



ProsperAMnet

Regional Strategic Action Report

D.T1.4.4

Country: Slovenia

Report written by PP04 Chamber of Commerce and Industry of Slovenia

Date: 30.8.2020

Version: final

Executive Summary

Servitization and service excellence are both strongly and directly related to innovation potential and innovation performance of firms, and countries in general. Since 2018, Slovenia has regressed from being a strong innovator to being only a moderate innovator according to the European Innovation Scoreboard. In some key innovation performance indicators (e.g. opportunity-driven entrepreneurship, knowledge-intensive services exports), Slovenia is considerably lagging behind the average of EU Member States. Regarding digital competitiveness (digitisation being very important for servitization potential), Slovenia ranks somewhere in the middle among EU Member States.

Main challenges regarding Slovenia's industrial service excellence are lack of skilled labour, population aging, Slovenian business environment not being in favour of industry and not stimulating new investments, obsolescence and non-flexibility of labour legislation, bureaucratized procedures. There is also a very minor support for the development of services in Slovenia by business support organizations and politics. Some service-performance leaders in the field of machinery and equipment production are presently not included in some of the Slovenian Strategic Research and Innovation Partnerships and therefore need to be included in the future. They also need to establish better cooperation with international associations.

For Slovenian advanced manufacturing firms, main challenges are risk assessment & key performance indicators for services, as well as network capabilities. Strengths of these firms are mainly partnership with customers and corporate culture. In general, services as enabler and non-financial performance show higher values than financial performance. This shows that it is easier for these companies to profit from the service business indirectly.

Based on specific regional challenges and needs, Slovenia's ambition is to increase its innovation performance and servitization substantially and thus become a strong innovator again (with innovation performance above or close to the EU average). It shall continue to increase labour productivity in services and its export market share of services. Also, it shall keep and strengthen its rank among EU countries regarding digital public services. In the report, numerous activities are presented that can be implemented in order to increase servitization and innovation performance of Slovenian (manufacturing) firms.

Slovenian advanced manufacturing companies shall either keep and strengthen their global position regarding service exports or expand their services to Europe as a whole and other continents. Slovenia's ambition is not only to be a provider of pre-sale services to other countries, but also to include other types of services in service export (expand the portfolio of exported services). Slovenia's supporting business environment shall move more closely towards the environment that is perceived by industrial firms as favourable to growth and development of their (exported) services.

Finally, service excellence is directly embedded into Slovenian RIS 3 strategy. Namely, RIS 3 is strategically oriented towards sustainable technologies and services for healthy living

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which shall position Slovenia as green, active, healthy and digital region with excellent conditions for creating and innovation, directed into development of middle- and high-tech solutions in niche areas. In these priority niche areas, Slovenia shall transition from follower to co-creator of global trends. Service excellence will be one of the main drivers for the success of RIS 3 implementation.

Main regional challenges and needs

According to the methodology of the European Innovation Scoreboard 2020 (Hollanders et al. 2020, 6), Slovenia is classified as a *moderate innovator* (innovation performance below EU average).¹ In macroeconomic terms, Slovenia's labour productivity in services has been growing since 2018, but also prices of services. It has a strong current account surplus in services and its export market share of services has been increasing and is expected to continue to do so. Slovenia has some specific regional challenges and needs regarding industrial service excellence, nevertheless, many of these challenges and needs are also shared (in different degrees) by other EU member states.

Key performance indicators regarding entrepreneurship and services

In 2019, Slovenia was considerably lagging behind EU average in KPI Opportunity-driven entrepreneurship (67 % relative to EU). Moreover, Slovenia's performance in this KPI has declined substantially since 2012 relative to EU average (in 2012, it was 192,8 % of EU average). In comparison to EU innovation leaders, Denmark scored 202,3, Finland 202,3, Luxembourg 122,2, the Netherlands 171,7 and Sweden 178,4 relative to EU 2019 in 2019. (Hollanders et al. 2020)

Regarding KPI Knowledge-intensive services exports, Slovenia was also substantially lagging behind EU average in 2019 (33 % relative to EU). However, this percentage has remained practically the same since 2012, when it was 33,5 % of EU average. In comparison to EU innovation leaders, Denmark scored 100,5, Finland 113,8, Luxembourg 147,6, the Netherlands 119,0 and Sweden 105,8 relative to EU 2019 in 2019. (*ibid.*)

Regarding KPI Employment in medium and high-tech manufacturing & knowledge-intensive services, Western Slovenia scored 150,17% in 2019 relative to 2011 and Eastern Slovenia scored 133,75% in 2019 relative to 2011 which means that both regions have considerably increased employment in the last decade in knowledge-intensive services (European Commission 2019). In 2019, both regions also scored noticeably higher in this KPI compared to EU average (Eastern Slovenia 120%, Western Slovenia 134%). Nevertheless, share of employment in total Services (G-N) was somewhat below EU average in 2019 in both of these regions (Hollanders et al. 2019).

One of the most important performance indicators for (potential) servitization is also digital competitiveness. In 2019, Slovenia ranked in the middle among EU Member States regarding DESI (Digital Economy and Society Index) score. Also, Slovenia ranks in the middle among EU Member States regarding DESI score growth between 2015-2020, which shows that Slovenia has made a noticeable progress in the overall level of digitisation of the economy and society in this time period. (European Commission 2020b, 13)

¹ Since 2012, innovation performance increased in 24 EU Member States and decreased in only three. Performance decreased the most in Slovenia and Romania.

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More specifically, in the performance indicator Online service completion (the extent to which the various steps needed for dealing with the public administration can be done completely online), Slovenia scored above 90 (interestingly, higher than Germany, Luxembourg and The Netherlands). The average answer time for contacting the emergency services was 6 seconds which is one of the fastest times among EU countries. Advanced mobile location (AML), a handset-based caller location solution that relies on GNSS and Wi-Fi signals, took off in Slovenia. Moreover, by the end of 2020, the EuroHPC JU will acquire and install a mid-to-high range (petascale) supercomputer in Slovenia. However, until the end of March 2020, Slovenia still has not assigned spectrum in the 5G pioneer bands. (European Commission 2020b)

Structure of Slovenia's service sector

Services represent 57 % of Slovenia's GDP in 2019.

Certain service sectors (e.g. wholesale and retail trade; professional, technical and scientific activities) have seen rapid catching up with the euro area average. This is possibly due to the market-opening measures taken after the crisis. Significant productivity gains have also been recorded in administrative and support services. This is largely due to the rapid productivity growth in private employment agencies. Two sectors have seen their productivity diverging further from the euro area average in recent years. The first of these is information and communication technology services, especially telecommunications. The second is the construction sector, which since 2009 has been faced with lower demand and structural changes. Productivity in Eastern Slovenia is lower than in Western Slovenia in all sectors except 'financial and other services'. (European Commission 2020a, 33).

Labour productivity grew by 2,3 % in 2018, substantially more than the average of the EU and the euro area. This helped Slovenia's ongoing process of convergence towards the average level of productivity in the euro area. Labour productivity growth in 2018 was especially concentrated in services but was weak in manufacturing. (*ibid.* 33)

Slovenia's current account has been in surplus since 2012. Although both goods and services balances are in surplus, the surplus in services is especially strong. (*ibid.* 9)

In the services sector, 22,8 % of employers reported labour shortages in 2019 (an increase of 2.6 percentage points (hereafter, pps) compared to 2018). (*ibid.* 28)

Slovenia's export market share increased by 4.7 pps back in 2018. This increase is expected to continue, for both goods and services, also supported by the relatively stable growth in Slovenia's destination markets. (*ibid.* 8)

In 2019, Slovenia's inflation reached 1,7 %, markedly higher than the inflation rate of 1,2 % in the euro area. Main driver of this growth were the prices of services. Price increases, particularly in services, reflect also recent wage increases. For the coming years, it is expected that inflation will remain close to 2,0 %, somewhat above the euro area inflation rate. (*ibid.*)

Slovenia ranks in the middle of EU countries for digital public services. A wide range of basic online services for businesses is available in Slovenia (80% of such services are online). (*ibid.* 37)

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Slovenia has taken measures to reduce the costs of compliance with regulations, in particular by promoting e-procedures and e-services (*ibid.* 4).

Western Slovenia scores better than the Eastern region across several economic and social indicators, which includes employment in high-technology sectors and knowledge-intensive services. Both employment in high-tech and knowledge-intensive services sectors are concentrated in the Western region. (*ibid.* 34)

Main challenges and needs regarding industrial service excellence

5 interviewed Slovenian advanced manufacturing companies pointed out the following key challenges regarding service excellence (ProsperAMnet 2020b): lack of skilled employees, population aging, Slovenian business environment not being in favour of industry and not stimulating new investments, obsolescence and non-flexibility of labour legislation, bureaucratized procedures.

For the purposes of service export (entering a new foreign market/region with one's own services), these companies would require the following information about the targeted region/market: administration/legislation, sufficiency of skilled local workforce, available technology, language issues, sales forecasts, customers' financial discipline, main potential competitors, structure of production, development of specific industries/businesses, materials and technologies used in production, what new products could be produced with one's own equipment/processes, what equipment or technologies are required for the production of new products. In general, interviewed companies are also interested or highly interested in all of the information categories that have been proposed by ProsperAMnet project partners in developing a Radar for the companies: local competitors to one's own product, free service suppliers, industrial landscape (branches, company structure), hourly rate of technicians, security information, network infrastructure, educational system, regulations/law, cultural information, travel information (Visa modalities, hotel availability) and financial rating. (*ibid.*)

Some of the interviewed companies are already globally positioned regarding their services, while others would want to export their services to Europe, Australia, Canada and Brasil. The types of services they want to export include pre-sale services (e.g. demonstration at trade fairs, company visits by potential customers, cooperation and finding solutions with sales people and technical team), product support services (e.g. warranty, customer consulting, testing) and R&D services (e.g. cooperation with development team, prototype design & development). (*ibid.*)

According to the interviewed Slovenia's ProsperAMnet regional associated partner (ProsperAMnet 2020a), there is a very minor support for the development of services in Slovenia by business support organizations and politics (exceptions include projects by Slovenian Research Agency and projects provided by Ministry of Economic Development and Technology).

Service-Performance leaders in the field of machinery and equipment production are presently not included in some of the Slovenian Strategic Research and Innovation Partnerships (SRIPs) and therefore need to be included in the future. They also need to establish better cooperation with international associations.

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Service awareness actions in Slovenia include workshops organized by different government bodies as well as institutes when it comes to the specific technical topics.

Slovenian service exporting companies want support and help in terms of start-up capital, establishment of pilot centres, financing of highly educated researchers, co-financing of basic and applied research projects, better state support in terms of environmental protection and laws (not just putting new laws in place but to discuss their implementation and their impact on industry and business). When aiming to increase service performance (service excellence), companies usually ask business support organizations for special skills training, good practices and guidelines for improvement.

In the future, companies (and business support organizations) will require information, data, analyses and tools in terms of handling big data, data security and data correlation/prediction, including data from the very beginning of production to properties and customer feedback.

Finally, industrial service excellence is strongly linked to innovation and Slovenia's key weaknesses regarding innovation are the following (SVRK 2017, 5):

- Weak R&D departments in firms.
- Insufficient and too weak cooperation between (a) knowledge institutions and industry, (b) among firms themselves, (c) among knowledge institutions themselves.
- Systemic (non)incentives in the framework of knowledge institutions (career systems and mobility, habilitation procedures, ...).
- Partiality and incompleteness of supportive environment and of developmental incentives that (a) do not address systematically development cycle as a whole (through technological levels), (b) that are excessively fragmented regarding their content, (c) that do not encompass entire support and (d) that are timely unpredictable and unstable.
- Fragmentation of supportive institutions that do not have sufficient critical mass.
- Orientation towards development of products on the basis of technology development (push factor) with too little emphasis on development of services/experience (pull factor).
- Insufficiently exploited potential of cultural and creative industries.

Industrial service excellence of Slovenian Advanced Manufacturing companies²

In the framework of ProsperAMnet project (Interreg Central Europe), Industrial Service Excellence Monitor³ was applied in 20 selected Slovenian Advanced Manufacturing companies⁴ which were analysed according to 12 dimensions of industrial service excellence

² This chapter is based on the following sources: ProsperAMnet 2020c, 2020d, 2020e.

³ Services are extremely important for the success of manufacturing companies. In order to be successful in the service business, various areas have to be adapted and the continuous measurement of the own development is indispensable. The ISE-monitor provides a detailed analysis of the current status of the service business of a company as well as comparison with other companies.

⁴ Participating companies were from the entire country Slovenia. Less than 5 % of Slovenian companies could have been included in the project (monitor usage). Home markets of participating AMs are

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and performance indicators included in these dimensions. Average scores of these dimensions and performance indicators therein were then compared to benchmark values⁵ that were computed on the basis of 379 companies from Austria, Germany, Czech Republic, Italy, Slovenia, Slovakia and Hungary. Analysis was based on companies' self-assessment on a scale from 1 (= totally disagree) to 7 (= totally agree). In praxis, score 7 represents the best mark.

In the following, key findings from this analysis are presented (that refer to Slovenian advanced manufacturers, hereafter AMs), according to specific 12 dimensions of industrial service excellence⁶.

Partnership with customers

Slovenian AMs ranked 1st in this dimension on average among AMs from all 7 participating countries. Slovenian AMs visibly exceeded benchmark value (5,69) for this dimension on average. They scored highest (6,6) in the indicator *We see the relationship with this service customer as a long-term partnership* and lowest (5,6) in the indicator *We know the business and the needs of our service customer* on average.

Network capabilities

Slovenian AMs ranked only fourth in this dimension on average among AMs from all 7 participating countries. Slovenian AMs only slightly exceeded benchmark value (4,64) for this dimension on average. They scored highest (5,40) in the indicator *We have the ability to build good personal relationships with service partners* and lowest (3,90) in the indicator *We have a contract that regulates responsibilities and defines how the risks are shared with our service partners* on average.

Corporate culture

Slovenian AMs ranked 2nd in this dimension on average among AMs from all 7 participating countries. Slovenian AMs somewhat exceeded benchmark value (5,37) for this dimension on average. They scored highest (6,40) in the indicator *Serving the customer is one of the main goals of our employees* and lowest (4,50) in the indicator *Our employees are regularly trained on how to offer better service to our customer* on average.

Organizational structure

mostly Germany, Austria, Italy, France and Croatia. They have a very high percentage of product export, but not services. Servitization among Slovenian industrial companies is fairly developed.

⁵ Data weighting according to equal distribution across countries.

⁶ Service excellence means that services are offered to the customer in high quality, that the customer is more than satisfied with the solution and that the service is competitive, that is better than those of the competitors. Further, processes and structures within the company support efficient and flexible provision of the services and all departments work together towards better services.

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Slovenian AMs ranked only fourth in this dimension on average among AMs from all 7 participating countries. Slovenian AMs slightly exceeded benchmark value (4,83) for this dimension on average. They scored highest (5,90) in the indicator *Product and service divisions work together cooperatively* and lowest (3,90) in the indicator *Service and product business are organized as separate units* on average.

Pricing of services

Slovenian AMs ranked 2nd in this dimension on average among AMs from all 7 participating countries. Slovenian AMs visibly exceeded benchmark value (5,04) for this dimension on average. They scored highest (5,70) in the indicator *Not only do our prices for services account for costs, but also for market prices and monetary value for the customer* and lowest (5,00) in the indicator *The pricing of our services helps us to achieve our aims in the service business* on average.

Sales capabilities for services

Slovenian AMs ranked 2nd in this dimension on average among AMs from all 7 participating countries. Slovenian AMs somewhat exceeded benchmark value (5,23) for this dimension on average. They scored highest (6,10) in the indicator *Our salespeople have extensive technical know-how* and lowest (5,00) in the indicator *Our service employees use their contact with the customer to sell additional products and services* on average.

Management and strategy

Slovenian AMs ranked 3rd in this dimension on average among AMs from all 7 participating countries. Slovenian AMs somewhat exceeded benchmark value (5,01) for this dimension on average. They scored highest (6,00) in the indicator *Our management supports service employees for solving customer problems* and lowest (4,60) in the indicator *We have a clearly defined service strategy* on average.

Risk assessment & key performance indicators for services

Slovenian AMs ranked 3rd in this dimension on average among AMs from all 7 participating countries. Slovenian AMs only slightly exceeded benchmark value (4,10) for this dimension on average. They scored highest (4,80) in the indicator *We measure the profitability of specific services* and lowest (3,80) in the indicator *Specific steps have been taken in our company to manage the risks in the service sector* on average.

Service processes

Slovenian AMs ranked only fifth in this dimension on average among AMs from all 7 participating countries. Slovenian AMs scored slightly below benchmark value (4,59) for this dimension on average. They scored highest (5,00) in the indicator *Processes across different*

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departments work well in our company and lowest (4,10) in the indicator *We have clearly defined instructions concerning how services should be executed (cf scripts, manuals)* on average.

Individualisation and standardisation

Slovenian AMs ranked 3rd in this dimension on average among AMs from all 7 participating countries. Slovenian AMs somewhat exceeded benchmark value (5,00) for this dimension on average. They scored highest (6,00) in the indicator *Customized solutions are sold at a higher price, as they are more cost intensive* and lowest (4,40) in the indicators *If possible we offer standardized service modules that can be combined individually* and *If possible, our services are standardized to reduce costs* on average.

Assessment of service quality

Slovenian AMs ranked 3rd in this dimension on average among AMs from all 7 participating countries. Slovenian AMs somewhat exceeded benchmark value (4,59) for this dimension on average. They scored highest (5,20) in the indicator *Customer feedback is used to generate concrete actions for improving the service quality* and lowest (4,40) in the indicator *We regularly measure how satisfied the customers are with our services* on average.

Service innovation

Slovenian AMs ranked 2nd in this dimension on average among AMs from all 7 participating countries. Slovenian AMs considerably exceeded benchmark value (4,26) for this dimension on average. They scored highest (5,00) in the indicators *Selected customers are actively involved in the development of new services* and *Different departments work together to develop new services* and lowest (4,40) in the indicator *Our company uses formalized processes for all new service development projects* on average.

Regarding Performance indicators, 20 Slovenian AMs scored somewhat below benchmark value (5,20) for service excellence on average, somewhat below benchmark value (5,21) for financial performance on average, somewhat above benchmark value (5,47) for non-financial performance and only slightly below benchmark value (5,47) for service as enabler.

In Slovenia, similarly to other participating countries in general, main challenges are risk assessment & key performance indicators for services, as well as network capabilities. Strengths of Slovenian AMs are mainly partnership with customers and corporate culture. In general, services as enabler and non-financial performance show higher values than financial performance. This shows that it is easier for companies to profit from the service business indirectly.

Vision for Service Export excellence

Predominantly based on Slovenian regional challenges and needs as outlined in the previous chapter, we present here a somewhat longer formulation of a possible vision for Slovenian service export excellence.

Slovenia's ambition is to increase its innovation performance substantially and thus become a *strong innovator* (with innovation performance above or close to the EU average). More specifically, Slovenia aims to substantially increase knowledge-intensive services exports and opportunity-driven entrepreneurship in the next 5 years in order to converge much more closely to the EU average.

It shall continue to increase labour productivity in services and its export market share of services. Also, it shall keep and strengthen its rank among EU countries regarding digital public services.

Slovenian advanced manufacturing companies shall either keep and strengthen their global position regarding service exports or expand their services to Europe as a whole and other continents. Slovenia's ambition is not only to be a provider of pre-sale services to other countries, but also to include other types of services in service export (expand the portfolio of exported services). Advanced manufacturing companies shall increase their awareness of service importance and make different types of services as one of priorities in their product portfolio. These companies shall become recognized and valued for their service excellence with strong financial and non-financial performance in services (visibly above EU average).

Slovenia's supporting business environment shall move more closely towards the environment that is perceived by industrial firms as favourable to growth and development of their (exported) services (sufficient base of skilled employees, stimulating new investment, increased support for the development of services, flexible labour legislation, fast and easy-to-understand procedures).

Actions to address the regional challenges

The main goal of the proposed activities outlined in this chapter is to increase service innovation and service excellence in Slovenian companies.⁷

Generally, the tools used to foster service innovation are adaptations of well-known instruments⁸, or highly specialised tools directed at specific industries (e.g. software) (Wied 2015, 12).

The obvious question is, how to implement servitization into daily business praxis. In this subchapter, we will present key activities which could lead to optimal servitization.

Common activities

- Establish conditions for sustainable development.
- Enhance innovation capacity and apply open innovation concept.
- Enhance cooperation with universities and R&D institutions and support development of servitization oriented solutions - cooperation can enhance number of breakthrough innovations compared to incremental innovations, which are developed in-house (in company by their own employees). Here are some evidence-based data for Slovenia (Bučar 2014) presenting suggested concrete activities for companies:
 - A competent R&D unit in a firm, with a good understanding of the potential of theoretical advancements for practical purposes and a good knowledge of the complexity of production process and its economics is the main factor in establishing mutual understanding between science and industry.
 - The objectives and targets of science-industry cooperation should primarily be formulated and set by the industry side.
 - Within this context, partners must come to a clear understanding of each other's objectives and goals.

⁷ At a general level, European government ministries and agencies are increasingly becoming aware of the importance of service innovation. However, the development of service innovation support is uneven across the countries and there is a wide variety of policy instruments in use. It is also important to note that completely new policy instruments to support service innovation are rare. (Kuusisto & Lahtinen 2015, 2 & 6)

⁸ Innovation in services may not require a brand-new set of specialized tools. Innovation in services may well be promoted by using existing tools that have been adapted to include a services dimension. In promoting service innovation, many European cluster initiatives employ a very wide range of tools directed at almost all parts of the value chain, including conception; IPR; entrepreneurship; finance; commercialization; public-private partnerships; growth; employment; internationalization and fundraising. Thus, a very significant portion of the general business policy 'toolbox' is being deployed under the heading of service innovation. Fostering cross-sectoral collaboration, including between manufacturing and services sectors, is also an important way that has the potential to add value to cluster firms through service innovation. (Wied 2015)

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- Objectives of each side need to be recognised and respected by the other side. Joint work should be designed in way that both sides meet their objectives. Only in such way both sides benefit.
- Enhance networking and strategic alliances at national and international level.
- Enhance informing activities for manufacturing companies related to potential of servitization.
- Development of national supporting mechanisms & avoiding overlapping among different supporting organisations/programmes.

Horizontal activities

- Implementation of new technologies, e.g.:
 - Internet of Things (IoT), 5G and blockchain technology
 - Development/integration of artificial intelligence solutions
 - Digitalisation of the whole servitization value chain
 - Stronger involvement of data-based decisions
- Development of competences of employees:
 - Enhance institutional capacity incl. trainings, peer reviews and staff exchanges clearly focused into servitization efficient development (SMeART 2019)
 - Development of servitization related study programmes at universities
 - Development of open access training capacities
 - Development of customised training programmes and coaching capacities

Regional support instruments at the company level

- **Design innovation clinics** (offered by a public innovation agency or by a private knowledge-intensive service provider such as a business consultancy: innovation-related analyses and advice in a condensed period of time with the objective of making business models, products and services more user-friendly and outlining new routes to market).
- **Innovation vouchers** (public innovation agencies grant companies or other public organizations a voucher which they can then spend to obtain certain predefined external innovation services: recipients of the voucher as well as the providers are nudged towards more collaboration and - ideally - new or improved products or services will be developed).
- **Innovation management coaching and training** (innovation agencies can provide benchmarking, coaching and training to SMEs to develop and improve their innovation management: this can be done through various advisory services provided by external service providers as well as by enabling companies to assess their performance and compare it with those of peer enterprises).
- **Facilitating access to finance** (The public sector can promote the development of a financial environment that is favourable to service innovation by offering

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investment readiness support to these companies, i.e. help for writing adequate business plans, by facilitating networking with public and private investors as well as by establishing publicly supported investment instruments for existing and emerging industries driven by service innovation).

- **Service incubation centres** (e.g. evaluating existing service models, identifying new demand and new markets for non-existing services, redesigning flows of information and capital around the supply chain, designing and testing new service concepts and identifying new routes to market for businesses). (European Commission 2012, 23-29)

Regional support instruments at the sectoral, business environment level

- **Design centres** (promote and raise awareness regarding the contribution of design to business success as well as to wider societal progress: design centres can work with business leaders to integrate design thinking into their strategies, and promote design as an innovative sector to local and regional policy makers).
- **Living Labs** (encourage all innovation stakeholders to collaborate in research and development activities and to test ideas, products and services at an early stage of their development: the aim is to make final solutions more market-oriented, sustainable and user-friendly).⁹
- **Innovation assistants** (employees that facilitate innovation by providing input and changing projects in companies; many regions across Europe use Structural Funds to help individual companies to hire graduates as well as young researchers to conduct in-house R&D, implement innovative projects and thereby help increase the sustainability of these businesses and create jobs at the same time - by paying a share of employment and social security costs over a defined period of time and offering coaching, training as well as guidance, such programmes significantly support the innovation capacity of participant companies). (European Commission 2012, 29-32)

Use of EU projects and programmes

- Companies can fruitfully use national (e.g. ARRS tenders for research applied projects, SRIP - Strategic research and innovation partnership) and EU instruments for development of servitization.
- Enhance national/regional information activities related to national and EU tenders and support at project proposal preparation.

Servitization specific solutions

⁹ Due to a strong focus on end users and applications, the results of Living Labs are often improved services or service innovations. Furthermore, Living Labs have a spatial dimension as they usually serve and test the application of products and services in their proximity and, therefore, are often supported by local or regional authorities. A Living Lab may focus on a specific theme or industry.

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- Development of solutions, e.g. integrated platform solutions, data-driven services.
- Turning service departments into profit centres instead of cost centres (SMeART 2019).
- Development of service innovation which requires customer involvement and solution co-creation.

In Slovenian clusters (or SRIPs), following the developmental chain from conception to realisation, it is possible to (further) implement some new, or newly adapted, tools to promote service innovation:

- **Novel network themes** (e.g. for conception and partnering) which are specific to innovation in services.
- **Facilitating access to finance** for developing services (e.g. offering advice on, or help in, raising money from public and private sources for innovation in services, online project brokering in which innovators can find partners and funding sources of special relevance to services).
- **Service-related R&D** (promoting the initialisation of R&D projects in service-related fields that do not fall under traditional product R&D, e.g. software, multimedia and finance).
- **Extended IPR facilitation** (e.g. help with, and facilitation of, IPR for service innovators such as trademarks and commercial names and author and software copyrights, internet domains and data protection).
- **Service regulation issues** (e.g. advice, guidance and expertise on regulatory issues closely related to services).

Potential impacts

The findings based on research in 2,503 Slovenian companies showed higher innovation expenditure productivity in the group of innovation leaders; each euro invested in innovation yields EUR 13.90, but just EUR 7.70 in the group of Followers. ROE is 40 % higher in Leaders (Likar et al. 2014a). This result shows that innovation pays off. But if we focus into service sector, the situation is even more interesting. Companies generate as much as three quarters of all revenues of service companies, while for each euro invested in innovation it generates as much as EUR 50 in revenues, which is several times more than for manufacturing companies (Likar et al. 2014b). The results clearly show that service sector in Slovenia has a great potential for innovations and consequent business results. Applying the servitization concept, also manufacturing companies can incorporate service concept and potential benefits into their business portfolio.¹⁰

¹⁰ For more on service innovation and economic performance, see Zenker et al. 2015.

Up- and Crosslink to RIS 3 Strategies

Service excellence is directly embedded into Slovenian RIS 3 strategy. Namely, RIS 3 is strategically oriented towards *sustainable technologies and services for healthy living* which shall position Slovenia as green, active, healthy and digital region with excellent conditions for creating and innovation, directed into development of *middle- and high-tech solutions in niche areas*. In these priority niche areas, Slovenia shall transition from follower to *co-creator of global trends*.

By 2023, performance of RIS 3 strategy implementation will be measured by:

1. Increased share of high-tech intensive products in export → increase to the average level of EU 15;
2. **Increased share of knowledge-intensive services export in total export** → increase to the average level of EU;
3. Increase in total entrepreneurial activity to at least the level of EU average.

In the following, specific priority niche areas from Slovenian RIS 3 are presented where innovative and competitive middle- and high-tech solutions are expected to be (further) developed and where service excellence will be one of the main drivers for the success of RIS 3 implementation. Also, in some of these specific focus areas, potential service export markets for Slovenian (advanced) manufacturers are listed.

Healthy living and working environment

This priority area combines application areas that require systemic solutions, i.e. integrating process technologies with end products and services. They require intensive investments into R&D as well as intensive integration of stakeholders (cooperation between stakeholders that introduce solutions to the market is equally important as cooperation between science and industry).

Smart cities and communities

Key focus areas are:

- open systemic solutions (IT platforms as ecosystems for hosting applications),
- conversion, distribution and management of energy.

Key technologies are:

- cloud computing, open and big data,
- internet of things, internet of the future,
- embedded smart systems,

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- HPC infrastructure,
- data collection and application of Earth's surface remote observations.

Slovenia's comparative advantage is in supply of comparatively inexpensive yet technologically superior solutions (e.g. higher energy savings, new technological solutions) for systems in smart communities. Its comparative advantage is also in the cultural and creative sector which is developing faster than other parts of the national economy. Slovenian firms have established numerous global connections on European, Asian and US markets, including with leading global IT companies. Slovenia is also a full member of European Space Agency which shall provide new stimulus for Slovenian SMEs (numerous projects already approved and confirmed).

Smart buildings and home with wood chain

A key goal here is to increase companies' export by 25 % until 2023.

Key focus areas and technologies are:

- advanced residential units,
- smartly built environment with intelligent systems of building management,
- smart devices,
- advanced construction materials and products, including wood and wood composites.

In the field of smart equipment and home appliances, there is a considerable concentration of capabilities and potentials in Slovenia which are then reflected also in stable export comparative advantages.

Special emphasis in this application area is wood. Slovenia is exporting a considerable amount of wood; however, this is mainly in form of different types of untreated wood. Therefore, wood needs to be actively supported as part of products and services which would then be successfully marketed by Slovenian firms (there are already few examples of this).

Here, great development opportunity is represented by investments in renovation of the building fund (including cultural heritage), energy efficiency and use of renewable resources.

Stakeholders have rich and lasting experiences in the field of international research and development cooperation by means of framework programs (FP6, FP7), COST program, international technological platforms, clusters and networks.

Natural and traditional resources for the future

This priority area integrates application areas that refer to usage of natural and traditional resources (e.g. cultural heritage, crafts etc.). In these areas, a larger number of stakeholders are active, normally without a dominant actor. For ensuring progress, it is decisive to connect different individual production phases into a whole chain or network.

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Networks for transitioning into circular economy

Key focus areas and technologies are:

- technologies for biomass processing and development of new biological materials,
- technologies for usage of secondary raw materials and re-use of waste,
- energy acquisition from alternative resources.

Implementing the industry symbiosis model represents a development opportunity not only for chemical industry, which is one of the most competitive ones in Slovenia, but also for an array of traditional industries, such as paper, wood and textile industry, agriculture and food-processing industry as well as services.

Market potential of sustainable energy acquisition, especially solar and wind energy, is rising steeply. Systems for co-production of heat and electricity, which can use an array of different raw materials, also show pronounced anticipated growth. Slovenia will focus on market segments where companies are already present on global markets or have a real potential for breakthrough onto global markets. In the field of sustainable energy acquisition, there already exists an established cooperation among companies as well as research institutions which will be upgraded in the future with the goal of maintaining highest level of quality and especially with the goal of integrating the whole systems where it is possible to achieve higher value added of products in business-to-customer business model.

Sustainable food production

Key focus areas and technologies are:

- sustainable production and processing of food products into functional foods,
- technologies for sustainable plant and animal production.

From the viewpoint of natural resources, Slovenia has great potential for beef production in line with the model of sustainable extensification. There are ideal primary production resources with simultaneous ensuring of sustainable management of natural habitats. Similarly, functional foods represent a great market opportunity for development of the whole food-processing industry together with supply chain and all local suppliers that provide process solutions in production.

Across Europe, there is an established network of partners with whom cooperation will be even more strengthened in the future (stakeholders from France, Greece, Germany, Austria, Italy, The Netherlands, Spain, Czech Republic and Belgium).

Sustainable tourism

A key goal here is to increase revenues from travels export by 4-6 % annually until 2023.

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Key focus areas and technologies are:

- IT supported marketing and networking with the design of innovative, integrated and sustainable tourist products and services in line with upcoming needs,
- knowledge for raising quality of service → service design, innovative management, process innovations, branding of basic (catering) and thematic tourist products while considering internationally established brands, and qualification,
- technological solutions for sustainable use of resources in accommodation capacities → in connection with activities in the field of smart buildings,
- green scheme of Slovenian tourism → systematic approach in connecting, directing and developing sustainable and integrated solutions on destination and local level.

Tourism is a very important export activity that accounts for more than 8 % of total export and more than 40 % of services export in Slovenia's current account. Existing trends in tourism are moving in the direction of high-quality sustainable tourism for demanding customers, also in connection with well-preserved nature and rich cultural heritage (natural and cultural tourism). In this regards, Slovenia is already recognized in Europe as one of the countries with the greatest plant and animal biodiversity, it has a great share of areas the belong to the Natura 2000, it has rich and diverse cultural heritage and developed potentials of cultural supply, from exhibitions to concerts and festivals. This type of wealth represents a great potential for developing high-quality eco-tourism. These activities can also be a platform for horizontal connections with development of innovative green technologies and complements superbly with guidelines in the field of sustainable foods.

Stakeholders are already strongly internationally connected with research organizations as well as international tourist companies and operators. Green scheme of Slovenian tourism is embedded into the framework of sustainable tourism on a global level.

Industry 4.0

This priority area combines application areas on which there is normally a dominant actor or a group of strong actors that often also has an established cooperation with scientific sphere, yet where there are opportunities that are not exploited from the view of:

- greater strategic connectedness of strong actors from private sector with the purpose of supplying more integrated solutions and consequentially joint market presence,
- strengthened connectedness with research organizations in product development in line with upcoming needs mid- and long-term,
- stronger connectedness with SMEs in the sense of strengthening not only supply networks, but also creating development networks,
- stimulating creation of new product directions by means of stimulating creation of new companies,

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- modernization and digitalization of product processes and management of the whole production cycle.

Factories of the Future

This is a profoundly integrating and horizontal area where there is a strongly expressed interest from users as well as from suppliers of smart factory technologies.

Key focus areas are:

- production optimization: (distributed) systems of steering and control, quality assurance, data regulations and processing, intra-logistics, automatization,
- optimization and automatization of production processes: smart machines and devices, mechatronic systems, actuators and smart sensors.

Key technologies are:

- robotics,
- nanotechnologies,
- modern production technologies for materials,
- plasma technologies,
- photonics with micro- and nano-electronics
- steering technologies

In the field of machines and devices production, FIDEA study from 2014 showed a great (still unexploited) export and research potential. There are already established connections with related clusters from Central European countries (Austria, Poland, Czech Republic, Slovakia, Hungary) and Balkans (Croatia, Serbia, Romania, Bulgaria), which will be the basis for cooperation, especially in the framework of territorial cooperation projects.

Health - Medicine

A key goal here is to increase companies' export by more than 30 % until 2023.

Key focus areas and technologies are:

- biopharmaceutics,
- translation medicine: diagnostics and therapeutics,
- cancer treatment - diagnostics and therapy,
- resistant bacteria,
- drugs of natural origin and natural cosmetics.

FIDEA study in 2014 showed that in production of medicine instruments, devices and tools, there was an unexploited export potential. This is a very dynamic, promising field with great

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potentials, where SMEs predominate. Between 2008-2012, export growth was 25,8 % in this field and where companies are very active in international cooperation.

Also, data show that production of soaps and washing agents, fragrances and toilet agents is a promising field with high export dynamics.

Slovenian companies and research institutions have established direct connections with leading global producers in the field of medicine.

Mobility

Key focus areas and technologies are:

- niche components in systems for internal combustion motors,
- systems for e-mobility and energy storage,
- systems and components for safety and comfort (interior and exterior equipment),
- materials for automobile industry.

This is one of the key production areas for Slovenian economy (it creates roughly 10 % of GDP). Between 2008-2012, export growth was more than 27 % in the field of production of parts and equipment for motor vehicles.

On one hand, Slovenian suppliers face high pressures regarding (lowering) prices, while on the other hand, they face high demands regarding quality of their solutions. Production of motor vehicles and trailers has below average technological intensity compared to leading countries which represents a priority for upcoming years.

For the future success of Slovenian automobile supply industry, it is necessary to achieve either a higher position in supply chain (1st level supplier) that ensures direct supply to vehicle producers, or to achieve niche products and technologies (pre-development supplier) that are appropriately protected by patents and which will enable supply of exclusive products to global vehicle producers.

Slovenian companies have established intensive cooperation with industrial and research-scientific partners from European countries in joint market projects or joint research projects, financed by EU programs.

Development of materials as end products

A key goal here is to increase export in the field of smart coatings by 20 % and in the field of smart multi-component materials by 10 % until 2023.

Key focus areas and technologies are:

- sustainable technologies in processing of metals and alloys,
- smart multi-component materials and coatings.

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In the field of metal production, Slovenia is comparable to leading European countries with respect to technological intensity. FIDEA study in 2014 showed that prices of numerous products from iron, steel or aluminum reach or even exceed prices from most successful European producers. This branch is also embedded in numerous international supply chains. It is oriented into development of advanced metal materials for demanding and complex applications, while following trends of transitioning to circular economy.

Between 2008-2012, there was a dynamic export growth in the field of smart multi-component materials and coatings, where Slovenia has great potential. It is anticipated that the global market for smart coatings will continue to grow substantially and Slovenian companies are strong in this field.

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