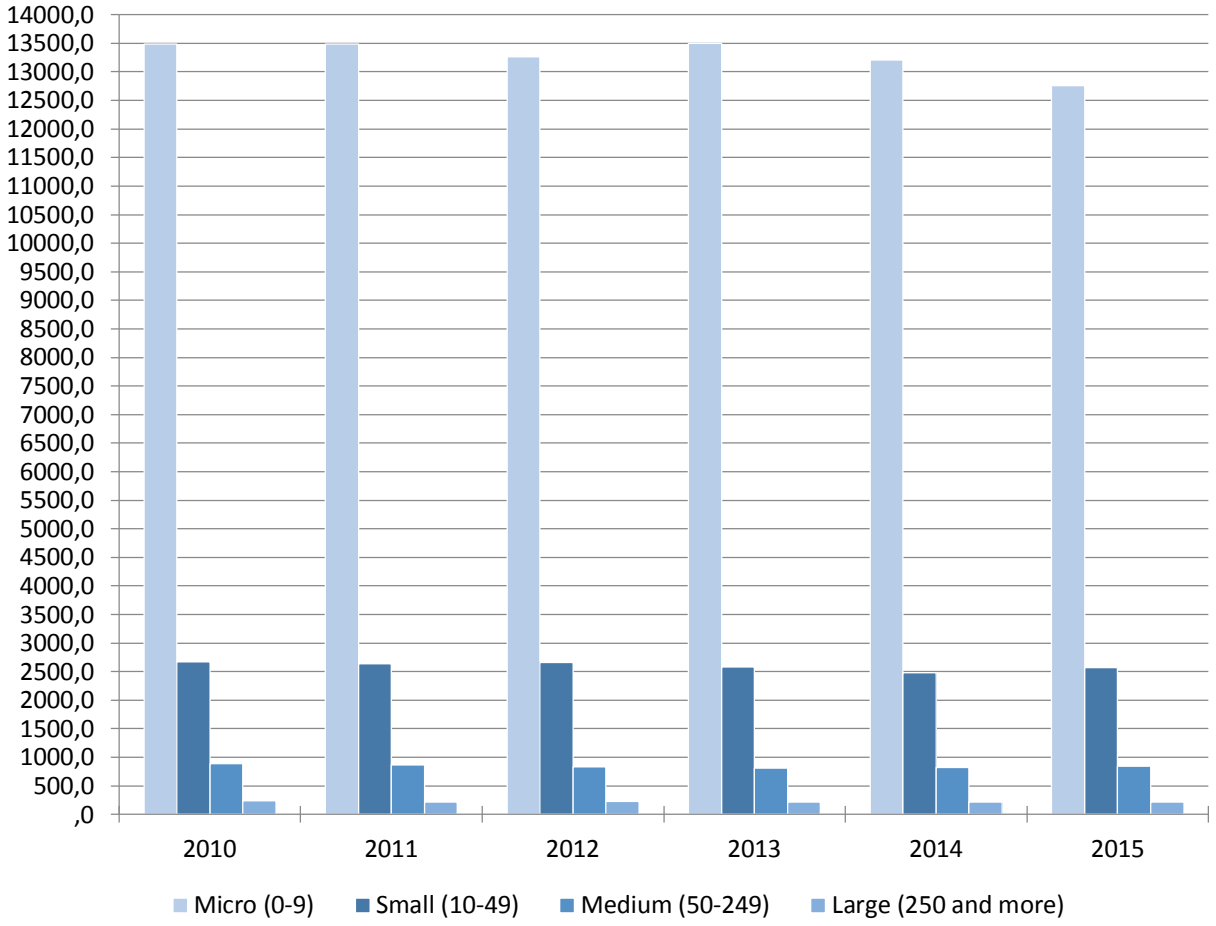
Considering all the problems faced by the domestic processing industry, it is necessary to encourage investments in new technologies, processes and services, as well as investments in the development of new products with higher added value, that meet European and international standards, in order to strengthen the competitive position. By analysing the structure of imports of the Republic of Serbia, it can be noticed that a large number of imported products are already being produced in the Republic of Serbia or that there are potentials for their production.

The aim of the incentive measures is to increase the competitiveness of exporting companies and their products with a higher share of domestic raw materials and components in the product, taking into account the economic viability and not compromising market competition, as well as expanding the production structure of domestic producers.

5 Trends in the manufacturing sector

Relevant manufacturing trends based on Eurostat and Statistical Office of the Republic of Serbia[1] statistical data are presented in this chapter.
Indicator presented on Figure 1 covers the number of enterprises active at least in one portion of the reference period (2010-2015). The data is broken down by size classes of persons employed.

Figure 1: Number of enterprises in manufacturing, by classes of persons employed

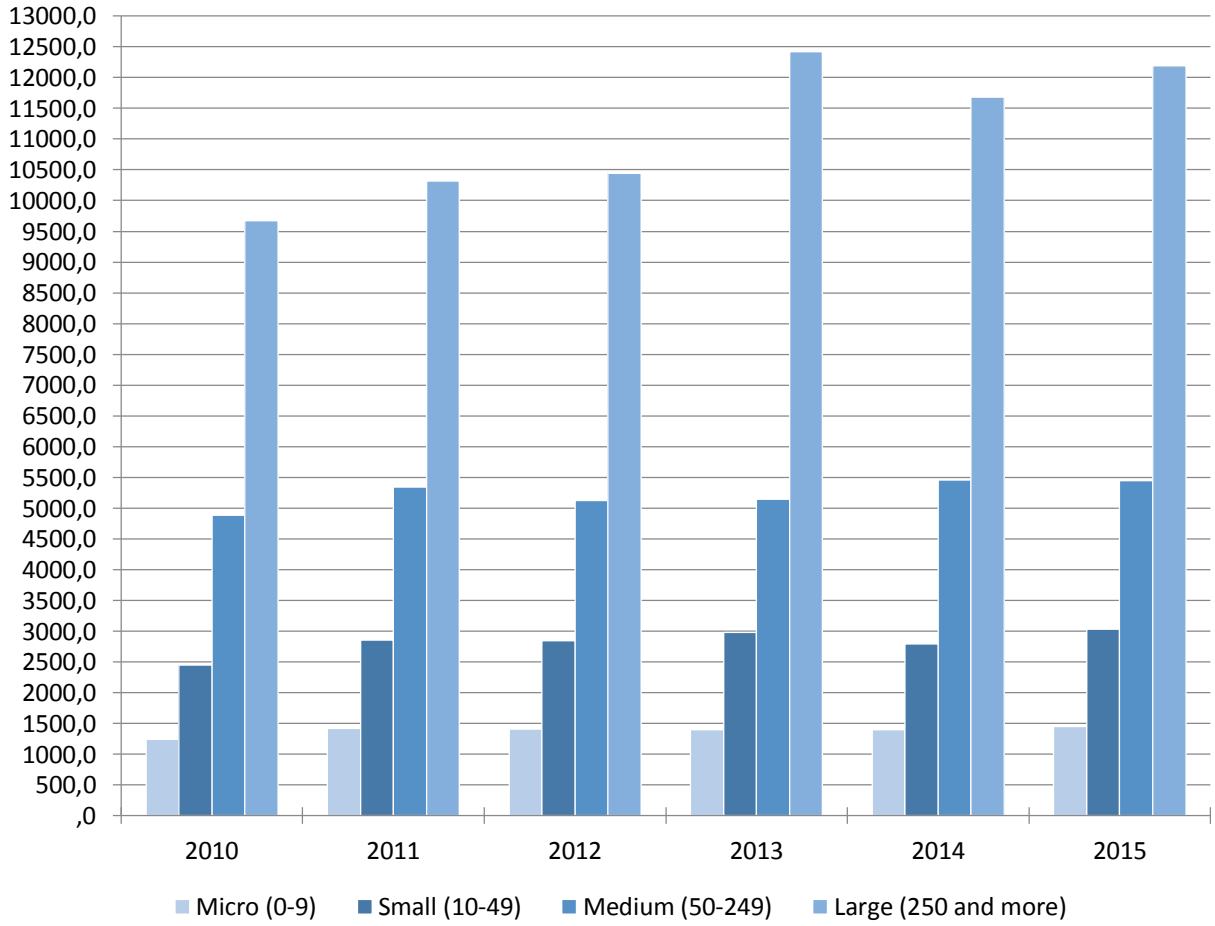


Source: Statistical Office of the Republic of Serbia.

[1] Data are presented according to the principal activity of the unit, which implies that when a legal entity is engaged in a few activities, its total performance is imputed to its principal activity.

Turnover comprises the totals invoiced by the observation unit during the reference period, which corresponds to market sales of goods and services to third parties. Turnover includes all duties and taxes (except VAT and similar deductible taxes), as well as all other charges passed on to the customer (transport, packaging, etc). Excluded are reduction in prices, rebates and discounts, value of returned packing, as well as subsidies, financial, extraordinary and other incomes.

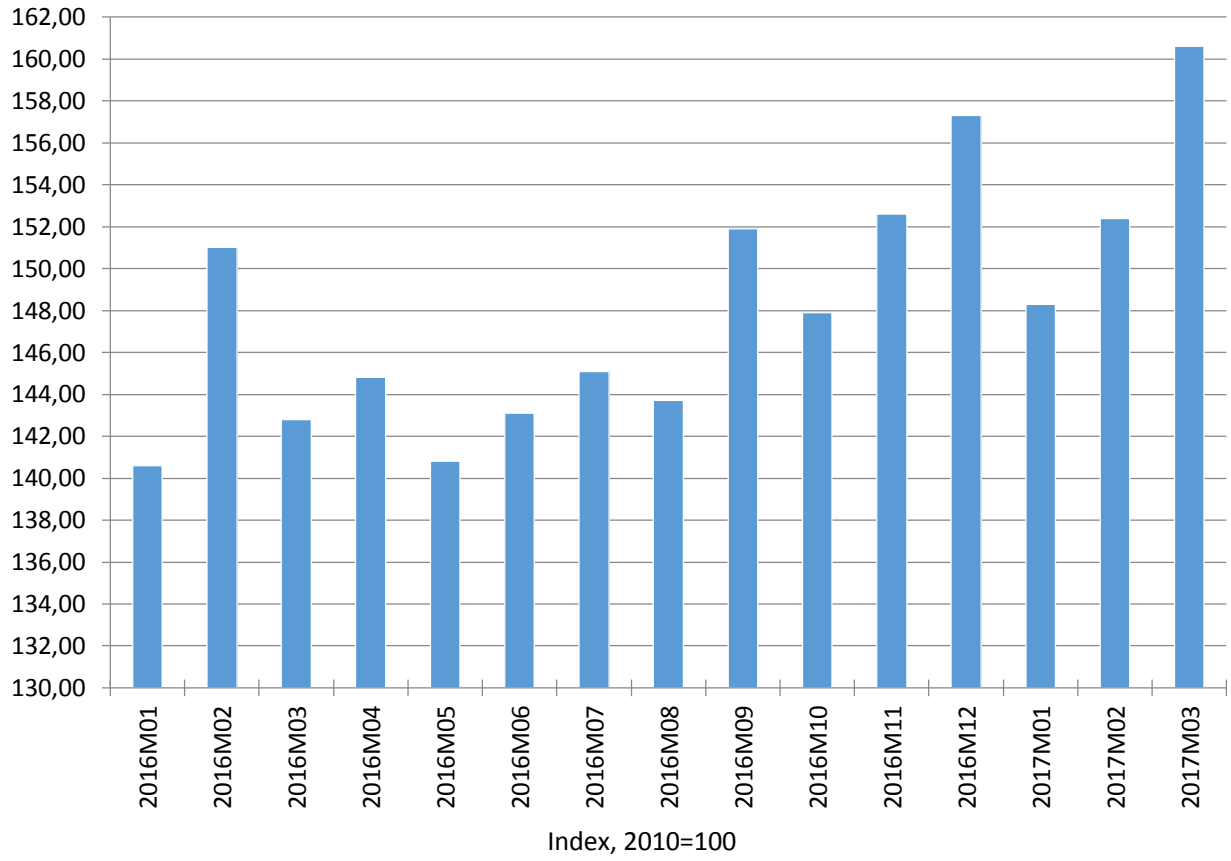
Figure 2: Turnover in manufacturing, by classes of persons employed, in mil EUR



Source: Statistical Office of the Republic of Serbia.

The Turnover Index presented on Figure 3 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. The objective of the turnover index is to show the development of the market for goods and services. Turnover comprises the totals invoiced by the observation unit during the reference period, and this corresponds to market sales of goods or services supplied to third parties. Turnover also includes all other charges (transport, packaging, etc.) passed on to the customer, even if these charges are listed separately in the invoice. Turnover excludes VAT and other similar deductible taxes directly linked to turnover as well as all duties and taxes on the goods or services invoiced by the unit. The indices of domestic and non-domestic turnover require turnover to be split according to the first destination of the product based on the change of ownership. The destination is determined by the residency of the third party that purchased the goods and services. Non-domestic turnover is further sub-divided into turnover despatched to euro-zone countries and all other non-domestic turnover.

Figure 3: Index of turnover in manufacturing, monthly data (seasonally and calendar adjusted data); Eurostat estimate (phased out)

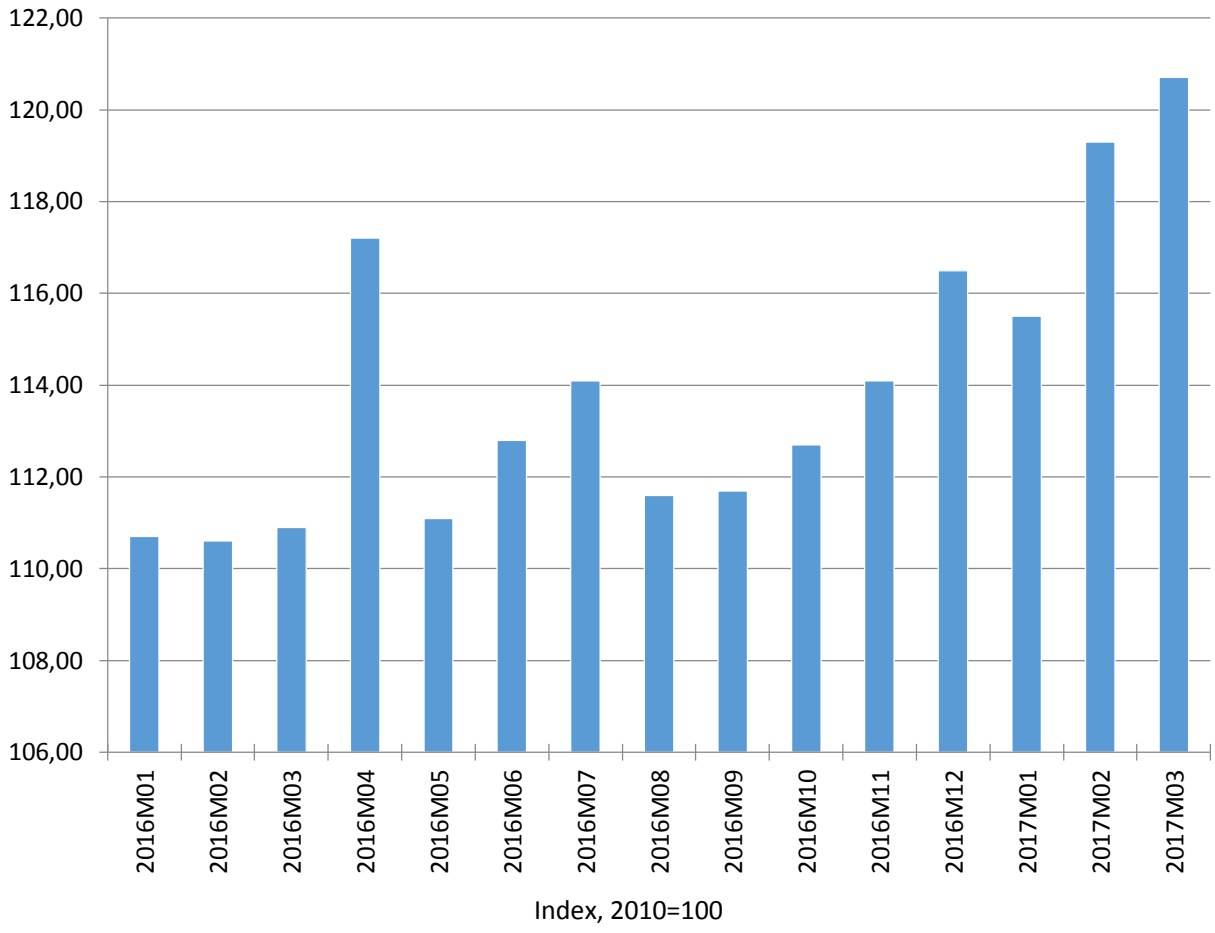


Source: Eurostat.

Note: starting from 1999 the Statistical Office of the Republic of Serbia has not at disposal and may not provide available certain data relative to AP Kosovo and Metohija and therefore these data are not included in the coverage for the Republic of Serbia (total).

The industrial production index presented on Figure 4 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 4: Volume index of production in manufacturing, monthly data (seasonally and calendar adjusted data)



Source: Eurostat.

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 3: Smart Factory related projects - extract

Main applicant country	Project name	Programme name	Year from:	Year to:
SI	SMART FACTORY HUB	Danube	2016	2019
IT	SMART INNO	IPA ADRIATIC PROGRAM	2012	2014
IT	EASYCONNECTING	IPA ADRIATIC PROGRAM	2012	2014
RS	MEDOCE	KEP AUSTRIA	2015	2016

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 4. The data is collected in Annex XLS file – sheet “Reg. actors”.

Table 4: List of regional actors – users

Name	Institution type	Industry sector	Service type 1	Service type 2	SFH relevance (user/solution provider)	Adress	Phone	e-mail	Webpage links
ASTRON d.o.o.	SME	Electrical and electronic engineering industries	Research and dev.	Engineering	Solution provider	Cesta XIV. divizije 51, 2000 Maribor, Slovenia	+386 2 620 55 70	info@astron.si	http://www.astron.si/
ATES D.O.O.	SME	Electrical and electronic engineering industries	Engineering	Consulting	Solution provider	Mroževa ul. 21, 2310 Slovenska Bistrica	02 845 3201	info@ates.si	www.ates.si
Atrium d.o.o.	SME	OTHER	Manufacturing		User	Kolodvorska 28 9240 Ljutomer Slovenija	+386 2 584 90 70		http://www.atrium-pohistvo.com/
Bent Excellent d.o.o.	SME	Electrical and electronic engineeri	Engineering	Services	Solution provider	Dragomelj 82, 1230 Domzale		masa.koren@bent.si	www.bent.si

		ng industries							
Castoola d.o.o.	SME	Electrical and electronic engineering industries	Services	Engineering	Solution provider	Plese 9a, 9000 Murska Sobota	+386 2 530 8210	info@castoola.com	www.castoola.com
CBRZNET d.o.o.	SME	Electrical and electronic engineering industries	Engineering	Services	Solution provider	Plese 9a, 9000 Murska Sobota		info@centerbrezzicnosti.si	info@centerbrezzicnosti.si
Elektromaterial d.o.o.	Large Enterprise	Electrical and electronic engineering industries	Manufacturing	Engineering	User	Kolodvorska 8 9220 LENDAVA SLOVENIJA – EU	+386 2 578 91 00	info@elektromaterial.si	www.elektromaterial.si
ELMITEL d.o.o.	SME	Electrical and electronic engineering industries	Engineering	Research and dev.	Solution provider	Orehovci 1A, 9250 Gornja Radgona	+386 41 646 945	info@elmitel.com	www.elmitel.com www.evineyardapp.com

ELRAD INTERNATIONAL d.o.o.	Large Enterprise	Electrical and electronic engineering industries	Manufacturing		User	Ljutomerska cesta 47, 9250 Gornja Radgona, Slovenija	+386 2 568 4 300	info@elrad-int.si	www.elrad-int.si
EMO ORODJARNA d.o.o.	SME	Mechanical engineering	Manufacturing	Research and dev.	Solution provider	Bežigrajska cesta 10, 3000 Celje, Slovenija	+386 3 42 82 100	info@emo-orodjarna.si	www.emo-orodjarna.com
Farmtech d.o.o.	SME	Mechanical engineering	Manufacturing		User	Industrijska ulica 7 SI-9240 Ljutomer Slovenia			www.farmtech.eu
Fotona d.o.o.	SME	Electrical and electronic engineering industries	Research and dev.	Engineering	User/Solution provider	Stegne 7, 1000 Ljubljana, Slovenija	+ 386 1 500 91 00	info@fotona.si	http://www.fotona.com
GOAP d.o.o.	SME	Electrical and electronic engineering industries	Manufacturing	Research and dev.	User/Solution provider	Ulica Klementa Juga 7 5250 Solkan Slovenia (EU)	+386 5 3359 500		http://goap.eu/

GORENJE ORODJARNA d.o.o.	Large Enterprise	Mechanical engineering	Engineering	Manufacturing	User	Partizanska 12, 3503 Velenje, p. p. 107, Slovenija	+386 3 899 2364	info@gorenje-orodjarna.si	www.gorenje-orodjarna.si
GOSTOL-GOPAN D.O.O.	SME	Mechanical engineering	Engineering	Manufacturing	Solution provider	Prvomajska ulica 37, 5000 Nova Gorica	05 330 7100	info@gostol.eu	www.gostol.eu
KOGAST GROSUPLJE D.D.	SME	Food industry			User	Adamičeva cesta 36, 1290 Grosuplje	01 786 6300	info@kogast.si	www.kogast.si
Kolektor Sisteh d.o.o.	Large Enterprise	Electrical and electronic engineering industries	Engineering	Research and dev.	Solution provider	Šlandrova ulica 10, 1231 Ljubljana		sisteh@kolektor.com	www.kolektorsisteh.com
Laboratory for Electronic and Information Systems LEIS – R&D Activities	R&D center	Electrical and electronic engineering industries	Research and dev.	Education/Training	Solution provider	Smetanova ulica 17 2000 Maribor Slovenia	+386 2 220 71 78	leis.feri@um.si	https://www.leis.um.si/en/

LES & VEHO D.O.O.	SME	Food industry			User	Dobro Polje 3, 4243 Brezje	04 533 8138	info@mizarstvo-sivic.com	www.mizarstvo-sivic.com
LIMOS D.O.O.	SME	Food industry	Engineering	Manufacturing	Solution provider	Kidričeva cesta 51, 4220 Škofja Loka	04 513 4333	info@limos.si	www.limos.si
Litostroj Ravne d.o.o.	SME	Mechanical engineering	Engineering	Manufacturing	Solution provider	Koroška cesta 15, 2390 Ravne na Koroškem, Slovenia	+386 2 870 7859	info@litostrojravne.com	http://www.litostrojravne.com/
LPKF Laser & Electronics d.o.o.	SME	Electrical and electronic engineering industries	Engineering	Research and dev.	Solution provider	Polica 33, 4202 Naklo, Slovenija	+386 592 08 800	info@lpkf.si	http://www.lpkf.si/
Medicop d.o.o.	SME	OTHER	Manufacturing	Engineering	User	Obrtna 43 SI-9000 Murska Sobota Slovenia	+386 2 539 12 50	info@medicop.si	www.medicop.eu

MENART d.o.o.	SME	Mechanical engineering	Engineering	Manufacturing	User	Poljska cesta 21, 3210 Slovenske Konjice, Slovenija	+386 3 758 08 60	menart@menart.net	www.menart.net
METERA d.o.o.	SME	Electrical and electronic engineering industries	Engineering	Research and dev.	Solution provider	Stegne 23A, 1000 Ljubljana		info@metera.si	www.metera.si
Metronik d.o.o.	SME	Mechanical engineering	Engineering	Research and dev.	Solution provider	Stegne 9a, 1000 Ljubljana, Slovenia	+3861 514 0800	aleksander.temeljotov@metronik.si	http://www.metronik.si/
MIEL Inženiring d.o.o.	SME	Electrical and electronic engineering industries	Engineering	Research and dev.	Solution provider	Efenkova cesta 61, 3320 Velenje, Slovenija	+386 3 898 57 54	info@miel-i.si	www.miel-i.si
Miniplast d.o.o.	SME	OTHER	Manufacturing		User	Plese 9a 9000 Murska Sobota Slovenija	+386 41 610 341	miniplast.si@gmail.com	www.miniplast.si

MITHRAEUM D.O.O.		Food industry			User	Lokve 10 b, 8340 Črnomelj	+386 7 356 7410	info@mithraeum.si	www.mithraeum.si
MODRI PLANET d.o.o.	SME	OTHER	Services	Research and dev.	Solution provider	Vojkova cesta 45, 1000 Ljubljana, Slovenija	+386 41 632 038	info@modriplanet.si	www.3Dsurvey.si
ORTOTIP d.o.o.	SME	Mechanical engineering	Engineering	Services	User/Solution provider	Obrtna ulica 40, 9000 Murska Sobota, Slovenija	+386 70 750 419	info@ortotip.com	www.ortotip.com
Pipistrel d.o.o., 3D Studio Pipistrel	SME	Aeronautics industries	Manufacturing	Research and dev.	User	Goriška cesta 50, 5270 Ajdovščina, Slovenija	+386 5 36 63 873	info@pipistrel.si	www.pipistrel.si
ROBOTEH d.o.o.	SME	Mechanical engineering	Manufacturing	Research and dev.	User/Solution provider	Goričica 2b, 3230 Šentjur, Slovenija	+386 3 746 42 44	office@roboteh.si	www.roboteh.si
ROBOTINA d.o.o.	SME	Electrical and electronic engineering	Engineering	Services	Solution provider	OIC Hrpelje 38, 6240 Kozina, Slovenija	+386 5 689 2020	info@robotina.com	www.robotina.com

		industries							
ROTO INOX D.O.O.	SME	OTHER			User	Prvomajska ulica 39, 5000 Nova Gorica	+386 5 330 6350	rotoinox.ng@siol.net	
SALVIRT	SME	OTHER	Education/Training	Research and dev.	Solution provider	Dunajska cesta 136, 1000 Ljubljana		info@salvirt.com	www.salvirt.com
ŠKRLJ D.O.O.	SME	Food industry			User	Dunajska cesta 196, 1000 Ljubljana	+386 5 364 3500	sk@sk-group.biz	www.sk-group.biz
SOLOPEX d.o.o.	SME	Electrical and electronic engineering industries	Engineering	Research and dev.	Solution provider	Pionirska cesta 9, 1360 Vrhnika		info@solopex.com	www.solopex.com
Špica International d.o.o.	SME	Electrical and electronic engineeri	Services	Engineering	Solution provider	Pot k sejmišču 33 1231 Ljubljana, Slovenija	+386 1 568 08 00	info@spica.com	http://www.spica.si

		ng industries							
Šumer d.o.o.	SME	Mechanical engineering	Manufacturing	Research and dev.	User	Cesta v Celje 2, 3202 Ljubečna, Slovenia	+386 3 780 6210	info@sumer.si	www.sumer.si
TALISMAN D.O.O.	SME	Mechanical engineering	Engineering	Services	Solution provider	Bobovek 31, 4000 Kranj	04 253 5340		www.talisman.si
TECOS, Slovenian Tool Development Center	SME	Mechanical engineering	Engineering	Research and dev.	Solution provider	Kidričeva ulica 25, 3000 Celje, Slovenia	+386 3 490 09 20	info@tecos.si	www.tecos.si
Telos d.o.o.	SME	Electrical and electronic engineering industries	Engineering		Solution provider	Seljakovo naselje 42, 4000 Kranj, Slovenija	+386 40 295 713	info@telos.si	http://www.telos.si
TITERA d.o.o.	SME	Textiles, Fashion and	Research and dev.	Engineering	User	Obrtna ulica 40, 9000 Murska		info@titerad.com	www.titerad.com

		creative industries				Sobota, Slovenija			
TRANSPAK d.o.o.	SME	Mechanical engineering	Engineering	Research and dev.	User/Solution provider	Noršinska ulica 27 9000 Murska Sobota, Slovenija	+386 2 534 11 68	info@transpak.si	www.transpak.si
USOL d.o.o.	SME	Electrical and electronic engineering industries	Manufacturing	Engineering	User	Kolodvorska ulica 43, 9220 Lendava	+386 82 053 980	stanislav.sobocan@usol.si	www.usol.si
VAR d.o.o.	SME	Mechanical engineering	Engineering	Manufacturing	User/Solution provider	Panonska 23, 9250 Gornja Radgona, Slovenija	+386 2564 8910	info@var.si	www.var.si
VARSTOJ d.d.	SME	Mechanical engineering	Manufacturing	Engineering	User	Industrijska ulica 4, 9220 Lendava, Slovenija	+386 2 5788 821	info@varstroj.si	www.daihen-varstroj.si

VIPOLL d.o.o.	SME	Mechanical engineering	Engineering		User/Solution provider	Bučečovci 1a, 9242 Križevci pri Ljutomeru, Slovenija	+386 2 588 8450	vipoll@vipoll.si	www.vipoll.si
GALENIKA FITOFARMACIJA A.D.	SME	Chemicals	Manufacturing		User	Batajnički Drum bb, 11080 Zemun, Srbija	+381 30 72 303	stamenkovic@fitofarmacija.rs	www.fitofarmacija.rs
SCGM DOO KRAGUJEVAC	SME	Chemicals	Manufacturing		User	19. Oktobra 2, 34000 Kragujevac, Srbija	+381 62 22 85 60	scadjenovic@scgm.com	www.scgm.com
AD IZOLIR	SME	Construction	Manufacturing		User	Novosadski put bb, 23000 Zrenjanin, Srbija	+381 23 561 791	office@izolir.rs	www.izolir.rs
Jasimpex DOO	SME	Textiles, Fashion and creative industries	Manufacturing		User	Beogradski put 147, 24000 Subotica, Srbija	+381 64 277 98 77	info@jasimpex.rs	www.jasimpex.rs
Luss Investment doo	SME	Textiles, Fashion and creative	Manufacturing		User	Tošin bunar 161, 11070 N.Beograd, Srbija	+381 63 403 977	sava.mitrovic@luss.rs	www.luss.rs

		industries							
FORMA VS	SME	Textiles, Fashion and creative industries	Manufacturing		User	Serdar Janka Vukotića 10, 11030 Beograd, Srbija	+381 62 222 101	vanja@formavs.com	http://formavs.com/
OBUĆA MARKO	SME	Textiles, Fashion and creative industries	Manufacturing		User	Batajnički put 23, 11080 Zemun, Srbija	+381 11 307 324	m.babic@obucamarko.co.rs	www.obucamarko.co.rs
PALETA DOO	SME	Textiles, Fashion and creative industries	Manufacturing		User	Maršala Tita 12, 26210 Kovačica, Srbija	+381 63 333 067	doopaleta@gmail.com	www.paletatextil.com
MINEX DOO	SME	Textiles, Fashion and creative industries	Manufacturing		User	Nemanjina 83, 17000 Vranje, Srbija	+381 69 285 11 11	minexex@ptt.rs	www.minex-vranje.co.rs

KONFEKCIJA ELIPSA DOO	SME	Textiles, Fashion and creative industries	Manufacturing		User	Radnički Bataljon 22, 36000 Kraljevo, Srbija	+381 63 611 865, +381 36 373 765	elilpsa@elipsa.rs	http://elipsa.rs
Recika doo	SME	Textiles, Fashion and creative industries	Manufacturing		User	Donja Kamenica bb, 19352 Knjaževac, Srbija	+381 65 4444 540	oliver.jelenkovic@menner.biz	/
Fori textile ser d.o.o	SME	Textiles, Fashion and creative industries	Manufacturing		User	Stojana Protica bb, 34000 Kragujevac, Srbija	+381 34 240 402	Daliborka.milicevic@foritextile.rs	www.zastavatapacirnica.rs
Elevator doo	SME	Mechanical engineering	Manufacturing		User	IX brigade 39A, 18110 Niš, Srbija	+381 18 245 688	momcilo.jankovic@elevator.rs	www.elevator.rs
Triplast d.o.o.	SME	Chemicals	Manufacturing		User	Janisa Janulisa prilaz 9, Niš, Srbija	+381 18 214 330	triplast.nis@mts.rs	http://triplast.rs

Doo Exkluziv	SME	Textiles, Fashion and creative industries	Manufacturing		User	Toplička 7, 18340 Kuršumlija, Srbija	+381 27 381 343	milenkovic.srdjan@gmail.com	/
Adient Seating doo	SME	OTHER	Manufacturing		User	Oktobarskih žrtava bb, 34000 Kragujevac, Srbija	+381 69 804 40 01	dragana.maljkovic@adient.com	www.adient.com
”Foka”d.o.o.	SME	Chemicals	Manufacturing		User	Kragujevačka 10, 32300 Gornji Milanovac, Srbija	+381 32 720 635 +381 63 621 036	a.ilic@foka.rs	www.foka.rs
STAX Tehnologies	SME	Mechanical engineering	Manufacturing		User	Konjevići bb, 32000 Čačak, Srbija	+381 32 545 9247	nenad@staxtechnologies.com	http://staxtechnologies.com
KVARC D.O.O.	SME	Raw materials, metals, minerals and forest-	Manufacturing		User	Vlaško polje bb, 11406 Vlaška, Srbija	+381 60 33 800 57	office@novikvarc.rs	www.novikvarc.rs

		based industries							
ADECO doo	SME	Chemicals	Manufacturing		User	Temerinski put 109, Novi Sad, Srbija	+381 21 678 88 80	nikola@adeco.rs	www.adeco.rs
VRŠKA-PRESS DOO	SME	Mechanical engineering	Manufacturing		User	Tot Ištvana 79, 23206 Zrenjanin, Srbija	+381 23 522 815	office@vrskapress.co.rs	http://vrskapress.eu
MEGAL AD	SME	Mechanical engineering	Manufacturing		User	Lopardinski put bb, 17520 Bujanovac, Srbija	+381 17 651 404	admegal@yahoo.com	http://megal.co.rs
KERAMIKA LESKOVAC DOO	SME	Chemicals	Manufacturing		User	Tome Kostića bb, 16000 Leskovac, Srbija	+381 63 402 657	zorankeramika@gmail.com	http://www.keramika-le.rs
HI Župa doo	SME	Chemicals	Manufacturing		User	Šandora Petefija bb, 37000 Kruševac, Srbija	+381 63 58 33 62	office@hizupa.rs	http://www.hizupa.rs

GRO-AS D.O.O.	SME	Mechanical engineering	Manufacturing		User	Kruševačka br. 18, 37230 Aleksandrovac , Srbija	+381 37 3555 382	office@groas.rs	http://groas.rs
TID 1990	SME	Textiles, Fashion and creative industries	Manufacturing		User	Moravska 10, 37252 Jasika, Srbija	+381 62 147 62 64	Tid1990office@gmail.com	

Identified potential solution providers for Smart Factories are presented in Napaka! Vira sklicevanja ni bilo mogoče najti..

A number of companies presented in **Table 5** was identified for acting as potential user and also solution provider for Smart Factories.

Table 5: List of regional actors - Users/solution providers

Name	Institution type	Industry sector	Service type 1	SFH relevance (user/solution provider)	Adress	Phone	e-mail	Webpage links
SIGMA DOO KULA	SME	OTHER	Manufacturing	User/Solution provider	Ivana Milutinovića 77, 25220 Crvenka, Srbija	+381 25 731 805	office@hlorogen.com	http://www.sigmakula.co.rs/
FORMA VS	SME	Textiles, Fashion and creative industries	Manufacturing	User/Solution provider	Serdar Janka Vukotića 10, 11030 Beograd, Srbija	+381 62 222 101	vanja@formavs.com	http://formavs.com/
P...S... FASHION DESING	SME	Textiles, Fashion and creative industries	Manufacturing	User/Solution provider	Bogićevićeva 8, 32000 Čačak, Srbija	+381 32 310 200 +381 64 82 10 500	predrag.pantovic@ps.rs	www.ps.rs
WELTEX	SME	Textiles, Fashion and creative industries	Manufacturing	User/Solution provider	Đorđa Tomaševića 160, 32103 Čačak, Srbija	+381 32 545 85 86 +381 32 545 84 86	contact@weltex.net	www.weltex.net
ELECTRONIC DESIGN doo	SME	Electrical and electronic engineering	Manufacturing	User/Solution provider	Makenzijeva bb, 11000 Beograd, Srbija	+381 11 308 5030	ed@ed.rs	www.ed.rs

		industries						
KRYOOPREMA doo	SME	Mechanical engineering	Manufacturing	User/Solution provider	Dragoslava Srejovića 1b, 11000 Beograd,	+381 13 301 245	info@kryooprema.com	www.cryooprema.com
MIKRO KONTROL doo	SME	Mechanical engineering	Manufacturing	User/Solution provider	Vase Pelagića 30, 11000 Beograd,	+381 11 369 9080	office@mikrokontrol.rs	www.mikrokontrol.rs
PROSMART doo	SME	Electrical and electronic engineering industries	Manufacturing	User/Solution provider	Dr Agostina Neta 48, 11070 Novi Beograd,	+381 64 5464 36	slavisa.mijuskovic@prosmart.rs	www.prosmart.rs
HARDER digital SOVA	SME	Mechanical engineering	Manufacturing	User/Solution provider	Bul. Cara Konstantina 80, 18000 Niš,	+381 64 5464 36	branislav.brindic@hdsova.rs	www.harderdigital.com
SENTRONIS ad	SME	Mechanical engineering	Manufacturing	User/Solution provider	Aleksandra Medvedeva 14, 18115 Niš,	+381 18 588 404	info@sentronis.rs	www.sentronis.rs
SERVOTEH doo DOBANOVCI	SME	Mechanical engineering	Manufacturing	User/Solution provider	Ul. Ugrinovačka 163, 11272 Beograd – Dobanovci,	+381 60 3550020	office@servoteh.com	www.servoteh.com

7 List of annexes

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

Microsoft Excel
97-2003 Worksheet

Figure 1: FILE - D3.2.1_Regional mapping Database_SFH_v06_PTP.xlsx